

State Agriculture Plan and State Infrastructure Development Plan (SAP & SIDP)

(2017-18 to 2019-20) GUJARAT



**Department of Agriculture, Farmers Welfare and
Co-operation
Government of Gujarat, Gandhinagar**

**STATE AGRICULTURE PLAN
AND
STATE INFRASTRUCTURE DEVELOPMENT PLAN
(SAP & SIDP)
(2017-18 to 2019-20)
GUJARAT**

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LIST OF ACRONYMS

Sr No	Abbreviated Form	Full Form
1	AAS	Atomic Absorption Spectrophotometer
2	AAU	Anand Agriculture University
3	A.H.	Animal Husbandry
4	AES	Agro Ecological Situation
5	AES	Advanced Encryption Standard
6	AFIS	Advance Fibre Information System
7	AGMARK net	Agricultural Marketing Network
8	Agril	Agricultural
9	AI	Artificial Insemination
10	AICCIP	All India Coordinated Cotton Improvement Project
11	AICPMIP	All India Coordinated Millet Improvement Project
12	AICRP	All India Coordinated Research Projects
13	AMCs	Automated Milk Collection Centres
14	APEDA	Agricultural Produce Export Development Authority
15	APMC	Agricultural Produce Marketing Committee
16	AS	Ammonium Sulphate
17	ATMA	Agriculture Technology Management Agency
18	AWS	Automatic Weather Stations
19	BCL	Bio Control Laboratory
20	BISAG	<i>Bhaskaracharya</i> Institute for Space Application and Geo-Informatics
21	BLB	Bacterial Leaf Blight
22	BOD	Biological Oxygen Demand
23	CA	Controlled Atmosphere
24	CARI	Central Avian Research Institute
25	CBG	Compressed Bio Gas
26	C-DAPs	Comprehensive District Agriculture Plan
27	CIFA	Central Institute of Freshwater Aquaculture
28	CIFRI	Central Inland Fisheries Research Institute
29	CIFT	Central Institute of Fisheries Technology
30	CRS	Community Radio Station
31	CWC	Central Warehousing Corporation
32	DAG	Director of Agriculture
33	DAO	District Agriculture Officer
34	DAP	District Agriculture Plan
35	DAP	Di-Ammonium Phosphate
36	DDA	District Development Agency
37	DHO	District Health Officer
38	DNA	Deoxyribo Nucleic Acid
39	DOA	Directorate of Agriculture
40	DRDA	District Rural Development Agency
41	DSM	Demand Side Management
42	EC	Effective Concentration, Electrical Conductivity
43	EEL	Extension Education Institute
44	EEZ	Exclusive Economic Zone
45	ELISA	Enzyme-Linked Immunosorbent Assay
46	Ext.	Extension
47	FAI	Fertilizer Association of India

Sr No	Abbreviated Form	Full Form
48	FAOSTATE	Food And Agriculture Organization Statistical Databases
49	FCO	Fertilizers Control Order
50	Fe	Iron
51	FFDA	Fish Farmer Development Agency
52	FFS	Farmers Field School
53	FG	Farmers Group
54	FGR	Forest Genetic Resources
55	FIAC	Farm Information Advisory Centre
56	FIG	Farmer Interest Group
57	FLDs	Front Line Demonstration
58	FRA	Forest Right Act, Farmers Right Act
59	FRP	Fibre glass Reinforced Plastic
60	FTC	Farmers Training Centres
61	FY	Five Years
62	FYM	Farm Yard Manure
63	FYP	Five Year Plan
64	GAU	Gujarat Agricultural University
65	GDP	Gross Domestic Product
66	GEDA	Gujarat Energy Development Agency
67	GFDP	Gujarat Forestry Development Project
68	GGRC	Gujarat Green Revolution Company
69	GHG	Green House Gas
70	GI	Geographical Indication
71	GIR	Geographical Indication Registration
72	GIS	Geographical Indication system
73	GIS	Geographic Information Systems
74	GM cotton	Genetically Modified Cotton
75	GM crops	Genetically Modified Crops
76	GMS Cotton	Grams per Square Meter cotton
77	GoG	Government of Gujarat
78	GPS	Global Positioning System
79	GSDP	Gujarat State Domestic Product
80	GSWAN	Gujarat State Wide Area Network
81	GSWDC	Gujarat State Wool Development Corporation
82	GVC	Gujarat Veterinary Council
83	HACCP	Hazard Analysis and Critical Control Print
84	HDP	High Density Planting
85	HDPS	High Density Planting System
86	HPS	Hydraulic Power System
87	HVI	High Volume Instrument
88	HYV	High Yielding Variety
89	ICAR	Indian Council of Agriculture Research
90	ICM	Institute Of Commercial Management
91	BL	Blast
92	BPH	Brown Plant Hopper
93	GLH	Grassy Leaf Hopper
94	GM	Gall Midge
95	ICM	Integrated Crop Management
96	ICT	Information Communication Technology
97	IDM	Integrated Disease Management

Sr No	Abbreviated Form	Full Form
98	IFTC	Inland Fisheries Training Cum Demonstration Centre
99	IMC	Indian Major Carp
100	IMD	Indian Meteorological Department
101	INM	Integrated Nutrient Management
102	INRM	Integrated Natural Resources Management
103	IPCC	Intergovernmental Panel on Climate Change
104	IPDM	Integrated Pest And Disease Management
105	IPM	Integrated Pest Management
106	IRM	Integrated Resource Management
107	ISFR	India State of Forest Report
108	IWM	Integrated Weed Management
109	IWM	Integrated Water Management
110	JAU	Junagadh Agricultural University
111	KVK	Krishi Vigyan Kendra
112	LAN	Local Area Network
113	LBF	Liquid Bio Fertilizer
114	LCD	Liquid Crystal Display
115	LED	Light-Emitting Diode
116	LF	Leaf Folder
117	LOI	Letter of Intent
118	MA	Modified Atmosphere
119	MAN	Metropolitan Area Network
120	MIS	Micro Irrigation System
121	Misc.	Miscellaneous
122	MMRS	Multi-Mode Receiver System
123	MoP	Murate of Potash
124	MPEDA	Marine Products Export Development Authority
125	MSP	Minimum Support Price
126	MU	Mega Units
127	N. A. U.	Navasari Agricultural University
128	N:P:K	Nitrogen: Phosphorus: Potash
129	NA	Not Available
130	NABARD	National Bank for Agriculture and Rural Development
131	NADEP	N.D. Pandharipande (also popularly known as "Nadepkaka")
132	NDC	National Development Council
133	NFSM	National Food Security Mission
134	NGOs	Non Government Organizations
135	NRM	Natural Resources Management
136	NUE	Nitrogen Fertilizer Use Efficiency
137	PCR	Polymerase Chain Reaction
138	PERI	Poultry Extension and Research Institute
139	PHCL	Plant Health Clinical Laboratory
140	PHM	Post Harvest Management
141	PL	Post Larvae
142	POL	Petroleum, Oil and Lubrication
143	PPP	Public Private Partnership
144	PPV &FR	Protection of Plant Varieties and Farmers Rights
145	PRI	Primary Rate Interface
146	PRL	Pesticide Residue Laboratory
147	Prod.	Production

Sr No	Abbreviated Form	Full Form
148	PSB	Phosphorus Solubilizing Bacteria
149	QTL	Quantitative Trait Loci
150	R&D	Research And Development
151	RCTs	Resource Conservation Technologies
152	RES	Renewable Energy Sources
153	RKVY	<i>Rastriya Krishi Vikas Yojana</i>
154	RTV	Rice Tungro Virus
155	S.C.	Schedule Caste
156	S.T.	Schedule Tribe
157	SAP	State Agriculture Plan
158	SAUs	State Agriculture Universities
159	SB	Stem Borer
160	SDAU	Sardarkrushinagar Dantiwada Agricultural University
161	SHGs	Self Help Groups
162	SIDP	State Infrastructure Plan
163	SIRA	Sawant's Integrated Rice Agro Technology
164	SLSC	State Level Steering Committee
165	SMD	Sterility Mosaic Disease
166	SPV	Solar Photovoltaic
167	SRI	System of Rice Intensification
168	SRR	Seed Replacement Ratio
169	SSNM	Soil Solarization Nutrient Management
170	SSP	Single Super Phosphate
171	STLs	Soil Testing Laboratories
172	SWC	State Warehousing Corporation
173	SWC	Soil and Water Conservation
174	SWOT	Strength, Weakness, Opportunity, Threat
175	T & V	Training and Visit
176	TDO	Taluka Development Officer
177	TOF	Green Forest Cover
178	TSI	Technical Support Institute
179	TSP	Triple Super Phosphate
180	TUF	Textile Up-Gradation Fund
181	TV	Television
182	UV	Ultra Violet
183	VAM	Vascular Arbuscular Mycorrhizal fungi
184	VHT	Vapor Heat Treatment
185	VLAWS	Village Level Agriculture Worker
186	WAN	Wide Area Network
187	WBPH	White- Backed Plant Hopper
188	WHO	World Health Organization
189	WHS	Water Harvesting Structure
190	WM	Water Management
191	WTO	World Trade Organization
192	WUA	Water User Association
193	WUE	Water Use Efficiency
194	YMV	Yellow Mosaic Virus
195	Y	Yield
196	Zn	Zinc

List of Measurement Units

Sl. No.	Symbol	Full Form of Unit
1.	@	At the rate
2.	A	Area
3.	C	Degree in Celsius
4.	cfu	Colony forming units
5.	cm.	Centimetre
6.	ha	Hectare
7.	kg	Kilogram
8.	Kg/ha	Kilogram/hectare
9.	m.m ³	Metre/cubic metre
10.	Mha	Million hectare
11.	MW	Mega Watt
12.	Nos.	Numbers
13.	Nos/ha	Numbers/ hectare
14.	Lit/kg	Litres/kilogram
15.	m.m ³	Milliliter/cubic metre (volume)
16.	q/ha or Q/ha	Quintal/hectare
17.	Qtls.	Quintals
18.	Sq km	Square kilometre
19.	sq. m.	Square metre
20.	T	Tonne
21.	M ²	Square metre
22.	T/ha	Tonne/hectare
23.	Y, Yld.	Yield
24.	G, g	Gram
25.	hp	Horse power
26.	KVA	Kilo Volt Ampere
27.	KW	Kilowatt
28.	Kwh/m ²	Kilo watt.hours/squaremetre
29.	M ³	Cubic metre
30.	MW	Mega Watt
31.	No.	Numbers

STATE AGRICULTURE PLAN EXECUTIVE SUMMARY

Doubling Farmers' Income by 2022-23 has become the watchword of the current agricultural policy scenario in India. The Hon'ble Prime Minister of India, Shri. Narendrabhai Modi, envisioned this target on February 28, 2016 while addressing farmers in Bareilly district of Uttar Pradesh. The target year (i.e. 2022) has more special connotations since that happens to be the 75th year of the country's Independence. As the policy level deliberations of various stakeholders toward identifying farm income issues and affixing strategies have gathered steam all over the country, it is beyond doubt that the Hon'ble Prime Minister's vision has certainly made a paradigm shift in our thinking process from ensuring food security to addressing income security. There cannot be anyone questioning the need for doubling farmers' income. But how far it is possible to be achieved within the targeted five years remains the moot question. For the goal to be realized, it is estimated that an agricultural growth rate of 10.46 per cent is required,

The farm income sources are also well diversified as farmers derive sizeable incomes from both crop and animal sector. The state tops the charts in milk production as well. Fisheries sector has been identified as the sunrise sector and it is expected to contribute more to the farm income basket. Micro-Irrigation and Soil Health Card schemes are being well implemented in the State and the water conservation efforts through construction of over 1.25 lakh check dams and water distribution efforts through intra-state river linking have started paying dividends. In addition, Gujarat is both pioneer and leader in harnessing solar energy for irrigation purpose. Going by all this track record, it is no coincidence that the State proves to have high potential for doubling farmers' income.

Table : 1 Total Financial Outlay Proposed for 3 Years		(Rs. in Lakh)
❖ Total Financial Requirement Proposed for Development of all Sectors under SAP	(10412.07 Crore)	10,41,206.52
➤ Cereal Crop	: 53,857.83	
➤ Cash Crop	: 5,173.79	
➤ Oilseed Crops	: 23,174.40	
➤ Pulse Crops	: 10,598.00	
➤ Fruits, Vegetables, Spices and Agroforestry	: 47,458.83	
➤ Animal Husbandry, Fodder Production, Fishery and Dairy Science	: 87,793.17	
➤ Other Sectors	: 8,13,150.50	
❖ Total Financial Requirements for Various Projects (89 Nos.) Proposed under SIDP	(6376.24 Crore)	6,37,624

Accordingly, the present report has included a host of specific strategies that are expected to exploit the natural advantage of Gujarat and to tap the entrepreneurial spirit of the farmers along with making better use of farm sector and business friendly initiatives of both the State and Central Governments alike. These plans present the vision for agriculture and allied sectors. As per guidelines of RKVY, State Agriculture Plan (SAP) and State Infrastructure Development Plan (SIDP) need to be prepared, for which, State Level Steering Committee (SLSC) decided that SAP and SIDP should also be prepared by SAUs and the Vice Chancellor of Anand Agricultural University, Anand to act as a Nodal Officer. The financial outlay proposed is given in Table-1 on the previous page. The points considered in preparation of State Agriculture Plan and State Infrastructure Development Plan are discussed here.

Major Agricultural Issues and Areas of Focus:

The major part of the Gujarat falls under varying climatic as well as soil conditions and has been divided into eight agro-climatic zones. The major issues and areas to be focused in the plan are:

- i. Integrated development of crop varieties and cultivation practices for major cereals, food, cash, fruits, vegetables and spices crops.
- ii. Enhancement of soil health, integrated nutrient management, use of organic and bio-fertilizers and integrated pest management.
- iii. Initiatives like integrated watershed management, drainage, rainwater conservation, ground water recharge, use of MIS should be focused to alleviate the problems like inland salinity and alkalinity, seawater ingress and climatic aberrations.
- iv. Development of mechanization by introducing improved tractors, machines, implements, equipments and tools. Increasing use of renewable energy i.e. solar, wind and bio energy in agriculture.
- v. Enhancement of horticultural production, high density cultivation and popularization of micro-irrigation systems. Food processing and value addition of produce; cold storage, handling, packaging, transportation and marketing of perishable produce (fruits and vegetables).
- vi. Good local breeds of cattle (*Gir* and *Kankrej*) and Buffaloes (*Jaffrabadi*, *Surati* and *Mehsani*) are reared, but needs breed establishment. Proper clinical care of animals, increased fodder production and feed management for increasing milk production.
- vii. Modernization of marine fish processing units and quality control as per HACCP norms for accelerating export at sea ports. Development of cage culture of commercial marine fauna. Development of inland fisheries by utilizing salt affected land and water by introducing diversified fish and shrimp fauna.
- viii. Strengthening of market infrastructure and marketing development.
- ix. Strengthening of infrastructure to promote extension services for farmers.
- x. Innovative schemes.

Methodology Adopted for Preparation of Comprehensive District Agriculture Plans:

The C-DAPs were prepared adopting participatory appraisal mode. All four SAUs of Gujarat were identified as Technical Support Institutes (TSI) for their working area. The TSI, under the guidance of respective Director of Research and Director of Extension Education, provided all necessary technical help to planning units and support groups for preparation of these C-Daps through participatory bottom-up process. The TSI trained the Planning Units/ Groups in designing formats for data collection, guided in data collection, analysis and conducted regular workshops for plan preparation. In coordination with Scientists/ Professors from SAUs and officials from Department of Agriculture, Horticulture, Animal Husbandry and Fisheries, District Panchayat, DRDA, BISAG, NABARD, ATMA, GVCL, Dept. of Disaster Management, Department of Irrigation etc, the task was fulfilled. The Taluka wise information was collected.

Formulation of District Planning Unit:

To facilitate the involvement of local representatives in the preparation of plans, planning units in each district were formulated. The composition of the district planning units was as given below:

- a) Director of Research & Dean PG studies, Associate Directors of Research, Director of Extension Education, Associate Director of Extension Education, Deans of various Colleges and scientists of related discipline.
- b) Coordinating staff from Directorate of Research and Directorate Extension Education.
- c) Officials of Line Departments from Agriculture, Horticulture, Animal Husbandry, Fisheries, District Panchayat and DRDA.

Meetings with stakeholders for proposed design, trials, front line demonstration (FLDs) and other activities in a farming system approach were discussed. The group identified the farmers' needs and constraints and subsequent changes proposed in management practices. The time frame of various activities and expected outcomes of five year plans were incorporated.

An indicative outline for the preparation of C-DAP:

- 1: A brief introduction to the District, its location, features, etc.
- 2: Main points of SWOT analysis of the District
- 3: Areas/ Sectors which need to be addressed in the district
- 4: Various on- going programs in the district- a brief contextual gist
- 5: The District Plan at a Glance.

Methodology Adopted for Preparation of State Agriculture Plan:

In this regard, a meeting was convened at AAU, Anand in February, 2018, inviting Officers from Gujarat State line Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries, SAUs and *Kamdhenu* University. Looking to the requirement of various components of SAP and SIDP, total 36 committees were formed with a Convener from one SAU, Co-Convener from Line Departments of Gujarat state and two members from other SAUs. They were instructed to follow latest guidelines of RKVY for compilation of C-DAPs for their respective discipline. Few topics of common issues and infrastructure development were also identified for inclusion in SAP and SIDP. The necessary input provided by these committees were compiled and edited in various chapters which are summarized here.

Agricultural Scenario of Gujarat State:

Gujarat has geographical area of 19.6 Mha, out of which, 55.10 % is under agriculture land i.e.10.8 Mha. The major crops grown in the state are wheat, bajra, paddy, maize, groundnut, mustard, sesame, pigeon pea, green gram, gram, cotton and sugarcane. Bajra, paddy, maize, groundnut, castor, cotton, tobacco and pulses are the main *kharif* crops and wheat, mustard and rapeseeds are the main *rabi* crops grown in the state. The state has a wide range of cropping systems viz. Cotton-Wheat-Bajra, Mung-Wheat-Bajra, Cotton-Wheat-Mung, Cotton-Wheat, Groundnut- Wheat, Paddy-Wheat-Bajra, Paddy-Wheat etc.

Gujarat is the largest producer of castor, fennel, tobacco and *isabgul*(*psyllium*), whereas it is second largest producer of sesame seeds, cotton and groundnut in the country. Gujarat has highest productivity in mustard, castor and cotton also has second highest productivity in groundnut and bajra, and third highest productivity in gram and guar in the country. Horticultural Crops are grown in about 14.04 lakh ha. The major Crops are mango, banana, sapota, lime, guava, tomato, potato, onion, cumin, garlic, *isabgul* and fennel. In the country, Gujarat has highest productivity in guava, potato, onion, cumin and fennel and third highest productivity in banana and *isabgul*.

Cereals Crops:

Cereals are grown on one-third of the cultivated land of Gujarat. Rice occupies about 10.61 % of the gross cropped area of the State and accounts for around 25.5 % of the total food grain production. It is grown on an average about 7.5 to 8.5 lakh hectares of land comprising nearly 70 to 80% of the low land (Transplanted) and 15 to 20 % of Upland (Drilled) rice.

Wheat is grown on 0.9 – 1.6 M ha that comprises 23 % of the land used for cereals. The average wheat production and productivity in Gujarat was 38.12 lakh T (2011- 12 to 2016-17) and 29.96 and 30.16 q/ha respectively. The state has nearly 45.90 % of the area under irrigation, though the irrigated wheat comprises 94 % of the total area.

Pearl millet is a drought tolerant and thermo resilient cereal grown in the state. It is more tolerant of high temperatures than any other cereal. It is valued for both, its grain and stover due to high protein content, balanced amino acid profile, and high levels of iron, zinc and insoluble dietary fiber. It is popularly known as “Nutri food”. In Gujarat, *Bajra* is grown in 26 out of 33 districts covering an area of 1.7 lakh ha in *kharif* with an average productivity 1567 kg/ha and around 2.84 lakh ha area under summer cultivation with an average productivity of 2726 kg/ha. The total area of *Bajra* in the state is 4.54 lakh ha (2016-17) with an average productivity of 2292 kg/ha. Area during summer cultivation is increasing gradually due to a short period of time window available to the farmer after *rabi* crops, increased demand for fodder and suitable climatic condition. The cultivation of pearl millet during the summer might reduce the instability as the crop is grown under irrigated conditions, which gives higher yields and returns.

Maize is a staple food and fodder of tribal people of the eastern region of Gujarat and emerging as a raw material for maize-based industries, viz. starch, protein, oil, ethanol (bio-fuel), poultry and animal feed including specialty corns (quality protein maize, sweet corn, popcorn and baby corn). Maize accounts for a little more than half of the production of coarse cereals. Panchmahals, Dahod, Vadodara, Chhota Udaipur, Mahisagar, Sabarkantha, Aravali and Banaskantha are main districts where maize is grown in *kharif* / *rabi* season. The Gujarat state had grown maize in 5.00 lakhs hectare land with production

8.4 m.m. tons and 1800 kg/ha yield in 2016. It survives better and is resilient under climate change than paddy and wheat.

Sorghum is another important food and fodder crop of dryland agriculture and ranks third in area and production after rice and wheat in India. Though sorghum is known for its versatile use, hardiness, dependability, the stability of yield and adaptability over a wide range of climate, the edaphoclimatic conditions in the sorghum growing areas of the world limit the crop production. The crop accounts for nearly 52% of the area and 63% of production under millets with an area of 15.8 M ha and a production of 11.85 T. In Gujarat, sorghum is grown as grain crop in South Gujarat, dual purpose in North Gujarat, Kutchh, and Saurashtra while partly as fodder in dairy developed.

Other Crops like small millets comprising the small-seeded cereal crops namely Finger millet, Little millet, Kodo Millet, Foxtail millet, Banti and Cheena are grown in hilly areas of Gujarat. These small millets are the staple food especially of the tribal in Gujarat. Among them, they grow mostly Nagli (Ragi) and Vari (Little millet).

Oilseed Crops:

Oilseeds are important next to food grains in terms of area, production and value in the state. The major groundnut growing districts include Junagadh, Jamnagar, Rajkot, Amreli, Bhavnagar, Kachchh, Porbandar and Banaskantha. These eight districts altogether account for about 92.88 % of total area and 91.61% of the production of groundnut in Gujarat. In Gujarat, groundnut is cultivated mainly in *kharif* season (rain-fed conditions) with low inputs and if available, with protective irrigations. In *kharif*, the pressure of diseases, insect pests and weeds are high.

Sesame productivity in Gujarat (4.15 Q/ha) is close to the productivity at the national level (4.29 Q/ha), One of the reasons for low productivity is rainfall dependent growing conditions with low input management.

Soybean, as a new crop in the state, has been introduced in the recent past. Now the crop is under cultivation in selected pockets of south Gujarat and middle Gujarat. The area under soybean in the year 2015-16 was 0.803 lakh hectares accounting total production of 0.635 lakh tones with the productivity of 790 kg/ha. The area under this crop is increasing day by day and became almost double as compared to the year 2011-12 (0.421 lakh hectares) but productivity is low as compared to that of national level.

Castor is an important industrial non - edible oilseed crop of arid and semi-arid regions. Gujarat is leading state in castor production in the country with 0.8 M ha cultivated area, which is about 60 % of total castor area of India and total production of 1.7 T, which is about 80 % of total castor production of India. Castor oil is of much industrial use. India is a leading exporting country of castor oil and its derivatives of worth more than Rs. 4000 crore. The castor growing area in Gujarat is increasing day by day.

Mustard is an important edible oilseeds crop of arid and semi-arid regions. It is grown extensively in rainfed as well as in irrigated conditions. In Gujarat, mustard is grown in 2.14 lakh ha with 0.32 MT of total crop production. North Gujarat is the main mustard producing area. This crop accounts for 22.7 % of total oilseed production and 19.2 % of the total cropped area in the country.

Pulse Crops:

Pulses not only provide nutritional security but also improve the soil health. Different pulse crops are grown in the state with a total area of 0.9 Mha and are cultivated in all three seasons. Pulses cultivation is not distributed uniformly in the state. Pigeonpea is cultivated in the south and middle Gujarat, Mungbean, Urdbean and Mothbean are predominant in North Gujarat and Gram is distributed throughout the state. Cowpea and Mungbean are grown in the summer season in middle and north Gujarat. During *Kharif* season, the major pulse crops are Pigeonpea, Mungbean, Urdbean, Cowpea, Mothbean, Horsegram, while in *rabi*, Gram accounts for major area. In the summer season, Mungbean and Cowpea are cultivated. The major pulses growing districts of Gujarat are Vadodara, Panchmahal, Kachchh, Bharuch, Bansakantha, Dahod, Narmada, Patan, Sabarkantha and Surat.

Cash Crops:

Gujarat has glorious past and glittering present ahead of all the states on the national map of cotton production and /or productivity. Cotton is cultivated in all the districts of the state except Valsad, Navsari and Dang. Nearly 26.8 % cropped area of the state is occupied by cotton, which played a pivotal role in the economy of the state providing employment to rural people. Increasing area of Bt hybrid cotton year by year reaching to the record cultivation of 30 lakh ha in 2014-15. however, the productivity is stagnant since last five years (from 2012-13 to 2016-17) around 550 to 650 kg/ha. During 2017-18, cotton lint productivity raised to 819 kg/ha, Cotton is one of the key drivers in Gujarat agricultural development from 1980-81 to 2017-18.

Sugarcane is an important cash crop in India having economic, political and sociological significance. It is a major source of food, fuel, fodder and fiber. The sugar industry is the second largest agro-industry next to textiles. Sugarcane is a tropical crop and is cultivated in 0.18 Mha, producing 12.96 MT of cane at approximately 71 T/ha in Gujarat (2015-16).

Integrated Pest and Disease Management (IPDM):

Integrated Pest and Disease Management (IPDM) programs allow growers to monitor pests and diseases to ensure that thresholds are not exceeded. Maintenance of crop health is essential for successful farming for both yield and quality of the product. This requires long-term strategies for the minimization of pest and disease occurrence preferably by enhancing natural control mechanisms for growing a “healthy crop”. Specific measures include the use of disease- and pest-resistant crops, rotation of crops, including those with pasture, to provide disease breaks for susceptible crops, apply non-chemical control practices (thermic, mechanical) as applicable and as for last resort, the tactical use of agrochemicals to control weeds, pests and diseases. The method provides information for the critical and the best times to apply control agents, optimizing inputs and reducing environmental consequences.

Soil Health:

Soil health needs to be assessed at regular intervals so as to ensure that farmers apply the required nutrients while taking advantages of the nutrients already present in the soil. Soil is a living and life-giving natural resource. A Soil Health Card displays soil health indicators and associated descriptive terms. In this direction, Gujarat is the first state in the country to issue Soil Health Cards to the farmers for increasing the resource use efficiency

and for sustaining agriculture productivity. Gujarat is the first state in the country to issue Soil Health Cards to the farmers for increasing the resource use efficiency and for sustaining agriculture productivity. The state had completed analysis work of soil samples of all 46.61 lakh farmer and distributed soil health cards to farmers from the year 2011- 12 to the year 2015-16. From the year 2016- 17 Gujarat government has started implementation of soil health card scheme as per GOI norms. Other states have also initiated soil health card system in the same lines that of Gujarat.

Bio-fertilizers:

Bio-fertilizers are microbial inoculants containing live or latent cells of useful strains of microorganisms. They are used for enhancing productivity of the soil. They fix atmospheric nitrogen and solubilise/mobilize phosphorus and potash. Also, they stimulate plant growth through synthesis of plant growth promoting substances and/or antibiotics. This highly efficient and low cost technology of bio-fertilizer application has an important role to play in increasing agricultural production.

Organic Farming:

Increasing consciousness about conservation of environment as well as of health hazards caused by agrochemicals has brought a major shift in consumer preference towards food safety and quality. Gujarat is bestowed with a lot of potentials to produce all varieties of organic products due to its diverse agro-climatic regions. In several parts of the state, the inherited tradition of organic farming is an added advantage. This holds promise to fetch the premium price to the organic producers by tapping steadily growing domestic and international markets of organic produce.

Horticulture Crops:

In Gujarat, horticulture sector contributes about 29% to the GDP and 37% of export of the agricultural commodities which played an important role in ensuring food security, income generation and uplifting the socioeconomic status of farmers. The area under total horticultural crop have increased from 7.54 lakh ha (2002-03) to 16.10 lakh ha (2016-17) with the production of 67.16 lakh MT (2002-03) to 243.02 lakh MT (2016-17) with the fourth position in a country which indicates a significant growth of the sunrise sector in the state.

Banana, mango, citrus and sapota (*Chiku*) are the major fruit crops grown in Gujarat. At present, Gujarat is sharing with 23.11 % papaya, 20.22 % sapota and 13.36 % banana production of India with the second number in banana productivity and third in pomegranate productivity within India. Nearly 19.50 percentage cropped area of the state is occupied by the fruit crops which played a pivotal role in the economy of the state and providing employment to rural people.

Floriculture has also paved fast and flourishing well with the production of 195.98 thousand MT flowers under 20641 ha area in the state (2016-17) with the fifth rank in the country regarding production (8.0%). The country rose, marigold, spider lily, jasmine, gaillardia, annual chrysanthemum, tuberose occupy maximum area under floriculture in Gujarat. Because of favourable agro-climatic conditions, high-value flower crop like an orchid (*Dendrobium*) is also becoming popular among farmers.

Spices:

On an average, seed spices are grown on 4,19,819 ha of land. Gujarat is the leading state for producing cumin and fennel. The share of Gujarat for cumin and fennel is 63 and 73 percent in area and 73 and 92 percent in production. Gujarat ranks first at National and International levels in average productivity. The state has also a wide range of cropping

systems viz. Jowar/Bajra-seed spices, Mung-cumin/fennel, Sesamum-seed spices etc.

Soil and Water Management:

Growing world population and increasing standard of living are placing tremendous pressure on soil and water resources and necessitated for judicious utilization and management of these resources without adverse environmental consequences. Soil degradation and water quality deteriorated due to overexploitation of these natural resources, coastal land inundation from sea tidal water and falling water table enriched with a salinity of groundwater and soil. Hydro-climatic extremes, low irrigation efficiencies, low water productivity added another dimension to low productivity in irrigated and rainfed agriculture. Necessary low cost, eco-friendly technological soil and water interventions are necessary for sustaining the productivity of water and soil.

Gujarat Government has created history in water conservation by constructing more than 3.5 lakh check dams, boribundhs and khettalavadies (farm ponds). The water conservation work was carried out by various state Govt. departments in cooperation with NGOs and the private sector during last 10 years, which has brought up the groundwater level throughout the state and increased the agriculture income by four folds. On behalf of Government of Gujarat, GGRC as an implementing agency aims to promote Micro Irrigation System (MIS) to bring 2nd green revolution. MIS saves water and energy, besides multiple benefits to improve agricultural productivity and farmer's prosperity at large. In this scheme 39086 large farmers covering 105358 hectares, 100768 marginal farmers covering 70837 hectares, 540935 medium farmers covering 1038901 hectares and 304553 small farmers covering 368993 hectares were benefited to October- 2017.

Farm Mechanization:

Farm mechanization has been helpful in improving the productivity of different crops, time-saving, reducing drudgery, timely farm operations, resource conservation and protection from natural calamities. Use of crop harvesting machines ensures early completion of harvesting and threshing works which avoids the untimely rainfall and storms hazards, particularly in wheat. Seed grader, laser leveller, bed planter, etc. needs large-scale adoption. There is a need to create more awareness among farmers for proper use of farm machinery for higher efficiency, saving human and energy resources etc.

Animal Husbandry:

The contribution of milk alone is higher than the major agricultural crops like paddy, wheat and sugarcane. Nonetheless, contribution of gross value output from livestock to agriculture and livestock sector improved consistently from 15% in 1981-82 to 23% in 2011-12. Total 42.66 lakh families keep livestock as primary or secondary source of income and contribution of gross value output from livestock to Total GSDP was estimated to ₹ 30.24 crore. In Gujarat, livestock sector has achieved remarkable milestone of over 103 lakh T annual milk production in the year 2012-13. Collective efforts of Government organizations, Non-Government organizations and the farmers have resulted into sustainable and steady growth of livestock sector and the consumption of livestock products is growing faster than the cereals.

The livestock sector, especially dairy farming, regarded as the powerhouse of growth, is most vibrant in Gujarat. It plays a pivotal role in rural livelihood, nutritional security and national economy by contributing significantly to the agricultural gross domestic product. Cattle and buffaloes contribute to food and nutritional security through milk, meat (buffalo meat), provide draught animal power, manure for crop production and various raw materials for several industries. Milk production in Gujarat during the year 2017 was 10.315 million MT and its share in country's milk production is 7.38% (140 million MT in India). The status and progress in the dairy husbandry sector have been directly or indirectly affected by a number of factors viz., breeding and health coverage programs, various inputs, infrastructure facility and change in demand and price of livestock products.

Gujarat ranks 12th and 15th in egg and poultry meat production, respectively in the country. The average annual growth rate in egg production in last decades (i.e. 2000-01 to 2010-11) is 15.34% which is much higher than the national average (5.58%). In view of modernization, ever-changing lifestyle and demand of quality protein resources there is tremendous scope for development of poultry farming in the State through improvement in production, infrastructure, better inputs and services, training to youth and women and providing organized marketing networks.

Small ruminants provide livelihood opportunities for marginalized section of society hence emphasis is placed on the capacity building of these stakeholders for scientific sheep and goat rearing. Gujarat is privileged to possess five recognized breeds of goats and one recognized breed of sheep.

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Gujarat state has a diversity of more than 18 domestic animal breeds. Milk production in Gujarat grew at a higher rate than that of a nation and hence the contribution of state in national production increased from 6.5% to 7.5% during last 15 years. The demand for milk and milk products is expected to grow rapidly with the rise in per capita income both in Gujarat as well as in India. The livestock sector plays important role in the rural economy through employment to uneducated youth and woman and income generation amongst landless labourers and marginal farmers especially in semiarid districts of north Gujarat.

Fisheries:

Gujarat is endowed with a wide range of marine and inland aquatic resources. Gujarat occupies the first position in the production of marine fish (0.71 T/year) with a share of 24 % in the total production of the country. Value of fish production is ₹ 1200 crore per annum and export worth ₹ 390 crores. In inland fisheries, catla, rohu, mrigal is the major fish varieties. The state has a long coastline extending to 1600 km, a continental shelf area of 0.18 million km², Exclusive Economic Zone (EEZ) of 0.214 million km², rivers and tributaries extending to 3865 km, reservoirs of 0.286 million ha, ponds and tanks of 0.071 million ha

and brackish water area of 0.376 million ha. Gujarat occupies 32% of the continental shelf area and 10% of the total EEZ of India. Inland fish production is 8-10 % of the total fish production in the state.

Forestry:

Gujarat state is composed of four forest types viz., i. Tropical Moist Deciduous Forests (Type 3B), ii. Littoral and Swamp Forests (Type 4B), iii. Tropical Dry Deciduous Forests (Type 5A) and iv. Northern Tropical Thorn Forests (Type 6B), that includes over 30 sub-types of the forest. As per recent data (ISFR, 2017), the forest cover of Gujarat is 14,757 Sq. Km contributing 7.52 percent of the state's geographical area. Area wise, Kachchh, Junagadh and The Dangs districts represented the maximum forest area of 2,312 and 1634 and 1368 Sq. Km, respectively. However, percent forest cover is highest in The Dangs district (77.5% of district's geographical area), followed by Narmada (34.2% of district's geographical area). The total carbon stock of the forests in the State is 110.697 million tonnes, which is 1.56 percent the total forest carbon of the country.

Extension and ICT Initiatives:

Information and Communication Technology (ICT) accelerates sustainable agricultural development and enhances productivity. Promoting Agricultural Information Systems programs like *KrushihMahotsav*, trainings, demonstrations, exhibitions etc enhance the dissemination of agricultural research information at grass root level.

The then, Hon'ble Chief Minister of Gujarat, Shri NarendraModi had initiated a mega event *KrushihMahotsav* for dissemination of agricultural and allied field technologies to the farmers in Gujarat. In a month long *KrushihMahotsav*, the government officials, agro-scientists and experts from SAUs are visiting all the villages of the state with informative *KrushihRath* to give scientific information about farming practices to the farmers. During *KrushihMahotsav*, intensive animal vaccination and animal health camps programs are held every year across all the villages.

Energy Use:

In Gujarat, under '*Jyoti Gram Yojna*', villages are getting round the clock uninterrupted electricity supply that covers 18,065 villages and 9,680 suburbs. The farmers are getting 8 hours per day assured 3 phase power supply for irrigation. Gujarat's advancement in the field of solar energy is also encouraging; the state has dedicated 600 MW of solar energy to the national grid, while the rest of the country is producing only 120 MW of solar energy. The solar park set up at *Charanaka* village will be the Asia's largest and innovative canal-top solar power project, which will save about one crore liters of water per kilometer from evaporation annually and would save 16 % of electricity and land for farmers.

Marketing:

The State has strong cooperative credit & marketing structure, along with 213 cold storages having 9.50 lakh tonne storage capacities. About 42 Fruit and Vegetable Co-operative Marketing Societies and 197 Agriculture Produce Market Committees (APMCs) deal with selling and buying of horticulture produce in the State. The State of Gujarat has strength in agro based industry in terms of natural resources, established industrial base, skilled labour force, enterprising farmers, network of market yards and other requisite infrastructure like airport, seaport and extensive road & railway network.

Post-Harvest Management and Value Addition of Horticulture Crops:

Horticulture accounts for more than 25 per cent of the agricultural GDP. In the production of fruits and vegetables India has attained global supremacy, occupying the first and second positions, respectively. According to recent estimate, horticultural Crops occupy 10% gross cropped area (17.95 Mha) with a production of about 214.73 million T. Fruit's production is 79.97 million T from an area of 9.5 Mha while that of vegetable's production is 129.1 million T from an area of 7.9 Mha. Despite a huge production of horticultural commodities, only about 2.4 % is utilized for processing purpose which resulting huge post-harvest losses of 20-30 % amounting more than Rs 65000 crore. The major cause of post-harvest loss is availability of poor infrastructure for post-harvest management (PHM) and processing of commodities. These losses can only be minimized by proper handling, marketing and processing of the agricultural commodities. There is an urgent need to address these issues for loss prevention and value addition.

Animal Health:

The provision of veterinary services is a key component to the success of farm operation. There is a direct correlation between quality livestock production and veterinary medical services to animals. An advice to the animal keepers on proper herd health management practices such as proper de-worming, vaccination, nutrition, environmental sanitation, disease prevention and control and treatment of animal illnesses are very critical issues.

Organic farming:

The area under organic certification (including wild harvest) in Gujarat was 41,978.94 ha (APEDA, 2011-12). The NCOF annual reports in the year 2011-12 say that Gujarat is having certified cultivated organic area (42267.48 ha), in conversion cultivated area (6251.43 ha) and total cultivated area under certification process is 48518.91 ha. It is very evident that this area is increasing day by day. In the state, a total of 3963.42 Mt carrier based biofertilizers (*Azotobacter*, *Azospirillum*, *Rhizobium*, PSB, KMB, ZSB, VAM and *Acetobacter*) and liquid-based biofertilizers of 2873.317 KL are produced in the year 2015-16 (NCOF Annual Report 2015-16). The organic manure produced or available in the state is 358 lakh mt of FYM, 0.50 lakh mt of vermicompost and other manures (5 lakh mt) (NCOF, 2011-12). So, the state has strong potential for organic farming.

The state is bestowed with a wide variety of natural resources and the Government is promoting organic farming in order to protect the environment, sustaining the crop production as well as ensuring human and animal health. Our Government became the 9th Indian state who declared organic farming Policy. The Gujarat government has already declared the tribal district, Dangs, as 100 percent organic. The government is also in-force to convert Ahva, Vaghai, Subir, Kaprada, Dhampur and Vansda taluka under organic.

Agricultural Scenario of Gujarat State:

The Gujarat state is located between latitude 20.1° N and 24.7° N and longitude 68.4° E and 74.4° E. The tropic of cancer passes through Gujarat state. The state has geographical area of 19,60,924 sq. km. accounting for 6.19% of total geographical area of India with costal line of 1600 km. Gujarat shares borders with the state of Rajasthan to the north, Madhya Pradesh to the east, Maharashtra, Union territories of Diu, Daman, Dadra

and Nagar Haveli to the south and international border with Pakistan to the north-west. The state is bounded to southwest by the Arabian Sea with Gulf of Khambhat and Kachchh.

Gujarat is divided into three physiographical regions **(1) Mainland Gujarat:** The main land plains extend from the *Rann of Kachchh* and the Aravali hills in north to Damanganga river in south. **(2) Kathiawar peninsular:** Covers irregular highland regions with central elevated core part. The slopes dissected by rivers flowing in all directions. The principal regions are *Shetrunji, Bhadar and Aji*. **(3) Kachchh region:** It is mainly *Rann* area. Gujarat is divided into eight Agro climatic zones. In North Gujarat weather is marked by a dry and arid climate; whereas in the south, one can find a moist weather owing to the Arabian Sea and the Gulf of Cambay.

Normally, the Gujarat weather is divided into four major seasons:

- Winter season (December - February)
- Summer season (March - May)
- Monsoon season (June - September), and
- Post monsoon season (October-November)

Winters in Gujarat are mild, pleasant and dry. The day temperature in winter is around 28.3 C and at night is 11.6 C. Summers are extremely hot, with the day time temperature being 46.1 C, and the night temperature being 32.2 C. In Gujarat, monsoon is generally hot and utterly humid. The temperature at day is 37.7 C but at night it falls down to 26.6 C. Sometimes severe flood also occurs in some parts of the region during monsoon. Rainfall in Gujarat varies from place to place the average rainfall varies from 33 to 152 centimeters. The northern region receives a rainfall ranging from 51 to 102 centimeters; whereas the southern region receives 76 to 152 centimeters of rainfall. Rainfall in the southern regions of Saurashtra and the Gulf of Cambay is low compared to the other parts of Gujarat. The hot arid region around the *Rann of Kachchh* faces an acute scarcity of water, due to frequent low rainfall in these areas.

District-wise Annual Average Rainfall (mm), rainy days, maximum and minimum temperatures of Gujarat are shown by maps. Based on soil characterization and rainfall, eight agro climatic zones in Gujarat have been identified:

Zone- I	South Gujarat (Heavy Rainfall Area)
Zone-II	South Gujarat
Zone-III	Middle Gujarat
Zone-IV	North Gujarat
Zone-V	North West Zone
Zone-VI	North Saurashtra
Zone-VII	South Saurashtra
Zone-VIII	Bhal and Coastal area

As per Census, 2011 the population of India was 121.06 crore (62.31 crore males and 58.74 crore females). The population of Gujarat was 6.04 crore (3.15 crore males and 2.89 crore females) comprising rural population of 3.47 crore and urban population of 2.57 crore. Gujarat accounts for 4.99 % of the population of India. The literacy rate is 78.0 %. In rural areas the literacy rate is 71.7 % and in urban areas it is 86.3%. The male literacy rate is 85.8 % (Rural 81.6 %, Urban 91.0 %) which is higher than the female literacy rate of 69.7 % (Rural 61.4 %, Urban 81.0 %). Similar data for SC and ST are also presented.

Total geographical area of the state is about 196.24 lakh ha and reported area of the state is 188.12 lakh ha which comprises of forest area, non-agriculture, net area sown, cultivable waste land, barren land, permanent pasture, land under misc. trees and crops, current fallow and other fallow. District-wise land utilization is also reported. Irrigated, Un-irrigated Land Water Resources of Gujarat are shown by map. Soil fertility indices in terms of availability of Nitrogen, phosphorous, potassium, copper, iron, zinc and manganese in different parts of Gujarat are shown by different maps.

Season-wise and Crop-wise Area, Production and Yield of Food and Non-food Crops for the Year 2011-12 to 2015-16 and average of five years are reported. Total Crop-wise Area and Production of Fruit, Vegetable, Spices and Flower Crops (2012-13 to 2016-17) are given.

Gujarat has 235.15 lakh livestock and poultry in the state comprised of mainly 79.76 lakh cattle and 87.74 lakh buffaloes. Animal Husbandry has been making a significant contribution to state's Agriculture GDP amounting to 23.5 percent of the share of Gujarat state and has very well developed dairy sector Gujarat is a leading milk-producing state and has contributed significantly to the overall success of the dairy sector of the country. Milk production in the state has increased from 4.4 million tonnes in the year 1994 to 12.784 million tonnes in the year 2016-17. The state contributes to around 7.8 % of milk production in the country. Gujarat has 18 District Milk Producers' Unions, 18,549 Milk Cooperative Societies, more than 34 lakh members of milk cooperatives in last decade, Gujarat's milk production has risen by 68 percent and reached to 150 lakh liters/day.

District-wise and Category-wise as per type of fish Inland and Marine Fish Production for 2013-14 to 2016-17 are given. Item-wise/Species-wise Foreign Export of total quantity and value of fish and fish products from Gujarat are also reported. The state has 23 wildlife sanctuaries and 4 National Parks covering about 8.47 % of the total geographical area of the State. Gujarat Forest Department has launched a "Social Forestry Programme" for planting trees on non-forest lands and become a pioneer and leading State in social forestry field.

SWOT Analysis:

A SWOT analysis is the first step in strategic planning. This is a modern structural planning management method/technique/base to analyse the Strength, Weaknesses, Opportunities and Threats of any business sector in order to make the venture more productive and efficient. The SWOT analysis has been attempted first for the state economy, as a whole and then for the agriculture sector as well as allied sectors like horticulture, agriculture engineering, agricultural marketing, animal husbandry, dairying, fisheries etc. Overall SWOT analysis is summarized here from chapter 3.

Strength: The major strength of the State is:

- Varied agro-climatic zones with different varieties of soil and crops
- Predominance of non-food, high value crops like *cotton, castor, tobacco, isabgul, cumin, fennel, mango groundnut, banana*
- The productivity of castor in state is highest in world.
- Leading state for groundnut area, production and productivity

- Well established forestry department and agriculture department with field staff up to taluka and village level
- Well established research and extension network
- Enthusiastic and highly entrepreneurial farmers
- Longest sea coastline
- Well-developed infrastructure
- Higher yield potential and productivity of mustard
- Congenial single window agro industries policy
- Well-developed co-operatives
- Dominance in milk sector
- Well established research and extension network
- Good governance + original initiatives
- Relatively strong marketing network
- Recent attention to post harvest management
- The State is endowed with favorable agro climate and abundance of natural resources for diversified agriculture production
- Highly productive soils with predominance of fertile alluviums which are responsive to different inputs and management practices.
- Well-developed irrigation infrastructure facilitating higher cropping intensity potential for further development especially of ground water resources.
- The technologies of crop production are also constantly changing due to research and development activities of the SAUs in the state. Constantly changing technologies are the essentials for agricultural development.
- Well-developed agro-based cotton and sugar-industries added Strength: for the rapid growth of the economy.
- People in the state are always industrious and hard-working and hence a science based technological back-up can go a long way in improving agricultural production.
- The rail as well as road transport system, which are essentials for agricultural development, are also well – knitted in the state
- Both urban and rural electrification is almost 100 percent in the State and acts as the catalyst for the growth of the State economy.
- As the urbanization and industrialization is on the accent in the recent years, the demand for quality agricultural products and protective foods like milk, fruits and vegetables is getting increased. These indicate the opportunities for increasing the yield per acre, the milk production, vegetables and fruits production etc. in the years to come. The demand for ready to cook as well as ready to eat foods is also increasing. Thus, there is ample opportunity for the agri-processing units to flourish in the years to come in the State.
- The agricultural and allied sector development department in the state are also well equipped with technical human power and the much needed infrastructure, to keep agricultural development going.

- Available surplus in Spices, Onion and Cucurbits and strong production base for horticulture crops especially fruits and vegetables with scope for further development, processing and value addition.
- Additional sources of income to farmers from animals and easy marketability for fluid milk and its by-products and heavy demand
- Suitable climatic condition and the local breeds and low input requirement
- Easy flock / herd management
- Sizable sheep and goat population and
- Availability of waste lands and fallow lands
- Sizable cattle population in the State
- Readily available bank credit
- Largest milk producer with highest milk production growth
- Strong successful cooperative dairy
- The innovation of cost effective post-harvesting equipment has been under taken by the universities which satisfy the needs of farmers.
- Many leading agro processing equipment and machinery manufacturers are also located.
- Number of tractor users is much larger than the number of tractor owners and relatively few farmers' depend on draught animals and labour alone for power.
- The multi-farm use of tractors and farm equipment has already become a common practice.
- Good draft cattle are available for mechanization of crop production operations using animal drawn equipment.
- Lot of scope for cultivation of cereals, oilseeds and pulses organically.
- HYVs available with different grain types and different maturity duration.
- A number of promising varieties for different ecological situations for choice of farmers.
- Feasibility of summer cultivation of many cereals with high yield potential and high productivity per day.
- The diseases and insects pest pressure is in general at a very low profile.
- High productivity of wheat/day
- Better chapatti & bread quality of wheat
- Bajra is C4 type crop so have high biomass productivity.
New high yielding varieties of bajra are available.
- Low cost sesame and soybean crop, fitting well with inter-cropping system
- Highly protein rich with good amount of oil containing castor crop
- Mustard is suitable to fit in various cropping sequence, inter / mix cropping
- Congenial atmosphere of soil and climate for mustard crop.
- Mustard is suitable for rain fed as well in irrigated conditions and for salt affected soils
 - Favourable soil and climate for production of different fruit crops like banana, mango, papaya and citrus as well as flowers like rose, tuberose, marigold, golden rod, lilly, etc.

- Leading state in Kesar mango production and is being famous at international level.
- Lot of scope of organic mango cultivation, production and its export
- Geographical Indication Registration (GIR) No. 185 was made for Kesar mango as “*GirKesar Mango*”
- Fruit and flowers are highly remunerative cash crop
- Early harvest and six to seven times more yield and high export potentiality as compared to field crops
- Our state being blessed with the unique gift of nature due to diverse climates and distinct seasons. It makes possible to grow an array of vegetables whose number exceeds thirty.
- Seed spices have greater potential to grow in arid and semi-arid regions
- Seed spices are short duration in nature and less requirement of inputs
- High remunerative and dominant foreign exchange earnings by spices crops
- Less risky crops like ajwain and dill seed
- The state has vast scope for increasing the forest area due to various climatic situations through social and agro-forestry
- Large number of well-established forest nurseries are readily available for supply of good planting materials of valuable species
- Leading state in cotton production and productivity, lot of scope of organic cotton cultivation as well as hybrid (Bt and non Bt) seed production
- Cotton is high remunerative cash crop in irrigated area and having black fertile soil which is most suitable for cotton
- Cotton is amenable to cultivate in all kinds of soil and topography
- Sugar factories are 100 % in Cooperative basis.
- Sugarcane survive in different agro climatic conditions
- Gujarat is High recovery and high productivity zone for sugarcane.
- High quality and improved nutrition providing food and environmental safety
- Improved soil health and sustainable crop production
- Premium prices and preserves traditional varieties
- Availability of ample solar and wind energy round the year
- Good transportation, port and marketing facilities attract many industries in the state
- Good potential of exportable fish fauna, marine fish catching and fish processing industries.
- **Energy Security:** Abundant renewable sources like solar, wind and biomass for energy generation. Conversion of organic waste into fuel will lead to energy security.
- **Food Security:** The energy security will help to improve farm productivities, handling, storage and processing activities in rural area causes food security for the nation.
- **Pollution Control:** The renewable energy sources are eco-friendly reduces greenhouse gas emission and helps in arresting depletion of the ozone layer.
- **Rural Sanitation:** With proper management of animal and other agriculture/organic wastes/ village will be clean leading to better health and hygiene in rural areas.

- **Reducing Drudgery:** Rural families particularly women would benefit from reduced drudgery and saving time from collecting wood and water from long distance and minimizing health hazards of cooking in Smokey kitchen.
- **Employment generation** Creates jobs especially in rural areas so helps to reduce migration to city.
- **Socio-Economic Up-liftment:** The energy security creates better income, facilities and an additional distribution channel for agricultural products and rise the income for farmers hence improves socio economic status of the rural people
- **Subsidies:** Feedstock production for energy purposes can reduce agricultural premiums and subsidies.
- More than 40 recommendations for farming community on use of bio-fertilizers in various crops by SAUs to curtail cost of cultivation with yield increase as well.
- Recommendations on AAU native BF bacterial cultures in different agro-climatic zone of Gujarat for farming communities:
- Strong extension institutional setup and technically skilled human resources
- The training and visiting (T & V) of extension
- Well established agri-clinic, KVKs, SHGs, ATMA and DOA and convergence work
- *KrushiMahotsav*
 - Centre for excellence in environment, climate change, weather forecasting and agro-advisory services
 - Agro-meteorological database at Anand
 - Eight agro-met advisory service centres of IMD, one in each agro-climatic zone

Weaknesses: The major weakness of the State are:

- 70% area depend on rain: After completion of *SardarSarovar* Project it will be 49%
- Uneven distribution of rain: *In Kachchh – 400 mm & In South Gujarat -1500 mm*
- Drought prone area
- Arid and semi-arid area : *19.61% & 9.46% Respectively share in India*
- Declining land holding
- Saline and water logged area
- Low technology assimilation capacity in rural areas
- High cost of power
- Flood /erosion
- Adverse impact on soil health and productivity due to imbalances in fertilizer application coupled with intensive agriculture. Application of organic fertilizers is very low with less than 10% area coverage
- Inadequacies in availability of quality seed/plant material for all the major crops grown in the State resulting in low levels of seed replacement
- Post-harvest glut in commodities and price crashing
- Fragmented Processing industry, total dependence on other states like Punjab for meeting the seed potato requirements. Absence of exclusive cold storage facilities for seed potato affecting seed quality and viability

- Though the State is a major producer of fruits and vegetables, inadequate post-harvest handling and cold storage facilities for perishable horticulture produce including potato is resulting in seasonal gluts and distress sales besides huge losses.
- Shortcomings in marketing, absence of adequate ice plant and cold storage facilities at the production point.
- Lack of adequate demand for processed fruit and vegetable products and infrastructure facilities for processing value-added products.
- Inadequate network of extension machinery in the State.
- Unorganized / conventional slaughtering methods
- Pricing of sheep by subjective assessment and exploitation of farmers by the Middleman
- Inadequate grazing land / seasonal grazing in cropped fields during off-season.
- Unrecognized breeds of goat / sheep in the State
- Non-availability of veterinary aids within the easy reach of sheep/goat farmers
- Lack of quality germplasm
- Lack of technological interventions
- Lack of scientific method of feeding, breeding and health management
- Scarcity of fodder
- Improper / insufficient housing leading to low productivity and disease problems
- Creation of social problems due to indiscriminate grazing at the gardens of neighbours
- High susceptibility to mastitis due to nomadic type of herd farming Indigenous non-descriptive cattle population with low milk productivity account for 70% of the cattle population due to non-availability of Quality animals with better productivity.
- Potential for commercial ventures in poultry farming is not fully exploited
- Low milk productivity Poor veterinary services
- Lack of data on dairy sector
- Poor raw milk quality
- Lack of Good dairy practices
- Low dairy plants efficiency
- Most of the fruit crops are highly season-bound and hence the year-round production is not possible.
- Capacity and facilities for manufacture and repair and maintenance of farm machinery are inadequate.
- Extension and training programs to acquaint the farmer with agricultural mechanization, to carry out farm machinery demonstrations, to help the farmer in the selection of farm equipment and train him in its operation and maintenance and to train rural/small town artisans in repair and maintenance of farm machinery do not exist.
- The Department of Agriculture is short of well trained and experienced agricultural engineering experts to plan and execute agricultural mechanization programme.
- R&D programme in agricultural mechanization is very limited.
- Injudicious (unwise) use of insecticides / pesticides eradicates the beneficial insect pest creating an imbalance in the ecosystem.

- Short & mild winter in Gujarat unsuitable for wheat
- Poor coordination among consumers, produces, millers, processors and trades
- Products of bajra have rough texture so less prefer by consumer.
- Abrupt rise in temperature at sowing time and maturity in mustard causes drastic yield losses
- Stringent rules and regulations for logging, harvesting and transpiration of wood based products from agro-forestry
- Complex genetic constitution and seed loose its germinability in very less time
- Sugarcane is long duration crop
- Non-synchronous flowering and maturity in most of the grasses and legumes.
- High cost involved in seed production of fodder.
- Productivity gaps, inadequate processing unit and lack of established markets for organic products
- Low R&D investments on organic farming research
- Poor infrastructural facilities at Taluka places
- Extensive R & D is required to make compatible with conventional energy.
- There is lacking of scientific and technical manpower at State to carryout qualitative R & D work and produced sufficient number of skilled manpower to meet the target. Needs to find and train the staff members in quite restricted local conditions.
- Bio-fertilizers yet not reached to the end users effectively. Hence, needs district-wise, set up of Bio-fertilizer production plants to make them available to the door step of farmers.
- Less access to information from different sources (TV, Radio, Folders, Articles etc...)
- Less number of farmers' interest group in village level
- Insufficient attention towards extension personnel's
- Lack of long period climatic data of taluka and districts
- Lack of standard agro-meteorological observatories at all research stations
- Lack of trained manpower for meteorological observation and analysis
- Lack of knowledge on weather variability and climate change
- Lack of knowledge on impact of climate change on agricultural production
- Lack of knowledge on understanding of weather forecasting
- Lack of coordination in climatic data sharing
- Inadequate data on environmental health monitoring
- Uneconomic size of very large number of marginal and small farms and poor economic status of the farmers and the low literacy level among farmers affect the full adoption of scientific technologies.

Opportunities: The major Opportunities of the State are:

- GM crops, Biotechnology
- Horticultural development

- Agri export zone: Groundnut, Potato, *Castor, Isabgul, Fruits. Datepalm, Duram wheat etc*
- Organic farming: Special Zone, Market for organic product
- Agro processing industries: *Cotton, Oilseed, Tomato, Cumin, Isabgul, Castor, Papaya, Fruits & Vegetables*
- Export potentiality: *Cotton, Cumin, Onion, Garlic, Castor, Isabgul, Mango, Other fruits & vegetables, Flowers, Duram wheat, Processed maize etc*
- May be exploited as quality groundnut zone
- New high yielding varieties are available for major crops.
- Corporate and contract farming
- Investment in agriculture sector: Private Market, Terminal Market, E-market
- IT network
- Public – Private partnership, NGOs work
- Use of solar energy in agriculture, Benefit of natural resource
- Better organic input supply through development of ‘Organic Inputs Production Hubs’, promotion of FYM and vermicomposting at farmers’ fields
- Rational utilization of ground water resources through adoption of micro irrigation system. Promotion of rain water harvesting structures for ground water recharging and supplemental irrigation.
- Augmenting seed production through promotion of seed villages for production of certified seed with centralized processing/quality control facilities at block /district level.
- Export market potential can be tapped further especially for flowers, fruits and vegetables.
- Installation of agri-processing units can be taken up at an early date
- Scope in area expansion of fruits crops
- Potential to increase production and export of Banana, Mango, Potato, Onion, Cumin, Fennel & *Isabgol*
- Vast potential for cultivation of medicinal and aromatic plants
- Shifting consumer preference
- Season-bound production, highly perishable nature of products and the year round demand provide excellent opportunity for the agro-processing entrepreneurs.
- Crop diversifications from low-return field crops to high-earning crops and raising the horticultural crops are the other possible opportunities.
- Adoption of technology interventions by illiterate shepherds
- Constantly increasing demand for milk and milk products from both domestic and export markets.
- The performance of genetically up-graded non-descript local breeds are quite promising in terms of increased milk productivity
- Technology empowerment on scientific dairy farming among farmers / rural women to boost milk production.
- Large rural market
- Increasing quantity of available milk for processing

- changing life style and preference for milk and milk products,
- Ample of demand for the quality fresh perishable production in the State.
- Efficient irrigation techniques like drip irrigation, production techniques like raised bed cultivation and precision in seed placement and application of fertilizers and plant protection chemicals will not only increase production but also improve the quality of produce and reduce the expenditure on cash inputs.
- Keeping in view the small holding nature where individual ownership of farm equipment is not a feasible and viable proposition, the concept of **“Farm Machinery Hub”** has wide opportunities in the state.
- Feasibility of inclusion of legume crops for sustainable soil fertility in Paddy-Wheat cultivation.
- To mitigate the harmful effects of methane gas (CH₄) **methanogens** (harmful methane (CH₄) producers) and **methylootrophs** (beneficial methane (CH₄) suppressors) micro flora are available in the low land paddy soil.
- May be exploited as quality wheat zone
- New quality durum varieties of wheat are available
- Alternative uses of bajra for poultry and animal feed and value addition of fodder through chopping.
- Bajra as an iron rich food in the scenario of iron deficiency in normal diet.
- Possibility of exploitation of sorghum for industrial use, particularly in sugar industries.
- Vast scope of exporting soybean and its preparations
- Soybean gives good quality oil.
- Mustard based cropping sequence is best suited sequences, possess higher yield potential
- Cereals, oilseeds and pulses fodder for supplement of fodder.
- Develop water harvesting structure in rain fed area for promotion of arid/minor fruit crops.
- Scope for increasing production through high density planting (HDP) in fruit crops
- Up gradation of post-harvest processing and marketing network and facilities for fruits and vegetables
- Scope for mechanization and use of renewable resources for fruits and vegetables
- Strengthening research for good quality production of fruit and flower crops
- As against the per capita per day requirement of 300 g by WHO, the present intake and availability of vegetables is only 170 g.
- Government of Gujarat declared Middle and South Gujarat as Agri Export Zone for vegetables and fruits as this area has assured irrigation facilities.
- Vegetables are fit for precision farming, protected cultivation and other high tech Olericulture practices.
- Spices have long range of value added products and have high medicinal value
- Fast growing demand spices crops are in domestic as well as international markets
- Increasing area under forests through plantation in community lands, agro-forestry and urban forestry

- Wasteland or unused lands of agriculture can be improved through plantation establishment
- Establishment of windbreak and shelter belt in the farm to protect crops against wind and soil erosion
- Promotion of wood/plywood industries and high value tree plantation
- Introduction of new short rotation tree species for agro-forestry
- Development of suitable agro-forestry models in different agro-climatic zones
- Potential for higher income generation and livelihood promotion
- Promotion and value addition of forest products from agro-forestry
- Research scope in development of compact, long staple, GMS cotton and Bt stable variety through tissue culture, breeding and biotechnology approach
- Research scope for increasing domestic consumption of cotton through innovative research and upgrading textile handloom and power loom sector.
- Growing forage crops as sole crop or in existing cropping systems, utilizing marginal and problematic soils is practiced to a varying degree throughout the country.
- Soil Health Card is a scientific tool to address soil health issues.
- Growing health awareness, purchasing power of consumers and market potential for organic products
- Improve water use efficiency and irrigation efficiency through micro irrigation system (MIS) and productivity enhancement.
- Conjunctive use of surface and groundwater
- Watershed management for water harvesting and Soil and Water conservation.
- Drainage of waterlogged saline and degraded soils.
- Treatment of waste water & reuse for irrigation to enhance agricultural productivity.
- Modernization and renovation of existing irrigation projects
- Better design, planning and management of canal networks including lining
- Creation of water user associations and developing mechanisms for proper operation & maintenance of the irrigation infrastructure.
- Protected cultivation in green house and shade net (low cost) for off season vegetable cultivation.
- Linking of local rivers/ponds at macro and micro level for increasing irrigation productivity.
- Expansion of inland and brackish water aquaculture.
- Scope for export of processed food products to other countries.
- Utilization of nonconventional energy sources solar, wind and sea waves in agriculture to meet the energy demand for pumping ground water.
- Improvement of drainage structure in high rainfall zone and to develop water harvesting structure in rain fed area and promoting micro-irrigation.
- Development of equipment for wastewater treatment and separation technology
- Development of new methods process configurations for water production from wastewater.

- Development of low cost and wastewater specific membranes for water reuse/reclamation.
- Development of energy efficient advanced oxidation for organic and recalcitrant compounds in wastewater.
- Alternative disinfection systems for wastewater including ozone, UV, chlorine dioxide and gaseous/liquid chlorine.
- Improvements and cost reductions in thermal processes for chemicals and energy recovery such as evaporation and plasma incineration.
- Delineation of treatment option/schemes to reduce energy consumption and hazardous wastes disposal.
- Development of instrumentation package for automation of the treatment package and bringing down cost of components.
- Gujarat has the highest share of renewable energy potential (25%) in the country.
- Out of total energy being consumed only 18.0 % comes from the RES as compared to TN 40.46%, Karnataka 28.63% and Rajasthan 26% despite of state is very rich in renewable Energy Sources.
- The Gujarat state has very high potential of solar energy utilization for different applications like crop drying, cooking, power generation, greenhouse crop production, etc.
- There is a good scope to replace a large percentage of fossil fuels with bio-fuel.
- The state has Out of total potential wind energy generation only 15% is yet to be explored, Biomass generation and utilization for energy has tremendous scope in Gujarat using biomass gasification and co-generation technology. Another important RES is the biogas for cooking and vehicle fuel need to be paid attention.
- There is good opportunity to carry out R &D activities in the above areas and new area like fuel cell, small wind mill and Hydrogen fuel technology and other RES to obtain better efficient and adoptive technology.
- Possibility to bridge the gap between demand and production of bio-fertilizers and thereby decrease subsidy load on chemical fertilizers
- e-learning through email.... etc
- m-learning through text & voice messages
- Use of KIOSK
 - Effective radio & TV talk
 - *Kisancall* center
 - Market facilitation
 - Establishment of network of agro-met observatory at each agricultural research stations
 - Setting up of automatic weather stations (AWS) in each taluka
 - Weather based assessment of crop growth and production
 - Sharing of past and current climatic data
 - Establishment of weather forecasting centres
 - Making climate smart village
 - Weather based advisories at village level

Threats: The major threats of the State are:

- Inadequate and erratic nature of rainfall
- Frequent draught
- Soil erosion, Depletion of water table, Salinity ingress / Sea water ingress
- Problems of blue cow and Sambhar
- Market fluctuation
- Inadequate processing facilities
- Smaller land holdings limiting the scope for adoption of intensive crop production technologies, which are capital intensive
- Increasing production costs especially labour due to proximity to metro city coupled with un remunerative/ fluctuating prices for produce severely affecting the profitability of agriculture
- Farmers may shift to other occupations to other area.
- Excessive use of chemical fertilizers & pesticides limiting the scope for adherence to quality standards with special reference to exports
- Changes in socio-economic conditions, with younger generation from farming community preferring urban employment in place of agriculture
- High fluctuations and non-remunerative prices of farm products and consequent non-profitability of the farm business perforce many farmers to quit the agricultural profession itself.
- Fast urbanization and industrialization and indiscriminate conversion of agricultural lands to non-agricultural purposes, pose a great threat of contraction of land put to agricultural uses and consequent reduction in production.
- Resistance to adopt new technologies by illiterate shepherds
- Frequent occurrences of killer diseases like Blue tongue, sheep pox, PPR etc.
- Inadequate / non-availability of sufficient quantity of vaccines
- Diminishing grazing land area
- Increasing cost of feeds for animals
- Uncontrolled use of antibiotics and medicines on milch animals
- Comparatively high cost of packaging and storage cost of finished produce
- In its anxiety to absorb more people in agriculture, State may deliberately discourage agricultural mechanization
- Inadequate financial capacity at the farmer's end to improve production technology including the use of better power sources and equipment.
- In the absence of proper equipment and technologies, quality of raw material may be too poor to produce processed products of acceptable/ marketable quality.
- Competition with cash crops due to drudgeries in cereals cultivation.
- Lower / fluctuating unreasonable market price for the producer farmers.
- Within few years, there might be shortage of fodder for milk cattle
- Aflatoxins problem in groundnut kernels
- Spread of soil-borne diseases
- Most of the vegetables are perishable to semi perishable in nature

- Unstable and wide fluctuating market price for fruits and vegetables
- Too many hybrids/varieties (costly) have unstable performance over years
- Long rotation of tree species
- Lack of marketing for minor forest products including medicinal and aromatic plants
- Flower structure is very small and delicate in most of the forage crops which make difficult the breeding work.
- Sea water intrusion in aquifers of coastal talukas and over exploitation of groundwater to cater the needs of drinking and irrigation.
- Climate change is a threat for sustaining productivity from field and horticultural crops.
- Deteriorating quality of rivers and soil due to discharge of Industrial and residential effluents without treatment
- Out of 225 talukas of the state, as many as 56 talukas are drought-prone which suffer from drought or scarcity condition at regular interval
- Drought, Flood and Cyclone raise after some interval badly affect agriculture of the state and also economy of the farmers.
- Heavy rain after long dry spell also affect the standing crops and also soil erosion
- Less interest of rural young generation in agriculture due to heavy loss and low revenue.
- Problem of salinity and water logging in coastal area
- Irregular and erratic rain threat timely sowing and sometimes resowing
- Labour shortage and Un-experienced laborers for irrigation cause wastage of irrigation water.
- The market of transport fuels is dominated by fossil fuels and will likely be so in the foreseeable future.
- The political lobby for RE is weak when compared to the lobby of fossil fuels.
- Discoveries of new oil fields rapidly decreased in the last few years The RE market is a relatively new market
- Restricted resources for R & D (financing and human capital - researchers), restricted innovation resources and restricted job opportunities for the Graduates
- Increase in extreme weather events
- Natural disasters may cause losses
- Large inter and intra-seasonal variability in rainfall

District Wise Developmental Plans for Agriculture and Allied Sectors:

According to 36 thematic area following points are discussed in chapter 4.

- Vision
- Mission
- Crop/ Area issues
- Priorities for field, horticultural, forestry, other Crop Cultivation, animal production, animal health and fisheries
- Ongoing Special Projects/ Programs like Agriculture Technology Management Agency, frontline demonstration, National Food Security Mission, Rashtriya Krishi

- Vikash Yojana and supply of drip irrigation system by Gujarat Green Revolution Company
- Renewable Energy Potential of the State of Gujarat in terms of Solar, Biomass, Biogas, Biogas Energy Plantation, Wind and Tidal Energy
 - Biological and Socioeconomic constraints associated with low productivity
 - District Wise Area under *Kharif* , *Rabi* and *Summer* crops during last five year plan
 - District-wise Large Animal Population and Total Milk Production in Gujarat
 - District-wise Sheep and Goat Population and Wool Production of Gujarat State
 - District-wise Population of Rabbit in Gujarat
 - Detail of Poultry Production along with its growth in Gujarat State
 - Pack animal Population and Growth Rate over Previous Livestock Census
 - District-wise Cultivation of Fodder Crops in Gujarat State
 - Category and District-wise Poultry Egg Production in Gujarat State
 - District-Wise Poultry Population of Gujarat State
 - District Wise and Category Wise Inland Fish Production
 - Species Wise Inland and Marine Fish Production of Gujarat State
 - Species-wise Marine Fish Production (T)Since
 - District-wise and Species-wise Marine Fish Production
 - Details of Fish Seed Farm of Gujarat State
 - Item-Wise/ Species-wise Foreign Export of Fish and Fish Products from Gujarat
 - District-wise Inter-State Export of Fish & Fish Products in quantity and value
 - Annual Plan Outlays and Expenditure in Fisheries sector
 - Agencies/Organization Activities as Per the Poultry Development in Gujarat
 - Yearly Trend of Change in No. of Productive Cattle and Buffaloes from
 - Trend of Change in Per-Animal Productivity and Annual Milk Production District-wise Milk Production in Gujarat
 - Trend of Change in No. of Productive Goats
 - Trend of Change in Per-animal Productivity and Total Milk Production in Goat
 - Year and district wise Area, Production and Yield of different crops
 - Year and district wise Area, Production and Yield of irrigated and unirrigated crops
 - Characteristics different common, popular and improved/ hybrid varieties of various crops grown in Gujarat
 - Input management for seed, fertilizer, insecticide, pesticide, fungicide, weedicide, farm equipment, etc.
 - Projected (year wise) Targeted Area (ha) and Targeted Seed Replacement Rate (SRR) and different seed requirement Based on Seed Rate (kg/ha)
 - Year and district wise different types of fertilizer Requirement for the different Crops
 - District-wise Yearly Requirement of Pesticides/Fungicide of different Crops
 - Year wise and District-wise Present Scenario of Chemical Pesticides in Gujarat
 - Farm Mechanization/Farm Equipment suitable for different farm operation in various crops

- Constraints Analysis and Recommended Interventions for Yield Gap Analysis
- The region wise constraints for low productivity in different crops
- Sustainability Issues, Gap Analysis and Strategies, Approach and Methodology and Performance Indicators to Enhance the Productivity of different Crops, animals, poultry and fisheries
- Bridging the Gaps for Realization of the Vision for different Crops, animals, poultry and fisheries
- Issues, Mode of Action, Collaborator/Target and Suggestions for different Activities for Integrated Water Management (IWM), Management of Salinity Stress, Resource Conservation Technology :Zero tillage, laser land levelling, Green manuring & Bio-fertilizers and Quality Seed production
- Sustainability Issues and Gap Analysis of Productivity in Dairy Husbandry for Breed of Animals, Housing management, balanced feeding, Health of animal and calf mortality
- Strategic Frame and Long Term Goals / Targets for poultry
- No. of Disease Investigation Work
- Details of Soil Testing Laboratories of Gujarat State with Full Address, Phone Number & Group
- Low and Medium Status of OC, Fe, Zn and Sulphur in Different Districts of Gujarat
- Year wise and district-wise Additional Area Coverage under Organic Farming
- District Wise Annual Rainfall (mm)
- Annual Rainfall (mm), Maximum Temperature (Tmax, C), Minimum Temperature (Tmin, C) and Relative Humidity (RH,%) at Different Stations in different districts of Gujarat
- District wise Existing Marketing Infrastructure facilities

Detailed Action Plan with Costs:

District wise and year wise Comprehensive package of activities discussed those are very vital for farmer's welfare, increasing their farm income, the overall productivity enhancement, employment generation with an environment friendly and Sustainable approach:

- Year wise and District-wise State Level Training Proposed for Capacity Building of Staff of Agriculture and Allied sectors for different activities in numbers and finance
- Year wise and District-wise Training Proposed for Capacity Building of Farmers at district level in numbers and finance
- Year wise and District-wise Training Proposed for Capacity Building of Farmers at State Level on Different Technologies like Integrated Nutrient Management, Natural Resource Management, Integrated Pest Management, Biological Control for Pests and Diseases Management, Resource Conservation Technologies, Water management, drip irrigation, Post-Harvest Management, Women empowerment, Credit & marketing, Seed Production, Farm waste management, Vermicomposting, Farm Mechanization, Renewable energy, Organic Farming, Green House / Net house (protected cultivation), Urban peri urban vegetable gardening, Integrated Weed Management and Forestry, Farmers/Bamboo Crafts & Minor Forest Products, Fodder Production, fisheries, Renewable Energy Technologies, Waste Management

- Year wise and District-wise Demonstration programmes for crop Varieties, Seed Planning/ Seed Village Program (Seed Production Enhancement), Integrated Nutrient Management, Plant Health Management, Soil Health Management, Resource Conservation Technologies, Laser Levelling, Inter Cropping, Green Manuring & Mulching, Seed Treatment, Organic Farming, Bio-fertilizer and Bio-compost, Integrated Weed Management, Fruit Crops (*Vadi Model*), high density planting of fruit crop and Water Resources Development (Farm Ponds, Bunding, Water Harvesting, Well Recharge, etc.) on farmers' fields, Agroforestry/Social Forestry/Bamboo Cultivation, forage crops in area/number and finance
- Year wise and District-wise Farmer Field Schools Covering Identified Critical Technologies for different Crops in numbers and finance
- Year wise and District-wise Group Formation /Commodity Interest Groups Formation for Specific Activities for different Crops in numbers and finance
- Year wise and District-wise Establishment of Agro Processing Units numbers and finance
- Year wise and District-wise establishment of Farm Level Storage, Model Floriculture Centres in number and finance
- Year wise and District-wise Establishment of Small Scale Nurseries in number and finance
- Year wise and District-wise Establishment of Model Nurseries in number and finance
- Year wise and District-wise Establishment of Poly Houses for Flower Crops in number and finance
- Year wise and District-wise Establishment of High Tech Green Houses in number and finance
- Year wise and District-wise Establishment of Low Cost Net House in number and finance
- Year wise and District-wise Establishment of Farm Level Small Pack House in number and finance
- Year wise and District-wise Establishment of Farm Level Low Cost Ripening Chamber in number and finance
- Year wise and District-wise Establishment of Farm Level Precooling Chamber in number and finance
- Year wise and District-wise Establishment of Mango, Banana Large Scale Ripening Chamber in number and finance
- Year wise and District-wise Supply of Tree Cover as Wind Break/for Social Forestry/Wasteland Development in number and finance
- Year wise and District-wise Action Plan of Social Forestry/Agroforestry Plantations, Forest Nursery Establishment/ Demonstration of Agroforestry-Social Forestry in number and finance
- Year wise and District-wise Proposal for the Development of Panchayat Land for plantation in number and finance
- Sugar Factory -wise Training Proposed for Capacity Building of Agricultural Staff for Sugarcane in number and finance

- Training Proposed for Capacity Building of Farmers (Sugar Factory Wise) on Different Technologies of Sugarcane in number and finance
- Sugar Factory-wise Demonstration on Variety, INM, IPDM, Seed/Sett Treatment, Resource Conservation (Inter-cropping), on Sugarcane crop in number and finance
- Year wise and District-wise Proposal for Capacity Building of Livestock and small ruminant Farmers in Gujarat State Along with Financial Requirements (Quality Improvement of Feed, Enhancement of Milk Production, Improvement of Reproductive Efficiency)
- Year wise Capacity Building for the State in Poultry Sector with Action Plan and Cost
- Year wise and District-wise No. of Fertility Camps to be Organized Under Fertility Improvement Program in the State
- Year wise and District-wise Supply of Breeding Bulls to Villages in the State and their maintenance in number and finance
- Year wise and District-wise No. of Commercial Dairy Farming Units Along with Financial Requirements
- Year wise requirement of Seed Cost for Forage Crops
- Year wise requirement of Fertilizer Cost for Forage Crops
- Year wise and District-wise No. of Cattle Shed for Dairy Farmers along with Financial Requirement
- Year wise and District-wise Supply of Dairy Utensils to A.H. (Dairy) Farmers in number and finance
- Year wise and District-wise Details of Expenditure for Calf Rearing Unit of 10 Calves (Concentrate, Fodder, Mineral Mixture, Medicines and Housing) in number and finance
- Year wise and District-wise Provision of Artificial Insemination Facilities in number and finance
- Year wise and Zone-wise Capacity Building for Rabbit Rearing in number and finance
- Year wise and District-wise Proposals for Milking Machines in number and finance
- Year wise and District-wise Proposals for Supporting Women Dairy Cooperatives in number and finance
- Year wise and District-wise Training proposed for capacity building of Dairy farmers on different Technologies on clean milk production, Preliminary knowledge on composition and nutritive value of milk and Manufacture of indigenous milk products in number and finance
- Year wise and District-wise Estimated cost for fodder seed production unit for Green fodder in number and finance
- Year wise and District-wise Estimated cost for fodder seed production unit for Dry fodder in number and finance
- Year wise and District-wise Fodder Banks for storage Dry grasses from forest in number and finance
- Year wise and District-wise proposal for no. of Portable FRP Carp Hatcheries for fish seed production units along-with financial requirements
- Year wise and District-wise no. of demonstration units of Freshwater Prawn in Village ponds along-with financial requirements

- Year wise and District-wise no. of Village pond units for development for fisheries along-with financial requirements
- Year wise and District-wise no. of Cage/Pen Culture units in Reservoirs lakes and canals along-with financial requirements
- Year wise and Fishing port-wise replacement of no. of units of the codend of trawl net along-with financial requirements
- Year wise and Fishing port-wise no. of Biometric cards to fishermen/crew and tandels along-with financial requirements
- Year wise and District-wise Financial Requirement for modernisation and developments of existing Fish markets
- Year wise and District-wise Material required for demonstration of seaweed cultivation in number and finance
- Year wise and District-wise Demonstration of seaweed liquid fertilizer to farmers in number and finance
- Year wise Approximate Cost of Subsidies for Soil Amendments like Micro-nutrients, Manures and Gypsum for Soil Health
- Year wise Approximate Cost for Soil Health Card Program
- Year wise and District-wise Proposal for Organic Seed Storage Structure in number and finance
- Year wise and District-wise Proposal for Strengthening of Research on Organic and Testing Facilities in number and finance
- Year wise and District-wise Proposal for Vermi-compost Units Establishment in number and finance
- Year wise and District-wise Establishment of NADEP Compost Unit in number and finance
- Year wise and District-wise Proposal for Infrastructure Development for Storage of Organic Produce in number and finance
- Year wise and District-wise financial requirement of Proposal for Providing Processing Tools and Facilities
- Year wise and District-wise financial requirement Proposal for Marketing, Supply Chain, Certification *etc* under Organ Farming
- Year wise and district-wise Proposal of supply of Tractors, Mini Tractors, Power Weeder, Rotavator, Diesel Engine with Pump, Threshers, Laser Leveller, Cotton Shredder, Plant Protection Equipments, Tractor and Bullock Drawn Seed cum Fertilizer Drill / Planter, Combined Harvester, Cultivator and Different Plough, Power Tiller, Castor Decorticator, Groundnut Decorticator, Maize Sheller, Paddy Transplanter, Sugarcane Transplanter, Reaper, Potato Planter, Potato Digger, Groundnut Digger and other Miscellaneous implements/ Small Tools for Gujarat State in number and finance
- Year wise and district-wise Water Resources Development: Water Harvesting Structures (WHS)/WHS Kachha, de-silting of check dams, ponds, well, bore well recharge, recharge structures, etc. in number and finance
- Year wise and District-wise Watershed Development in number and finance

- Year wise and District-wise Land development: Land Reclamation, Bunding, Soil Conservation, Amelioration of Water Logged and Saline Soils, Land Levelling, etc in hectare and finance
- Year wise and District-wise Soil and Water Conservation (SWC), Loose Boulder Checks, Recharge Structures, Pipelines, Desilting of Checkdams, Ponds, Rain Water Harvesting, etc. in number/ hectare and finance
- Year wise and District-wise Soil survey (Topographic survey)/ land survey in hectare and finance
- Year wise and District-wise Micro Irrigation System (MIS) in hectare and finance
- Year wise and District-wise Water Management Works, Farm Pond, Community Tanks, Minor Irrigation in number/ hectare and finance
- Year wise and District-wise Dug / Bore Well, Pump Sets, Lift Irrigation Sets, Minor Irrigation in number and finance
- Year wise and District-wise Provision of Adequate Drainage Systems/ Structures in number and finance
- Year wise and District-wise Gobar Bank and Community Biogas Plants (85 M³ Capacity, Each) in number and finance
- Year wise and District-wise Domestic Biogas Plants (2 to 10 m³ Capacity with average 6m³) in number and finance
- Year wise and District-wise Biogas Purification and Bottling Unit (Average 2000 M³/Day Capacity) in number and finance
- Year wise and District-wise Briquetting Units (Waste Utilization) in number and finance
- Year wise and District-wise Biomass Gasification Units in number and finance
- Year wise and District-wise Biomass Cookstoves/ Smokeless Chulas in number and finance
- Year wise and District-wise Bio-Ethanol^a(10,000 Liter Capacity) and Bio-Diesel Production^b (5000 Liters Capacity) Units in number and finance
- Year wise and District-wise Solar Cookers in number and finance
- Year wise and District-wise Solar Street Lights in number and finance
- Year wise and District-wise Solar Lantern (6-8W) in number and finance
- Year wise and District-wise 5hp Submersible Solar Water Pumping System
- Year wise and District-wise SPV Solar Photo Voltaic Power Plant (10 Kw) for Remote Villages in number and finance
- Year wise and District-wise 1 MW Agriculture (Greenhouse) cum SPV Power pilot project at SAUs @ 12.0 cr/plant^a, in number and finance
- Year wise and District-wise SPV Operated Cold Storages for 1000 MT Storage Capacity^b @ 15 cr in number and finance
- Year wise and District-wise on Farm Fruits and Vegetable Storage for 10MT Capacity @ 20 Lakh in number and finance
- Year wise and District-wise Roof-top Small Solar cum Wind Turbine for Power Generation in number and finance
- Year wise and District-wise Wind Pumps in number and finance

- Cost for the Strengthening of Training Infrastructure Facilities for Training Hall, Information technology Lab, Automatic Weather Station, well equipped training hall, E-connected computer lab and Soil testing lab at FTC (District level) and FIAC (FIACs – at block level). (Rs in lakh)
- Year wise and Districtwise Strengthening of APMC in number and finance
- Year wise and Districtwise Establishment of Rural godown in number and finance
- Year wise and Districtwise Number of processing units and financial requirements
- Development of Terminal Market in Four Zone and financial requirements
- Year wise and Districtwise Establishment of small scale fruit and vegetable processing units in number and finance
- Year wise and Districtwise Establishment of Cold Storage in number and finance
- Year wise and District Wise Establishment of Location Specific Research Unit for Value Addition in number and finance
- Year wise and District-wise supply of Small Scale Power Operated Cleaner cum Graders for Cereals in number and finance
- Year wise and District Wise Strengthening of Infrastructure Facilities for Strengthening of Processing Facilities for Establishment of Mini Dal Mills in number and finance
- Year wise and District Wise Processing Units and Financial Requirements for Oil Mill, Cotton Ginning
- Year wise and District Wise Establishment of Spice Processing Unit (Cleaning/Grading/Mill) in number and finance
- Year wise and DistrictWise Strengthening of Infrastructure facilities for rural godowns for storage of food grains including cereals, pulses, oilseeds, spices, Onion and Garlic, etc. in number and finance

Researchable Issues:

Future researchable issues for different crops on development of suitable varieties/ hybrids, insect, pest & diseases management, Protected cultivation and precision farming, Small equipment, changes agronomical practices due to weather effects, micro nutrients for increasing fertilizer use efficiency, Post-harvest techniques, fertigation & Water use efficiency, high density planting of orchards, Livestock Improvement, Animal Genetics & Breeding /Animal Biotechnology, Research in Embryo-transfer Technology/Veterinary Gynaecology, Animal Nutrition, Livestock Production and Management, Solar Thermal Energy, Solar PV, Bio-Energy, *Biofuels*, Export oriented research for post-harvest treatments, proper ripening practices, Research on storage and processing practices, etc..

Following new/ special innovative projects are proposed for plan with proper justification, objectives, action plan and proposed outlay

- ✓ Soil Health Cards to be prepared
- ✓ Subsidies for soil health inputs *Rs. 10 lac/district/year
- ✓ Proposal for organic seed production and storage
- ✓ Proposal for infrastructure development for storage of organic produce
- ✓ Proposal for the strengthening of research on organic and testing facilities
- ✓ Proposal for providing processing tools and facilities
- ✓ Proposal for marketing, supply chain, certification etc. under organic farming
- ✓ Proposed tractors District wise for Gujarat State
- ✓ Proposed Mini Tractors District wise for Gujarat State

- ✓ Proposed power weeder district wise for Gujarat State
- ✓ Proposed rotavator district wise for Gujarat State
- ✓ Proposed Diesel Engine with a pump for Gujarat State
- ✓ Proposed Threshers for Gujarat State
- ✓ Proposed Laser leveler for Gujarat State
- ✓ Proposed Cotton shredder for Gujarat State
- ✓ Proposed Plant Protection Equipments for Gujarat State
- ✓ Proposed Tractor and Bullock drawn seed cum fertilizer drill/planter for Gujarat State
- ✓ Proposed Combine harvester for Gujarat State
- ✓ Proposed Cultivator and different Plough for Gujarat State
- ✓ Proposed Power Tiller for Gujarat State
- ✓ Proposed Groundnut Decorticator for Gujarat State
- ✓ Proposed Maize Sheller for Gujarat State
- ✓ Proposed Paddy Transplanter for Gujarat State
- ✓ Proposed Sugarcane Transplanter for Gujarat State
- ✓ Proposal farm machinery equipment/implements – Reaper for Gujarat State
- ✓ Proposed Raised Bed Planter for Gujarat State
- ✓ Proposed Zero Till Drill for Gujarat State
- ✓ Proposed Roto/ Strip-Till Drill for Gujarat State
- ✓ Proposal farm machinery equipment/implements – Potato planter for Gujarat State
- ✓ Proposal farm machinery equipment/implements – Potato Digger for Gujarat State
- ✓ Proposal farm machinery equipment/implements – Groundnut digger for Gujarat State
- ✓ Water Resources Development: Water Harvesting Structures (WHS) etc..
- ✓ Groundwater recharge structures, open well, bore well recharge, etc.
- ✓ De-silting/deepening of reservoirs/lower downstream natural depression
- ✓ Land reclamation, Amelioration of water logged and saline soils
- ✓ Watershed Development
- ✓ Micro Irrigation System (MIS) etc
- ✓ Dug / bore well pump sets, lift irrigation sets for Minor irrigation
- ✓ Gobar bank and community biogas plants (85 m³ capacity each)
- ✓ Domestic biogas plants (2 to 10 m³ capacity with average 6m³)
- ✓ Biogas Purification and Bottling unit (average 2000 m³/day capacity)
- ✓ Briquetting units(Waste Utilization)
- ✓ Biomass Cook stoves/ Smokeless Chulas
- ✓ Biomass gasification
- ✓ Bio-ethanol (10,000-liter capacity) and Bio-diesel production (5000 liters capacity)
- *biodiesel plants
- ✓ solar cookers
- ✓ solar street lights
- ✓ solar Lantern (6-8W)
- ✓ solar water pumping system
- ✓ SPVpower plant (10 kW) for remote villages
- ✓ 1 MW Agriculture (Greenhouse) cum SPV Power pilot project at SAUs@ 12.0 cr/planta,
- ✓ SPV operated cold storages for 1000 MT storage capacity@ 15 cr(c) on farm fruits and vegetable storage for 10MT capacity@ 20 lakh
- ✓ Roof-top Small Solar cum Wind Turbine for Power Generation
- ✓ Wind pumps
- ✓ Establishment of Farmer's Training cum Exhibition Centre
- ✓ Strengthening of KVK by developing models of agriculture at KVKs

- ✓ Dissemination of Information to farming community through Android/IOS based Mobile App (M-Agriculture)
- ✓ Projects for Solar Agriculture KIOSK
- ✓ Capacity Building for adopting Climate Change
- ✓ Effect of environment on phenotypic performance of dairy cattle/buffaloes and strategies to deal with in climatic conditions of Gujarat
- ✓ Strengthening of APMC
- ✓ Establishment of rural godowns
- ✓ Establishment of processing units
- ✓ Development of terminal market
- ✓ District wise Establishment of small scale fruit and vegetable processing units
- ✓ District wise Establishment of cold storage
- ✓ District wise Establishment of location-specific research unit for value addition
- ✓ Establishment of small scale small cleaner cum graders for cereals (Power operated)
- ✓ Strengthening of Infrastructure facilities for Strengthening of processing facilities For Establishment of Mini Dal mills (district wise)
- ✓ Number of processing units and financial requirements for oil mill (district wise)
- ✓ Number of processing units and financial requirements for cotton ginning (district wise)
- ✓ Establishment of spice processing unit (Cleaning/grading/mill)
- ✓ Strengthening of Infrastructure facilities for rural godowns for storage of food grains including cereals, pulses, oilseeds, spices, etc
- ✓ Strengthening of Infrastructure facilities for onion & garlic godowns (district wise) and Budget requirement

State Plan

Major sector wise growth drivers were indicated to achieve the target plan. Compiled state plan according to 36 thematic area discussed in chapter 5. Detailed Component wise and programme wise plan are also discussed and overall State Plan is given here under.

Table- 2 Overall financial requirement proposed for development of all sectors under SAP (Sum of all district) (Rs. In Lakh)

SN	Crop/Enterprise	1 st year	2 nd year	3 st year	Total
		Fin	Fin	Fin	Fin
1	Rice	4,137.19	4,140.66	4,144.66	12,422.51
2	Wheat	8,957.01	8,622.90	8,764.92	26,344.83
3	Maize	835.01	830.01	829.01	2,494.03
4	Bajara	592.69	592.69	609.69	1,795.07
5	Sorghum	1,019.15	3,612.47	4,851.87	9,483.49
6	Small Millet	439.30	439.30	439.30	1,317.90
	Total	15,980.35	18,238.03	19,639.45	53,857.83
7	Sugarcane	788.40	788.40	788.40	2,365.20
8	Cotton	929.53	937.53	941.53	2,808.59
	Total	1,717.93	1,725.93	1,729.93	5,173.79
9	Groundnut	828.30	828.30	885.30	2,541.90
10	Castor	3,769.39	3,769.39	3,769.39	11,308.17
11	Mustard	691.05	690.99	690.99	2,073.03

SN	Crop/Enterprise	1 st year	2 nd year	3 st year	Total
		Fin	Fin	Fin	Fin
12	Sesamum	1,152.75	1,152.75	1,152.75	3,458.25
13	Soyabean	1,018.21	1,033.21	1,048.21	3,099.63
14	Niger	153.47	228.57	311.38	693.42
	Total	7,613.17	7,703.21	7,858.02	23,174.40
15	Pulses	3,532.64	3,532.68	3,532.68	10,598.00
	Total	3,532.64	3,532.68	3,532.68	10,598.00
16	Fruit and Flower	13,594.32	15,181.32	15,121.32	43,896.96
17	Vegetables	285.71	285.71	285.71	857.13
18	Spices	260.30	260.30	260.30	780.90
19	Agro forestry	641.28	641.28	641.28	1,923.84
	Total	14,781.61	16,368.61	16,308.61	47,458.83
20	Large animal	17,242.20	17,242.20	17,242.20	51,726.60
21	Small Ruminant	50.10	50.10	50.10	150.30
22	Poultry	152.00	152.00	152.00	456.00
23	Pack Animal	0.00	0.00	0.00	0.00
24	Fodder production	2,473.20	2,931.80	3,019.40	8,424.40
25	Fishery	903.65	3,412.45	3,218.05	7,534.15
26	Dairy Science	6,500.36	6,500.68	6,500.68	19,501.72
27	Animal Health	0.00	0.00	0.00	0.00
	Total	27,321.51	30,289.23	30,182.43	87,793.17
28	IPDM	457.35	457.35	457.35	1,372.05
29	Soil Health	0.00	5,225.00	5,225.00	10,450.00
30	Organic Farming	6,804.37	6,858.36	8,783.64	22,446.37
31	Farm Mechenization	59,134.00	60,603.00	62,362.00	1,82,099.00
32	Soil & Water Mng	1,07,711.10	1,07,711.10	1,07,711.10	3,23,133.30
33	Re. Energy	67,270.08	65,555.82	71,270.08	2,04,095.98
34	Ext & ICT	3,650.00	3,369.00	3,215.00	10,234.00
35	Climate Change	731.40	640.60	635.00	2,007.00
36	Marketing	15,046.00	15,046.00	15,192.00	45,284.00
37	Post-Harvest	129.40	810.20	11,089.20	12,028.80
	Total	2,60,933.70	2,66,276.43	2,85,940.37	8,13,150.50
	GT	3,31,880.91	3,44,134.12	3,65,191.49	10,41,206.52

Infrastructure Development Plan

Total 89 projects including two flagship programmes in detail with objectives, plan of work, total outlay in three year break up are discussed in chapter 6.

**Table- 3 Total Financial Requirements for Various Projects Proposed under SIDP
(Rs. in Lakh)**

Sr. No.	Project	1 year	2 year	3 year	Total
1	Establishment of Liquid Biofertilizer Mass Production Units (Biofertilizer Plants) for Fertigation and Soil Health Improvement				7260.00
2	Establishment of Agrinet for Gujarat State				359.06
3	Use of Sweet Sorghum as Bio-Fuel Production and Source of Second Generation Ethanol		1800	1800	3600.00
4	Value Addition in Sorghum		343.12	255.12	598.24
5	Discrimination of white spot of grain in wheat	16.33	16.33	16.34	50.00
6	Strengthening of Infrastructure Facilities Proposal for Infrastructural strengthening for research on wheat at Main Wheat research station, SDAU, Vijapur	566.0	11.9	10.9	610.8
7	Climate Change Impact Assessment, Adaptation and Mitigation Strategies for wheat in Gujarat	550.00	353.00	256.30	1159.30
8	Modernizing Existing Infrastructure for Quality Testing of Cotton at Main Cotton Research Station, NAU, Surat and Cotton Research Station, JAU, Junagadh	1056.00	23.80	21.80	1101.60
9	Promoting Cultivation of Salt Tolerant Cotton Varieties in Salt Affected Soils of Gujarat	91.0	19.5	13.5	134.0
10	Empowerment of Rural Women and Youth Through Cotton Production and Promotion of Solar Charkha, Spinning and Weaving and Garments Manufacture	402.00	402.00	11.00	815.00
11	Development of Cotton Pickers to Small and Large Holdings (In Partnership with John Deer or Suitable Company)	83.00	53.00	40.00	176.00
12	Promotion of Mobile Shredder and Rotavator for Cotton Crop Waste Management in Cotton Fields	225	225	225	675
13	Establishment of Value Addition Chain Especially for Small Millets in The Tribal Belt of the Gujarat.	300	300	300	900
14	Evaluation of Multipurpose Tree Species under Agroforestry Systems	70.80	736.80	478.80	1286.40
15	Research and Extension Training Scheme for Development of Forestry/Agroforestry for Food, Nutrition, Environment & Livelihood Security in The State	125.00	225.00	150.00	500.00
16	Establishment of Training Center for Repair and Maintenance of Farm Implements & Machineries in the State	7200	1200	1200	9600
17	Vocational Courses Institute for Maintenance and Repairs of Agricultural Implements	1090	170	100	1360
18	Establishment of Implements / Machinery Testing Centre at Banaskantha and	500	100	100	700

Sr. No.	Project	1 year	2 year	3 year	Total
	Vadodara Districts of Gujarat				
19	Establishment of Special Production Zone for Agricultural Implements, Equipments, Machinery and Irrigation Equipments at Porbandar, Banaskantha, Vadodara and Navsari Districts	800	100	100	1000
20	District Wise Physical and Financial Infrastructure Development Plan for Soil and Water Management	116475	116475	116475	349425
21	Status of Leopard and its Prey Base in Vansda National Park		27.24	16.24	43.48
22	Decision Support Systems (DSS) for Agroforestry Systems Adaptation in South Gujarat	195.80	1050.24	656.74	1902.78
23	Project for Rain Water Harvesting	200	200	200	600
24	Vegetable Grafting to Mitigate Abiotic and Biotic Stresses in Vegetable Crops	160.51	16.44	19.05	196.00
25	Strengthening of Existing Goat / Sheep Farms (State Government and University Farms)	80.0	80.0	80.0	240.0
26	Establishment of Elite Buck / Ram Mother Farms for Various Breeds of Goats / Sheep	400.0	400.0	400.0	1200.0
27	Establishment of New Sheep and Goat Conservation Farms in Gujarat	300.0	300.0	300.0	900.0
28	Establishment of New Sheep and Goat Feed Manufacturing Factories	400.0	400.0	200.0	1000.0
29	Strengthening of Existing Market Yards / Ghenta-Bakra Mandies for Small Ruminants	40.0	40.0	20.0	100.0
30	Establishment of Sheep and Goat Mobile Clinics (Van)	75.0	75.0	50.0	200.0
31	To Create Research Facilities for Study of Medicinal (Aurvedic) Properties of Goat Milk	40.0	40.0	20.0	100.0
32	Establishment of Feed and Fodder Banks for Sheep and Goat	1296			1296
33	Establishment of Regional Rabbit Farms			18.0	18.0
34	Establishment of Poultry Extension and Research Institute (PERI) in the State	1250	5350	3400	10000
35	Establishment of Central Poultry Disease Diagnostic Laboratory	125	535	340	1000
36	Establishment of Mobile Poultry Health Monitoring Units (regional)	92	94	14	200
37	Establishment of Regional Poultry Farmer's Training Centers	1300	670	30	2000
38	Strengthening of Existing Poultry Breeding Farm and Hatcheries	80	160	160	400
39	Establishment of New Breeding Farm and Hatcheries	800	1600	1600	4000
40	Strengthening of Existing Poultry Feed Production Units	70	400	230	700
41	Strengthening of Existing Vaccine Production Unit in the Public Sector	10	60	30	100
42	Creation of Cold Storage Facilities for Poultry Products	150	400	250	800

Sr. No.	Project	1 year	2 year	3 year	Total
43	Strengthening of Existing and Establishment of New Poultry Testing Laboratories	150	250	250	650
44	Establishment of "Veterinary Disease Diagnosis and Research Laboratories (VDDRL) under four Veterinary Colleges of all the four SAU's of Gujarat State"	1066.12	1036.12	675.12	2777.36
45	District Wise Proposals for Cold Chain of Milk Handling (Bulk Milk Coolers)	47.65	47.65	47.65	142.95
46	District Wise Proposal for Automated Milk Collections System (AMCS)	942	942	942	2825
47	Establishment of Pack Animal Research Institute (PARI)	12000	10000	8000	30000
48	Strengthening of Existing Dairy Industries to Process and Market Camel Milk	2180	1140	680	4000
49	Value Addition and Marketing of Camel and Donkey Hair By-Products	600	400	200	1200
50	Improve and Increase Biomass to Enhance Camel Milk Productivity	230	190	80	500
51	Establishment of State Epidemiology cum Surveillance Center for Animal diseases	2000	1000	750	3750
52	Establishment of Center of Excellence in Ruminant Medicine	800	600	200	1600
53	Establishment of Regional Fisheries Trainers' Training Centres	20	500	440	960
54	Strengthening of existing ornamental fish breeding centres (three) functioning under the State fisheries department, Government of Gujarat	30	90	90	210
55	Establishment of Fish Disease Diagnosis Centre in South Gujarat, Central Gujarat and Saurashtra	30	405	405	840
56	Establishment of modern aquaculture farm complex	40	400	280	720
57	Establishment of quality control laboratory in Saurashtra and South Gujarat	30	405	405	840
58	Establishment of Research and Training Centre for Seaweed	47	42	42	131
59	Establishment of plant health clinical laboratories	1497.37	1647.11	1811.82	4956.30
60	Establishment of Bio-control Laboratory	1497.37	1647.11	1811.82	4956.30
61	Establishment of Pesticide Residue Laboratory		503.12	553.43	1056.55
62	Establishment of new soil testing laboratories in newly for districts of state		690.00	690.00	1380.00
63	Create Facility of Inductively Coupled Plasma (ICP) in zone wise government laboratories and in SAU's.		200.00	200.00	400.00
64	Establishment of Advance Research cum Training center on soil health at four SAU's	804.72	207.12	207.12	1218.96
65	Establishment of training center for repair and maintenance of farm implements & machineries in the state	7200	1200	1200	9600
66	Vocational courses institute for maintenance & repairs of agricultural implements	1090	170	100	1360
67	Establishment of implements/ machinery	500	100	100	700

Sr. No.	Project	1 year	2 year	3 year	Total
	testing center at Banaskantha and Vadodara districts of Gujarat				
68	Establishment of Special Production Zone for agricultural implements, equipments, machinery and irrigation equipments at Porbandar, Banaskantha, Vadodara and Navsari districts	800	100	100	1000
69	Strengthening of training infrastructure facilities at farmers Training Center (district level) and Farm information and Advisory Centers (FIACs – at block level)	46961	35961	27500	110422
70	Establishment of Community Radio Station	564.12	564.12	564.12	1692.36
71	Strengthening of Krushi Vigyan Kendra	5430	5430	5430	16290
72	“Development, maintenance, evaluation and characterization of male sterile lines in fennel (<i>Foeniculum vulgare</i> Mill.)”	15.61	16.91	18.26	50.78
73	Value Enhancement of Cumin through Organic Cultivation	18.37	19.22	19.82	57.41
74	Capacity Building / Farmers Awareness Programme for adapting Climate Change	38.65	42.54	46.80	127.99
75	Development of an ICT tools for awareness and dissemination of advisory services for farmers.	45.00	39.88	42.06	126.94
76	Establishment of National Institute of Renewable Energy Technology at Rajkot (gujarat)	4237.8	1283.47	1083.5	6604.77
77	Establishment of Postgraduate Institute of Veterinary Education & Research at Kamdhenu University	2788.6	1000	1000	4788.6
78	Strengthening of Vice Chancellor's Office at Kamdhenu University	200	100	129	429
79	Establishment of Veterinary Hospital at Kamdhenu University	1164.5	1129.6	1164.5	3458.6
80	Establishment of Instructional Farm for Veterinary Science at Kamdhenu University	221.5	66	221.5	508.925
81	Establishment of Farmers Training Center for Animal Husbandry, Dairy and Fisheries at Kamdhenu University	200.8	99.4	200.8	500.975
82	Development of Animal Forage Farm at Kamdhenu University	143	101	143	387
83	Establishment of Information and Communication Technology Center in Animal Science at Kamdhenu University	100	100	100	300
84	Establishment of Students' Training Dairy	464.4	158.8	464.4	1087.595
85	Establishment of Postgraduate Institute of Dairy Education & Research at Kamdhenu University	1102.4	785.2	1102.4	2990.0
86	Establishment of Dairy Animal Farm at Kamdhenu university	413.8	144.3	413.8	971.8
87	Establishment of Camel Research Station at Kamdhenu University	200	200	200	600
88	Establishment of Mobile Veterinary Ambulatory Clinic at Kamdhenu University	46	16.2	46	108.3
89	Establishment of Kamdhenu University Central Library	5	30	5	40
	Total	242196	205652	189744	637624

CHAPTER – 1

INTRODUCTION

1.1 Prologue:

Doubling Farmers' Income by 2022-23 has become the watchword of the current agricultural policy scenario in India. The Hon'ble Prime Minister of India, Shri. Narendrabhai Modi, envisioned this target on February 28, 2016, while addressing farmers in Bareilly district of Uttar Pradesh. The target year (i.e. 2022) has more special connotations since that happens to be the 75th year of the country's Independence. As the policy level deliberations of various stakeholders toward identifying farm income issues and affixing strategies have gathered steam all over the country, it is beyond doubt that the Hon'ble Prime Minister's vision has certainly made a paradigm shift in our thinking process from ensuring food security to addressing income security. To fuel his vision, he also unveiled a seven-point strategy for doubling farmers' income *viz.* focused measures to scale up irrigation; providing quality seeds and assuring nutrients based on soil health; large investments in post-harvest technologies; prioritizing value addition, creating National Farm Market; leveraging PMFBY, and promoting on-farm ancillary activities.

Therefore, our policies in the SAP must stand with a potential to gain on all these trivial counts. Sixty-five percent (65%) of Gujarat State's population is either wholly or significantly dependent for their livelihoods on agriculture, horticulture, animal husbandry or fisheries.

The Gujarat Government envisages agriculture promotion through focused agricultural research and dissemination of useful scientific knowledge at the farmers' doorsteps through technological interventions. Liberalization has boosted the process of agricultural commercialization in Gujarat. This was possibly aided by the enhanced availability of water due to Sardar Sarovar Project (SSP) and some proactive Government initiatives such as subsidized electricity, extension services, soil health cards, mass-based groundwater recharge through small water harvesting structures and spread of micro-irrigation.

Government of Gujarat rightly took several initiatives likes 1) Supply of good quality planting material (grafts, saplings, and seeds) for horticultural crops; 2) Introduction of new crops; 3) Cultivation of waste/fallow land, border plantation, inter-cropping and crop rotation; 4) Increasing productivity by using sophisticated technology such as micro-irrigation systems; 5) Promoting corporate/contract farming, export oriented production practices; 6) Strengthening of marketing societies; 7) Provide training to farmers for post-harvest packaging and orchard management; and 8) Establishment of export zones for onions and fruits & vegetables processing **in the past to achieve the current agricultural growth rate of about 11% and thus has become the growth-engine for agricultural development in India**, when the country's growth rate is less than 3%.

As per the directives from Government of Gujarat to prepare the Comprehensive District Agriculture Plans (2017-18 to 2019-20) by the Agricultural Universities for all the districts under their jurisdiction. These plans present the vision for agriculture and allied sectors within the overall development perspective of the district apart from financial requirements and the sources of the financing agriculture development plan in a comprehensive way, in order to further strengthen agriculture during 2017-18 to 2019-20. The District Agriculture Plan (DAP), therefore has potential to integrate multiple programs that are in operation in the district concerned, including the resources and activities indicated by the state and combined the resources available from the other programs.

1.2 Objectives and Expected Outcomes:

Keeping above points in view, the present SAP includes database/information as made available through DAPs and is prepared with the following objectives.

- Analysis of the existing farming practices to identify the development opportunities and potentialities for employment generation in agriculture and allied sectors.
- Collection and analysis of secondary data on agriculture and allied sectors and documentation of existing marketing pattern.
- Identification of production constraints and technological gaps for understanding prevailing agricultural and allied situations in the state.
- Need-based analysis for future employment generation, export potential, resource conservation and infrastructure development.
- Formulation of short and long-term strategies and action plan for different agricultural and allied sectors, production systems to increase productivity, production and farm income.

1.3 General Information:

The State of Gujarat lies between 20°1' and 24°7' N latitude and 68°4' and 74°4' E longitude. The tropic of cancer passes through Gujarat state. The state has a geographical area of 19.6 m ha accounting for 6.19% of the total geographical area of India with a coastal line of 1600 km. Gujarat shares borders with the state of Rajasthan to the north, Madhya Pradesh to the east, Maharashtra, Union territories of Diu, Daman, Dadra and Nagar Haveli to the south and international border with Pakistan to the north-west. The state is bounded to the southwest by the Arabian Sea with Gulf of Khambhat and Kachchh. The population of India is 121.06 crore (62.31 crore males and 58.74 crore females). The population of Gujarat is 6.04 crore (3.15 crore males and 2.89 crore females) comprising a rural population of 3.47 crore and urban population of 2.57 crore. The rural population has increased by 29.54 lakh and the urban population by 68.15 lakh in the last decade (Anon., 2011). The population of Gujarat in 2001 was 5,05,96,992 comprising 2,63,44,053 males and 2,42,52,939 females. It formed 4.93% of India's population. Compared to the national average of 72.22%, only 62.65% of Gujarat's population lived in villages. Population density in the State was 258/km². Central and Southern Plains of Gujarat were the most thickly populated while Kutch had the lowest (34/km²) density.

1.4 Agricultural Scenario of Gujarat State:

Gujarat is one of the fastest growing states in India. The state has adopted a novel pattern of progress with the strategic development of the key sectors like energy, industry, and agriculture for which it has achieved ambitious double-digit growth rate since 10th Five Year Plan period. As per Census 2011, about 3.47 crores people of the state live in rural areas forming about 57.4 percent of its total population (GoG, 2011). About 70.5 percent of total workers in the state is rural based. Agriculture continues to be the primary occupation for the majority of rural people in the state. About 51.8 percent of total workers are cultivators and agricultural labourers. Thus, the agriculture in the state has been a major source of labour absorption. Moreover, agriculture provides indirect employment to a large portion of the population in agro-based occupations. Thus, prosperity and well-being of people in Gujarat are closely linked with agriculture and allied activities. The State is endowed with abundant natural resources in terms of varied soil, climatic conditions and diversified cropping pattern suitable for agricultural activities.

Gujarat has a geographical area of 196 lakh ha, out of which, 55.10 % is under agriculture land i.e. 10.8 Mha. The major crops grown in the state are wheat, bajra, rice, maize, groundnut, mustard, sesame, pigeon pea, green gram, gram, cotton, and sugarcane. Bajra, paddy, maize, groundnut, castor, cotton, tobacco, and pulses are the main Kharif crops and wheat, mustard and rapeseeds are the main rabi crops grown in the state. The state has a wide range of cropping systems viz. Cotton-Wheat-Bajra, Mung-Wheat-Bajra, Cotton-Wheat-

Mung, Cotton-Wheat, Groundnut- Wheat, Paddy-Wheat-Bajra, Paddy-Wheat etc.

Gujarat is the largest producer of castor, fennel, tobacco, and Isabgol (psyllium), whereas it is the second largest producer of sesame seeds, cotton and groundnut in the country. Gujarat has the highest productivity in mustard, castor and cotton also have second highest productivity in groundnut and bajra and third highest productivity in gram and guar in the country.

The major vegetables grown in Gujarat are Onion, Potato, Brinjal, Tomato, Okra and Cucurbits. The state also produces spices viz. Cumin, Fennel and Garlic. The state is leading in productivity of onion, tomato, banana, potato and pomegranate at the national level. The state has also introduced new horticulture crops like cashew nut, palmarosa, sweet orange and medicinal crops. Onion dehydration industry of the state is biggest in the country. In floriculture flowers like; carnation, gerbera and rose are cultivated using Hi-Tech Green House. Moreover, the state enjoys a monopoly in the processing of Isabgol. Horticultural Crops are grown in about 14.04 lakh ha. In 2001, Gujarat produced 23 lakh bales of cotton, but today the figure stands at 123 lakh bales (one bale equals 170 kg).

1.5 Cereals Crops:

Cereals are grown on one-third of the cultivated land of Gujarat. Rice occupies about 10.61 % of the gross cropped area of the State and accounts for around 25.5 % of the total food grain production. It is grown on an average about 7.5 to 8.5 lakh hectares of land comprising nearly 70 to 80% of the low land (Transplanted) and 15 to 20 % of Upland (Drilled) rice.

Wheat is grown on 0.9 – 1.6 M ha that comprises 23 % of the land used for cereals. The average wheat production and productivity in Gujarat was 38.12 lakh T (2011- 12 to 2016-17) and 29.96 and 30.16 q/ha respectively. The state has nearly 45.90 % of the area under irrigation, though the irrigated wheat comprises 94 % of the total area.

Pearl millet is a drought tolerant and thermo resilient cereal grown in the state. It is more tolerant of high temperatures than any other cereal. India ranks third in the area after rice and wheat among cereals and is grown in Gujarat, Rajasthan and Haryana. It is valued for both, its grain and stover due to high protein content, balanced amino acid profile, and high levels of iron, zinc and insoluble dietary fiber. It is popularly known as “Nutri food”. In Gujarat, *Bajra* is grown in 26 out of 33 districts covering an area of 1.7 lakh ha in *kharif* with an average productivity 1567 kg/ha and around 2.84 lakh ha area under summer cultivation with an average productivity of 2726 kg/ha. The total area of *Bajra* in the state is 4.54 lakh ha (2016-17) with an average productivity of 2292 kg/ha. Area during summer cultivation is increasing gradually due to a short period of time window available to the farmer after *rabi* crops, increased demand for fodder and suitable climatic condition. The cultivation of pearl millet during the summer might reduce the instability as the crop is grown under irrigated conditions, which gives higher yields and returns.

Maize is a staple food and fodder of tribal people of the eastern region of Gujarat and emerging as a raw material for maize-based industries, viz. starch, protein, oil, ethanol (bio-fuel), poultry and animal feed including specialty corns (quality protein maize, sweet corn, popcorn and baby corn). Maize accounts for a little more than half of the production of coarse cereals. It ranks third after rice and wheat across the world and India in production. Panchmahal, Dahod, Vadodara, Chhota Udaipur, Mahisagar, Sabarkantha, Aravalli and Banaskantha are main districts where maize is grown in *kharif* / *rabi* season. The Gujarat state had grown maize in 5.00 lakhs hectare land with production 8.4 m.m. tons and 1800 kg/ha yield in 2016. It survives better and is resilient under climate change than paddy and wheat.

Sorghum is another important food and fodder crop of dryland agriculture and ranks third in area and production after rice and wheat in India. Though sorghum is known for its versatile use, hardiness, dependability, the stability of yield and adaptability over a wide range of climate, the edaphoclimatic conditions in the sorghum growing areas of the world limit the crop production. The crop is often grown in poor soils by farmers who have little resources for control of moisture and purchase of fertilizers, insecticides and other inputs. The crop accounts for nearly 52% of the area and 63% of production under millets with an area of 15.8 M ha and a production of 11.85 T. In Gujarat, sorghum is grown as grain crop in South Gujarat, dual purpose in North Gujarat, Kutchh, and Saurashtra while partly as fodder in dairy developed. The total rabi and kharif grain sorghum occupied 84.4 thousand hectares with 11.12 lakh tonnes production and average 1323 kg/ha productivity in the state (2015-16).

Other Crops like small millets comprising the small-seeded cereal crops namely Finger millet, Little millet, Kodo Millet, Foxtail millet, Banti and Cheena are grown in hilly areas of Gujarat. These small millets are the staple food especially of the tribal in Gujarat. Among them, they grow mostly Nagli (Ragi) and Vari (Little millet).

1.6 Oilseed Crops:

Gujarat plays a prominent role in oilseed production in India. Oilseeds are important next to food grains in terms of area, production and value in the state. The major groundnut growing districts include Junagadh, Jamnagar, Rajkot, Amreli, Bhavnagar, Kachchh, Porbandar and Banaskantha. These eight districts altogether account for about 92.88 % of total area and 91.61% of the production of groundnut in Gujarat. In Gujarat, groundnut is cultivated mainly in *kharif* season (rain-fed conditions) with low inputs and if available, with protective irrigations. In *kharif*, the pressure of diseases, insect pests and weeds are high.

Sesame productivity in Gujarat (4.15 Q/ha) is close to the productivity at the national level (4.29 Q/ha), One of the reasons for low productivity is rainfall dependent growing conditions with low input management.

Soybean, as a new crop in the state, has been introduced in the recent past. Now the crop is under cultivation in selected pockets of south Gujarat and middle Gujarat. The area under soybean in the year 2015-16 was 0.803 lakh hectares accounting total production of 0.635 lakh tones with the productivity of 790 kg/ha. The area under this crop is increasing day by day and became almost double as compared to the year 2011-12 (0.421 lakh hectares) but productivity is low as compared to that of national level.

Castor is an important industrial non - edible oilseed crop of arid and semi-arid regions. Gujarat is leading state in castor production in the country with 0.8 M ha cultivated area, which is about 60 % of total castor area of India and total production of 1.7 T, which is about 80 % of total castor production of India. Castor oil is of much industrial use. India is a leading exporting country of castor oil and its derivatives of worth more than Rs. 4000 crores. The castor growing area in Gujarat is increasing day by day.

Mustard is an important edible oilseeds crop of arid and semi-arid regions. It is grown extensively in rainfed as well as in irrigated conditions. In Gujarat, mustard is grown in 2.14 lakh ha with 0.32 MT of total crop production. North Gujarat is the main mustard producing area. This crop accounts for 22.7 % of total oilseed production and 19.2 % of the total cropped area in the country.

1.7 Pulse Crops:

Pulses not only provide nutritional security but also improve the soil health. India is the largest producer, consumer and importer of pulses. Different pulse crops are grown in the state with a total area of 0.9 Mha and are cultivated in all three seasons. Pulses cultivation is not distributed uniformly in the state. Pigeon pea is cultivated in the south and middle Gujarat,

Mung bean, Urd bean and Moth bean are predominant in North Gujarat and Gram is distributed throughout the state. Cowpea and Mung bean are grown in the summer season in middle and north Gujarat. During *Kharif* season, the major pulse crops are Pigeon pea, Mung bean, Urd bean, Cowpea, Moth bean, Horse gram, while in *rabi*, Gram accounts for major area. In the summer season, Mung bean and Cowpea are cultivated. The major pulses growing districts of Gujarat are Vadodara, Panchmahal, Kachchh, Bharuch, Banaskantha, Dahod, Narmada, Patan, Sabarkantha and Surat. As far as pulses production is concerned, Gujarat occupies the seventh position.

1.8 Cash Crops:

Gujarat has glorious past and glittering present ahead of all the states on the national map of cotton production and /or productivity. Cotton is cultivated in all the districts of the state except Valsad, Navsari and Dang. The major cotton growing districts are Surendranagar, Rajkot, Bhavnagar, Amreli, Ahmedabad, Junagadh, Jamnagar, Sabarkantha, Vadodara and Bharuch. Nearly 26.8 % cropped area of the state is occupied by cotton, which played a pivotal role in the economy of the state providing employment to rural people. Increasing area of Bt hybrid cotton year by year reaching to the record cultivation of 30 lakh ha in 2014-15. Even after foregoing the higher cost of cultivation for Bt cotton due to higher seed cost, net profit is reported to increase by 75 percent with the adoption of Bt cotton, thus explaining the success of Bt cotton in Gujarat. This might be due to (a) low cost of cultivation, (b) resilient to pest and diseases and (c) high revenue. In Gujarat, cotton occupied 26.8% of the gross cropped area (9.88 million ha) of the state; however, the productivity is stagnant since last five years (from 2012-13 to 2016-17) around 550 to 650 kg/ha. During 2017-18, cotton lint productivity raised to 819 kg/ha, which is two to three times lower than Brazil and Australia (2000 to 2500 kg/ha) which provide ample scope for improvement. Cotton is one of the key drivers in Gujarat agricultural development from 1980-81 to 2017-18. During 2015-16, the total increase in value output was 6162.90 corers with 15.0 percent contribution to the value increase in gross of agricultural output.

Sugarcane is an important cash crop in India having economic, political and sociological significance. It is a major source of food, fuel, fodder and fiber. The sugar industry is the second largest agro-industry next to textiles. Sugarcane is a tropical crop and is cultivated in 0.18 Mha, producing 12.96 MT of cane at approximately 71 T/ha in Gujarat (2015-16).

1.9 Integrated Pest and Disease Management (IPDM):

Integrated Pest and Disease Management (IPDM) programs allow growers to monitor pests and diseases to ensure that thresholds are not exceeded. Maintenance of crop health is essential for successful farming for both yield and quality of the product. This requires long-term strategies for the minimization of pest and disease occurrence preferably by enhancing natural control mechanisms for growing a “healthy crop”. Specific measures include the use of disease- and pest-resistant crops, rotation of crops, including those with pasture, to provide disease breaks for susceptible crops, apply non-chemical control practices (thermic, mechanical) as applicable and as for last resort, the tactical use of agrochemicals to control weeds, pests and diseases. The method provides information for the critical and the best times to apply control agents, optimizing inputs and reducing environmental consequences.

1.10 Soil Health:

Soil health is a state of a soil meeting its range of ecosystem functions as appropriate to its environment. Soil health needs to be assessed at regular intervals so as to ensure that farmers apply the required nutrients while taking advantages of the nutrients already present in the soil. The soil is not just an inert, lifeless growing medium; rather it is a living, dynamic and ever-so-subtly changing whole environment. The soil is a living and life-giving natural resource. As world population and food production demands rise, keeping our soil healthy and productive is of paramount importance. Improving the health of our Nation's soil is one of the most important conservation endeavors of our time. Imbalanced use of fertilizers, the low addition of organic matter and non-replacement of depleted micro and secondary nutrients over the years, keeping the soil healthy and productive is of paramount importance.

Economic use of the fertilizers (chemical and organic) requires the information on the existing fertility status of the soil. A Soil Health Card is used to assess the current status of soil health and, when used over time, to determine changes in soil health that are affected by land management. A Soil Health Card displays soil health indicators and associated descriptive terms. **In this direction, Gujarat is the first state in the country to issue Soil Health Cards to the farmers for increasing the resource use efficiency and for sustaining agriculture productivity. The state had completed analysis work of soil samples of all 46.61 lakh farmer and distributed soil health cards to farmers from the year 2011- 12 to the year 2015-16. From the year 2016- 17 Gujarat government has started implementation of soil health card scheme as per Gol norms. Other states have also initiated soil health card system in the same lines that of Gujarat.**

1.11 Bio-fertilizers:

Biofertilizer are microbial inoculants containing live or latent cells of useful strains and organic input, which fix atmospheric nitrogen, solubilize phosphorous, mobilize potash and also make micronutrient available in the soil. Bio-fertilizers also stimulate plant growth through the synthesis of plant growth promoting substances and/or antibiotics and termed as PGPR. They are used for enhancing the productivity of the soil. Injudicious application of chemical fertilizers coupled with intensive agriculture has impacted adversely on soil health and productivity. Application of this enormously efficient and low-cost technology of biofertilizer can effectively improve soil health and increase agricultural production in an eco-friendly manner; however, the technology yet not reached to the end users effectively. Hence, district wise set up of biofertilizer production plants to make them available to the doorstep of farmers is very much essential and need of the future for sustainable agriculture production. Recently introduced new technology for Bio NPK consortium supplementing all macronutrients for crops in single product application.

1.12 Organic Farming:

Increasing consciousness about conservation of environment as well as of health hazards caused by agrochemicals has brought a major shift in consumer preference towards food safety and quality.

In India, about 5,28,171 ha area is under organic farming (this includes certified and area under organic conversion) with 44,926 number of certified organic farms. This accounts for about 0.3% of the total agricultural land. About 5,85,970 tons of organic products exported from India (APEDA, 2014-15). India's rank in terms of world's organic agricultural land was 15 as per 2013 data (FIBL & OFOAM yearbook, 2015). The total area under organic certification is 5.71 million hectares (2015-2016). This includes 26% cultivable area with 1.49 million

hectares and rests 74% (4.22 million hectares) forest and wild area for collection of minor forest producers.

Our country produced around 1.35 million MT (2015-16) of certified organic products which include all varieties of food products namely sugarcane, oilseeds, cereals and millets, cotton, pulses, medicinal plants, tea, fruits, spices, dry fruits, vegetables, coffee etc. The total volume of export during 2015-16 was 2,63,687 MT in 50% itself contributed by oilseeds (50%) followed by processed food products (25%), cereals and millets (17%), tea (2%), pulses (2%), spices (1%), dry fruits (1%) and others (NPOP, 2015).

Gujarat is bestowed with a lot of potentials to produce all varieties of organic products due to its diverse agro-climatic regions. In several parts of the state, the inherited tradition of organic farming is an added advantage. This holds promise to fetch the premium price to the organic producers by tapping steadily growing domestic and international markets of organic produce. Therefore, it is very essential to know the present status, potential and other relevant issues of organic farming under agro-climatic conditions of Gujarat.

1.13 Horticulture Crops:

Horticulture constitutes an important segment of agriculture which is recognized as a crop diversification option in Indian agriculture. In Gujarat, horticulture sector contributes about 29% to the GDP and 37% of export of the agricultural commodities which played an important role in ensuring food security, income generation and uplifting the socioeconomic status of farmers. Due to value addition and commercialization of horticultural produce globally, the demand of these has increased exponentially in the recent past. Accordingly, high priority has been accorded to development of horticulture. However, there is still a gap between demand and supply of many horticultural commodities.

The area under total horticultural crop have increased from 7.54 lakh ha (2002-03) to 16.10 lakh ha (2016-17) with the production of 67.16 lakh MT (2002-03) to 243.02 lakh MT (2016-17) with the fourth position in a country which indicates a significant growth of the sunrise sector in the state.

Banana, mango, citrus and sapota (*Chiku*) are the major fruit crops grown in Gujarat. Although, the area and production under fruit crops are increasing rapidly the productivity is not increasing in the same trend. Fruit crops are cultivated in all the districts of the state. However, the major fruit crops like mango and sapota are cultivated mainly in Valsad, Navsari and Junagadh districts, whereas, banana in Valsad, Navsari, Narmada and Baroda districts of the state. Acid lime is more growing in the districts of North Gujarat and Bhavnagar district of Saurashtra. Guava is also grown with higher acreage in Bhavnagar district. Pomegranate is emerging arid fruit of Saurashtra region and the area under cultivation is increasing with a fast rate. At present, Gujarat is sharing with 23.11 % papaya, 20.22 % sapota and 13.36 % banana production of India with the second number in banana productivity and third in pomegranate productivity within India. Nearly 19.50 percentage cropped area of the state is occupied by the fruit crops which played a pivotal role in the economy of the state and providing employment to rural people.

Floriculture has also paved fast and flourishing well with the production of 195.98 thousand MT flowers under 20641 ha area in the state (2016-17) with the fifth rank in the country regarding production (8.0%). The country rose, marigold, spider lily, jasmine, gaillardia, annual chrysanthemum, tuberose occupy maximum area under floriculture in Gujarat. Navsari and Valsad districts emerged as a hub of spider lily flower with the major markets of Mumbai, Ahmedabad, Surat, Vadodara, etc. Vadodara, Bharuch and Ahmedabad are districts in jasmine production while Central and South Gujarat are leading in marigold production. Because of favourable agro-climatic conditions, high-value flower crop like an orchid (*Dendrobium*) is also becoming popular among farmers in Surat and Navsari districts.

South Gujarat has also emerged as flower basket because of favourable climatic condition for protected cultivation of gerbera and many units established.

Florists of the cities purchase cut flowers like orchids, cut roses, gladiolus, etc from neighboring state Maharastra, therefore, a bright future of this sector in the state. Periurban areas of Gujarat.

1.14 Spices:

On an average, seed spices are grown on 4,19,819 ha of land. Gujarat is the leading state for producing cumin and fennel. The share of Gujarat for cumin and fennel is 63 and 73 percent in area and 73 and 92 percent in production. Gujarat ranks first at National and International levels in average productivity. Within the state, seed spices cultivation area fall in Saurashtra, North Gujarat and Middle Gujarat. Gujarat grows various seed spices viz., cumin (*Cuminum cyminum* L.), fennel (*Foeniculum vulgare* Mill.), coriander (*Coriandrum sativum* L.), Fenugreek (*Trigonella Foenum graecum* L.), ajowain (*Trachyspermum ammi* S.) and dillseed (*Anethum graveolens* L.) in scattered pockets. The state has also a wide range of cropping systems viz. Jowar/Bajra-seed spices, Mung-cumin/fennel, Sesamum-seed spices etc.

1.15 Soil and Water Management:

Growing world population and increasing standard of living are placing tremendous pressure on soil and water resources and necessitated for judicious utilization and management of these resources without adverse environmental consequences. Soil degradation and water quality deteriorated due to overexploitation of these natural resources, coastal land inundation from sea tidal water and falling water table enriched with a salinity of groundwater and soil. Hydro-climatic extremes, low irrigation efficiencies, low water productivity added another dimension to low productivity in irrigated and rainfed agriculture. Necessary low cost, eco-friendly technological soil and water interventions are necessary for sustaining the productivity of water and soil.

Gujarat Government has created history in water conservation by constructing more than 3.5 lakh check dams, boribundhs and khettalavadies (farm ponds). The water conservation work was carried out by various state Govt. departments in cooperation with NGOs and the private sector during last 10 years, which has brought up the groundwater level throughout the state and increased the agriculture income by four folds. On behalf of Government of Gujarat, GGRC as an implementing agency aims to promote Micro Irrigation System (MIS) to bring 2nd green revolution. MIS saves water and energy, besides multiple benefits to improve agricultural productivity and farmer's prosperity at large. In this scheme 39086 large farmers covering 105358 hectares, 100768 marginal farmers covering 70837 hectares, 540935 medium farmers covering 1038901 hectares and 304553 small farmers covering 368993 hectares were benefited to October- 2017.

1.16 Farm Mechanization:

Farm mechanization has been helpful in improving the productivity of different crops, time-saving, reducing drudgery, timely farm operations, resource conservation and protection from natural calamities. Use of crop harvesting machines ensures early completion of harvesting and threshing works which avoids the untimely rainfall and storms hazards, particularly in wheat. Seed grader, laser leveler, bed planter, etc. needs large-scale adoption. There is a need to create more awareness among farmers for proper use of farm machinery for higher efficiency, saving human and energy resources etc.

1.17 Animal Husbandry:

The livestock sector, especially dairy farming, regarded as the powerhouse of growth, is most vibrant in Gujarat. It plays a pivotal role in rural livelihood, nutritional security and national economy by contributing significantly to the agricultural gross domestic product. Cattle and buffaloes contribute to food and nutritional security through milk, meat (buffalo meat), provide draught animal power, manure for crop production and various raw materials for several industries. Milk production in Gujarat during the year 2017 was 10.315 million MT and its share in country's milk production is 7.38% (140 million MT in India). The status and progress in the dairy husbandry sector have been directly or indirectly affected by a number of factors viz., breeding and health coverage programs, various inputs, infrastructure facility and change in demand and price of livestock products.

Gujarat ranks 12th and 15th in egg and poultry meat production, respectively in the country. The average annual growth rate in egg production in last decades (i.e. 2000-01 to 2010-11) is 15.34% which is much higher than the national average (5.58%). In view of modernization, ever-changing lifestyle and demand of quality protein resources there is tremendous scope for development of poultry farming in the State through improvement in production, infrastructure, better inputs and services, training to youth and women and providing organized marketing networks.

Small ruminants provide livelihood opportunities for marginalized section of society hence emphasis is placed on the capacity building of these stakeholders for scientific sheep and goat rearing. Gujarat is privileged to possess five recognized breeds of goats and one recognized breed of sheep.

The contribution of milk alone is higher than the major agricultural crops like paddy, wheat and sugarcane. Nonetheless, the contribution of the gross value output from livestock to agriculture and livestock sector improved consistently from 15% in 1981-82 to 23% in 2011-12. Total 42.66 lakh families keep livestock as a primary or secondary source of income and contribution of the gross value output from livestock to Total GSDP was estimated at ₹ 30.24 crores. In Gujarat, livestock sector has achieved the remarkable milestone of over 103 lakh T annual milk production in the year 2017. Collective efforts of Government organizations, Non-Government organizations and the farmers have resulted into the sustainable and steady growth of livestock sector and the consumption of livestock products is growing faster than the cereals.

Gujarat state has a diversity of more than 18 domestic animal breeds. Milk production in Gujarat grew at a higher rate than that of a nation and hence the contribution of state in national production increased from 6.5% to 7.5% during last 15 years. The demand for milk and milk products is expected to grow rapidly with the rise in per capita income both in Gujarat as well as in India.

The livestock sector plays important role in the rural economy through employment to uneducated youth and woman and income generation amongst landless labourers and marginal farmers especially in semi-arid districts of north Gujarat.

1.18 Fisheries:

Gujarat is endowed with a wide range of marine and inland aquatic resources. **Gujarat occupies the first position in the production of marine fish (0.71 T/year) with a share of 24 % in the total production of the country.** Value of fish production is ₹ 1200 crore per annum and export worth ₹ 390 crores. In inland fisheries, catla, rohu, mrigal is the major fish varieties. The state has a long coastline extending to 1600 km, a continental shelf area of 0.18 million km², Exclusive Economic Zone (EEZ) of 0.214 million km², rivers and tributaries extending to 3865 km, reservoirs of 0.286 million ha, ponds and tanks of 0.071 million ha and

brackish water area of 0.376 million ha. Gujarat occupies 32% of the continental shelf area and 10% of the total EEZ of India. Inland fish production is 8-10 % of the total fish production in the state.

1.19 Forestry:

Gujarat state is composed of four forest types viz., i. Tropical Moist Deciduous Forests (Type 3B), ii. Littoral and Swamp Forests (Type 4B), iii. Tropical Dry Deciduous Forests (Type 5A) and iv. Northern Tropical Thorn Forests (Type 6B), that includes over 30 sub-types of the forest. As per recent data (ISFR, 2017), the forest cover of Gujarat is 14,757 Sq. Km contributing 7.52 percent of the state's geographical area. Area wise, Kachchh, Junagadh and The Dangs districts represented the maximum forest area of 2,312 and 1634 and 1368 Sq. Km, respectively. However, percent forest cover is highest in The Dangs district (77.5% of district's geographical area), followed by Narmada (34.2% of district's geographical area). The total carbon stock of the forests in the State is 110.697 million tonnes, which is 1.56 percent the total forest carbon of the country.

1.20 Extension and ICT Initiatives:

Information and Communication Technology (ICT) accelerate sustainable agricultural development and enhances productivity. Promoting Agricultural Information Systems programs like *Krusha Mahotsav*, training, demonstrations, exhibitions etc. enhance the dissemination of agricultural research information at grass root level.

In the present electronic era, the role of ICT in the transfer of technologies to the farmers is utmost necessary to update the latest technical know-how of progressive agriculture.

Knowledge is an increasingly significant factor of production in modern agriculture. Every activity in the agricultural supply chain involves creation, processing and communication of information. Timely access to information can add value at each step in the agricultural supply chain. Many innovative initiatives in ICTs in agriculture extension in the public, private and non- government sectors are underway in India. Key issues such as feasibility, scalability, sustainability, and overall impact are being addressed. Equally important is to enable small-holders access to ICTs. Information and communication technologies (ICTs) can facilitate effective data, information and knowledge flow across the network.

1.21 Energy Use:

In Gujarat, under '**Jyoti Gram Yojna**', villages are getting round the clock uninterrupted electricity supply that covers 18,065 villages and 9,680 suburbs. The farmers are getting 8 hours per day assured 3 phase power supply for irrigation. Gujarat's advancement in the field of solar energy is also encouraging; the state has dedicated 600 MW of solar energy to the national grid, while the rest of the country is producing only 120 MW of solar energy. **The solar park set up at Charanaka village will be the Asia's largest and innovative canal-top solar power project, which will save about one crore liters of water per kilometer from evaporation annually and would save 16 % of electricity and land for farmers.**

1.22 Marketing:

The State has strong cooperative credit & marketing structure, along with 213 cold storages having 9.50 lakh tonne storage capacities. About 42 Fruit and Vegetable Co-operative Marketing Societies and 197 Agriculture Produce Market Committees (APMCs) deal with selling and buying of horticulture produce in the State.

1.23 Post Harvest Management and Value Addition of Horticulture Crops:

Horticulture accounts for more than 25 percent of the agricultural GDP. In the production of fruits and vegetables, India has attained global supremacy, occupying the first and second positions, respectively. According to a recent estimate, horticultural Crops occupy 10% gross cropped area (17.95 Mha) with a production of about 214.73 million T. Fruit's production is 79.97 million T from an area of 9.5 Mha while that of vegetable's production is 129.1 million T from an area of 7.9 Mha. India's share in world fruit production is 12 % and vegetable production is 13.25 %. India is the largest producer of mango, banana, and acid lime. India produces world's 41 % mango and 23 % banana. India has prime position in cauliflower, second in onion and third in cabbage in the world. Among plantation crops, India is the largest producer and consumer of cashew nut. India is the 3rd largest producer of coconut with a total production of 12, 148 million nuts from an area of 1.93 Mha.

Despite a huge production of horticultural commodities, only about 2.4 % is utilized for processing purpose which resulting huge post-harvest losses of 20-30 % amounting to more than Rs 65000 crore. The major cause of post-harvest loss is the availability of poor infrastructure for post-harvest management (PHM) and processing of commodities. These losses can only be minimized by proper handling, marketing and processing of the agricultural commodities. Even by processing such a meager quantity (2.4 %), the food processing industry ranks fifth in size in the country and employs 16 lakh workers, which is 19 % of the country's industrial labour. It accounts for 14 % of the total industrial output with 18% of industrial GDP and 6.3% of countries GDP. So, food processing plays a vital role in increasing India's prosperity and thus needs expansion throughout the country on a priority basis. Furthermore, Gujarat is ahead of all the states on the national map of horticultural crop production and /or productivity. Mango, sapota, banana and papaya are important crops of South Gujarat regions including Navsari, Valsad, Surat, Bharuch, Narmada and Tapi districts.

Production of fruits and vegetables in the country is 33 and 72 million T respectively. Lack of proper technologies for harvesting, handling, storage and processing has resulted in the loss of 20- 40 % of the product costing about ₹ 23,000 crores. There is an urgent need to address these issues for loss prevention and value addition in the production catchment.

The State of Gujarat has strength in the agro-based industry in terms of natural resources, established an industrial base, skilled labour force, enterprising farmers, a network of market yards and other requisite infrastructures like an airport, seaport and extensive road & railway network.

1.24 Animal Health:

Animal diseases and lack of proper livestock production management skills are major constraints to livestock production and food security. Poor animal health decreases the performance of the animals leading to lower production and financial losses. The provision of veterinary services is a key component to the success of farm operation. Inputs such as feed, water, proper housing, good management practices and record keeping are essential to outputs and financial gain. Improper animal health practices reduce efficiency and optimal profits. There is a direct correlation between quality livestock production and veterinary medical services to animals. An advice to the animal keepers on proper herd health management practices such as proper de-worming, vaccination, nutrition, environmental sanitation, disease prevention and control and treatment of animal illnesses are very critical issues. Once the above practices are carried out, there will be a reduced dependency on the overuse of veterinary drugs and therefore reduce inventory cost. By following good animal health preventative measures on the farm, animal keepers are opted to have healthy and productive animals for marketing and a brighter financial gain from farm operation.

1.25 Major Agricultural Issues and Areas of Focus:

The major part of Gujarat falls under varying climatic as well as soil conditions and has been divided into eight agro-climatic zones. The major issues and areas to be focused on the plan are:

- i. In Gujarat, about 58 percent of land area is under arid and semi-arid region needs an integrated development of crop varieties and cultivation practices for major cereals, food, cash, fruits, vegetables and spices crops.
- ii. Activities related to the enhancement of soil health, integrated nutrient management, use of organic and bio-fertilizers and integrated pest management schemes.
- iii. Initiatives like integrated watershed management, surface and sub-surface drainage, *in-situ* and *ex-situ* rainwater conservation measures, enhanced groundwater recharge, increased use of MIS for crop irrigation should be focused to alleviate the problems like inland salinity and alkalinity, seawater ingress and climatic aberrations.
- iv. Development of mechanization by introducing improved tractors, machines, implements, equipment and tools. Increasing use of renewable energy i.e. solar, wind and bioenergy in agriculture.
- v. Activities relating to enhancement of horticultural production, high-density cultivation and popularization of micro-irrigation systems. Food processing and value addition of produce; cold storage, handling, packaging, transportation and marketing of perishable produce (fruits and vegetables).
- vi. Good local breeds of cattle (*Gir* and *Kankrej*) and Buffaloes (*Jaffrabadi*, *Surati* and *Mehsani*) are reared, but needs breed establishment and increased involvement of various farming communities in animal rearing. Proper clinical care of animals, increased fodder production and feed management for increasing milk production.
- vii. Modernization of marine fish processing units and quality control as per HACCP norms for accelerating export at seaports. Development of cage culture of commercial marine fauna. Development of inland fisheries by utilizing salt-affected land and water by introducing diversified fish and shrimp fauna.
- viii. Strengthening of market infrastructure and marketing development.
- ix. Strengthening of infrastructure to promote extension services for farmers.
- x. Innovative schemes.

1.25.1 Methodology Adopted for Preparation of Comprehensive District Agriculture Plans:

The C-DAPs were prepared by adopting participatory appraisal mode. All four SAUs of Gujarat were identified as Technical Support Institutes (TSI) for their working area. The TSI, under the guidance of respective Director of Research and Director of Extension Education, provided all necessary technical help to planning units and support groups for preparation of these C-DAPs through the participatory bottom-up process. The TSI trained the Planning Units/ Groups in designing formats for data collection, guided in data collection, analysis and conducted regular workshops for plan preparation. In coordination with Scientists/ Professors from SAUs and officials from Department of Agriculture, Horticulture, Animal Husbandry and Fisheries, District Panchayat, DRDA, BISAG, NABARD, ATMA, GVCL, Dept. of Disaster Management, Department of Irrigation etc., the task was fulfilled.

1.25.2 Collection of Data:

The preparation of district-level plan involved basically a collection of baseline and benchmark details. So a template is developed to collect these particulars from the different

districts. The district level scientist's teams from SAUs were formed for the collection and compilation of the information. The Taluka wise information was collected with the help of Taluka Development Officer (TDO) and his team, officers from Animal Husbandry, officers from Agriculture Department, District *Panchayat*, Taluka *Panchayat*, Village *Panchayat*, NGOs, BISAG, NABARD, ATMA, DRDA, Watershed development agency, etc.

1.25.3 Formulation of District Planning Unit:

To facilitate the involvement of local representatives in the preparation of plans, planning units in each district was formulated. The composition of the district planning units was as given below:

- a) Director of Research & Dean PG studies, Associate Directors of Research, Director of Extension Education, Associate Director of Extension Education, Deans of various Colleges and scientists of related discipline for every 2 talukas.
- b) Coordinating staff from Directorate of Research and Directorate Extension Education.
- c) Officials of Line Departments from Agriculture, Horticulture, Animal Husbandry, Fisheries, District Panchayat and DRDA.

Numbers of meetings were held at the State and University levels with authorities and concerned officials of C-DAP. The current priorities were discussed with scientists of the University, officers of the line departments, NGOs and farmers. During these meetings of stakeholders, the proposed design, trials, front-line demonstration (FLDs) and other activities in a farming system approach were discussed. The group identified the farmers' needs and constraints and subsequent changes proposed in management practices. The time frame of various activities and expected outcomes of three-year plans were incorporated.

1.25.4 An indicative outline for the preparation of C-DAP:

- 1: A brief introduction to the District, its location, features, etc.
- 2: Main points of SWOT analysis of the District
- 3: Areas/ Sectors which need to be addressed in the district
- 4: Various ongoing programs in the district- a brief contextual gist
- 5: The District Plan at a Glance.

1.25.5 Methodology Adopted for Preparation of State Agriculture Plan:

As decided in SLSC, C-DAP for all the districts were prepared by State Agricultural Universities. As per guidelines of RKVY, SAP and SIDP need to be prepared, for which, the suitable agency should be decided for preparation of the same. On this line, SLSC decided that SAP and SIDP should also be prepared by SAUs and the Vice Chancellor of Anand Agricultural University, Anand will act as a Nodal Officer. In this regard, a meeting was convened at AAU, Anand in February 2018, inviting Officers from Gujarat State Line Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries, SAUs and *Kamdhenu* University. Looking at the requirement of various components of SAP and SIDP, total 36 committees were formed with a Convener from one SAU, Co-Convener from Line Departments of Gujarat state and two members from other SAUs. They were instructed to follow latest guidelines of RKVY for the compilation of C-DAPs for their respective discipline. Few topics of common issues and infrastructure development were also identified for inclusion in SAP and SIDP.

CHAPTER – 2

GENERAL DESCRIPTION OF THE STATE

2.1 General Information:

As per Census 2011, Gujarat covered 26 Districts, 225 Talukas, 348 Towns (195 Statutory Towns and 153 Census Towns) and 18225 Villages (including Uninhabited). There is an increase of 106 towns consisting of 27 statutory towns and 79 census towns as compared to Census 2001. By bifurcating existing districts, Government of Gujarat has formed 7 new districts and 23 talukas on 13th August 2013. Accordingly, from 15th August 2013, there are total 33 districts and 250 talukas in Gujarat State.

2.1.1 Geography:

Gujarat is westernmost state of India located between latitude 20.1° N to 24.7° N and longitude 68.4° E to 74.4° E. The tropic of cancer passes through Gujarat state. The state has a geographical area of 19, 60,924 sq. km. accounting for 6.19% of the total geographical area of India with a coastal line of 1600 km. Gujarat shares borders with the state of Rajasthan to the north, Madhya Pradesh to the east, Maharashtra, Union territories of Diu, Daman, Dadra and Nagar Haveli to the south and international border with Pakistan to the north-west. The state is bounded to the southwest by the Arabian Sea with Gulf of Khambhat and Kachchh.

Gujarat is divided into three physiographical regions **(1) Mainland Gujarat:** The mainland plains extend from the *Rann* of Kachchh and the Aravalli hills in the north to Damanganga river in the south. It is made up of mainly alluvial soil except for some sandy soil in the north. The plains of the mainland are traversed by the big river *Narmada*, *Sabarmati*, *Mahi* and *Tapi*. Other small rivers are *Banas*, *Sarasvati*, *Meshvo*, *Vatrak*, *Shedhi*, *Vishvamitri*, *Kim*, *Purna*, *Ambika* and *Damanganga*. **(2)**

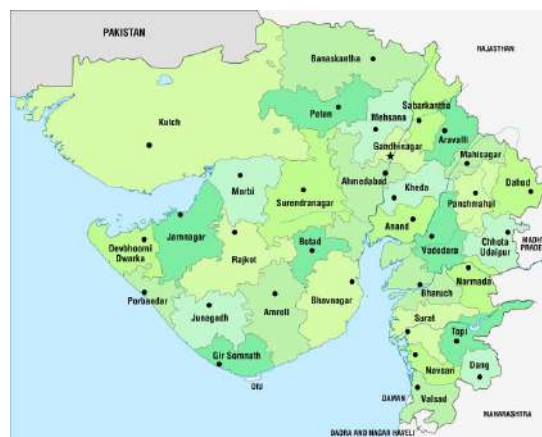


Fig. 2.1 District wise Map of Gujarat

Kathiawar peninsula: covers irregular highland regions with central elevated core part. The slopes dissected by rivers flowing in all directions. The principal regions are *Shetrunji*, *Bhadar* and *Aji*. **(3) Kachchh region:** It is mainly *Rann* area. The area is a low lying salt-encrusted wasteland. The region is composed of disintegrated sandstones with intrusive and inter-bedded basalts.

Gujarat has 11.17 % of its total geographical area under forest cover (Gujarat Forest Statistics Report 2016-17). The Dang district has the largest area under forest cover. Narmada, Junagadh, Valsad, Dahod and Tapi are the other districts having some part covered by forests. There is about 1.5M ha of land affected by the soil erosion by water and wind. A major part of the state has emerged from the sea in geological parts are saline. The *Ranns* of Kachchh are remnants of ancient seabed experiencing periodic inundation by sea water. The low lying parts like Bhal, Khadapat, Ghed and Banni are not exposed to regular sea water inundations but retain soil salinity.

2.1.2 Climate:

Gujarat State experiences diverse climatic conditions in terms of the standard climate types, tropical climates viz., subhumid, arid and semi-arid, are spread over different regions of

the state. Out of total area of the state 58.60 %fall under arid and semi-arid climatic zone. The arid zone contributes 24.94 %, while the semi-arid zone forms 33.66 %of the total area of the state. The regions in the extreme north comprising the district of Kachchh and the western parts of Banaskantha and Mehsana, the northern fringe of Saurashtra (Jamnagar) and its western part have arid climate and the rest of the State has a semi-arid climate. The districts of Valsad, Dangs, Surat, Vadodara and Kheda have a subhumid climate. The principal weather parameters that build the climate of the State are rainfall and temperature, although others like humidity, cloudiness, dew and fog are also important from the agricultural point of view. Considering rainfall pattern, physiography, soil and cropping pattern the state has been divided into eight agro climatic zones (Figure 2.2; Table- 2.1).

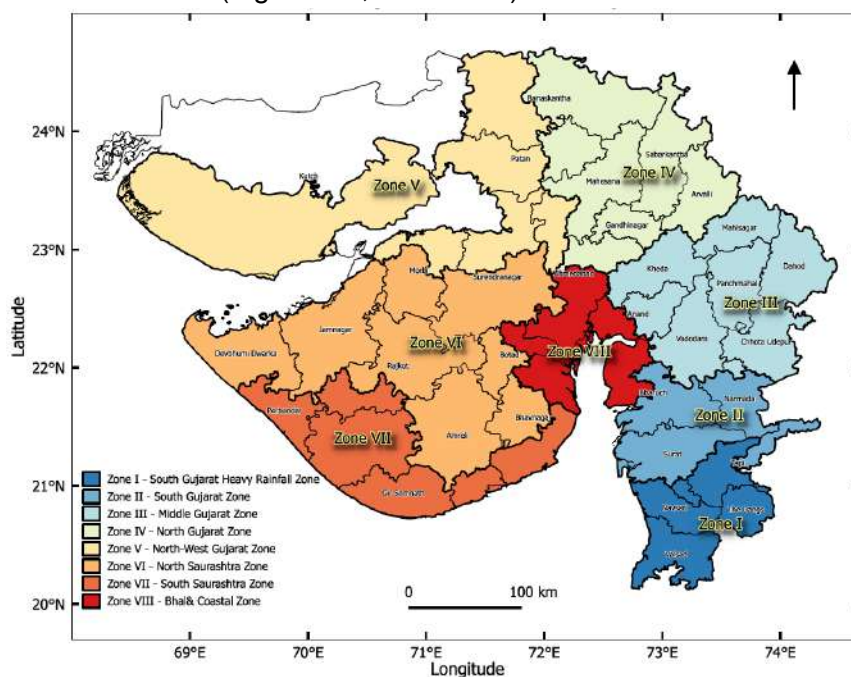


Fig. 2.2 Agro-climatic zones of Gujarat

Normally, the Gujarat weather is divided into four major seasons:

- Winter season (December - February)
- Summer season (March-May)
- Monsoon season (June - September), and
- Post monsoon season (October-November)

Table-2.1 Agro-climatic Zones of Gujarat

Agro-climatic Zone	Type of Soil	Rainfall (mm)	Area Covered
South Gujarat (Heavy Rain Area).	Deep black with few patches of coastal alluvial, laterite and medium black	1500 and more	<ul style="list-style-type: none"> • Dang district • Part of Valsad district (excluding Gandevi & Navsarialukas) • Part of Surat District (Valod, Vyara, Uchchhal, Songadh and Mahuva talukas)
South Gujarat	Deep black clayey	1000-1500	<ul style="list-style-type: none"> • Area between rivers Ambica and Narmada • Part of Valsad District (Navsari and Gandevitalukas) • Part of Surat district (Kamrej, Nizar, Palsana, Bardoli, Mangrol and Mandvi)

Agro-climatic Zone	Type of Soil	Rainfall (mm)	Area Covered
			<ul style="list-style-type: none"> • talukas) • Part of Bharuch district (Ankleshwar, Valia, Rajpipla, Dediapada and Sagabaratalukas)
Middle Gujarat	Deep black, medium black to loamy sand	800-1000	<ul style="list-style-type: none"> • Panchmahals district • Vadodara district • Part of Bharuch district (Bharuch, Amod and Jambusar talukas) • Borsadataluka of Kheda district
North Gujarat	Sandy loam to sandy	625-875	<ul style="list-style-type: none"> • Sabarkantha district • Part of Ahmedabad district, (includes Dehgam, Dascroi & Sanand talukas) • Kheda district except Borsad and part of Khambhat and Matar talukas • Mehsana district (except Chanasama, Sami & Hari talukas) • Part of Banaskantha district (Deesa, Dhanera, Palanpur, Danta & Vadgam talukas)
Bhal & Coastal Area	Medium black, poorly drained and saline	625-1000	<ul style="list-style-type: none"> • Olpad talukas of Surat district • Hansot & Wagratalukas of Bharuch District • Dholka and Dhandhuka talukas of Ahmedabad district • Vallabhipur and Bhavnagar talukas of Bhavnagar district • Limbdi talukas of Surendranagar district
South Saurashtra	Shallow medium black calcareous	625-750	<ul style="list-style-type: none"> • Part of Bhavnagar district (Sihor, Ghogha, Savarkundla, Gariadhar, Palitana, Talaja, & Mahuva talukas) • Part of Amreli district (Dhari, Kodinar, Rajula, Jafrabad, Khambha, Amreli, Babra, Lilia, Lathi & Kunkavav talukas) • Part of Rajkot district (Jetpur, Dhoraji, Upleta & Gondal talukas)
North Saurashtra	Shallow medium black	400-700	<ul style="list-style-type: none"> • Whole of Jamnagar district • Part of Rajkot district (Padadhari, Lodhika, Jasdan, Rajkot, Wankaner, Morvi, Jamkandorna & Kotda Sangani talukas) • Part of Surendranagar dist. (Wadhvan, Muli, Chotila and Salya talukas) • Part of Bhavnagar district (Gadhada, Umrala, and Botad talukas)
North West Zone	Sandy and saline	250-500	<ul style="list-style-type: none"> • Whole of Kachchh district • Malia taluka of Rajkot district • Halvad, Dhrangadhra and Dasada talukas of Surendranagar district • Sami, Harij and Chanasma talukas of

Agro-climatic Zone	Type of Soil	Rainfall (mm)	Area Covered
			Mehsana district •Santalpur, Radhanpur, Kankrej, Diyodar, Vav and Tharad talukas Banaskantha district •Viramgam and Daskroi city of Ahmedabad district

Table- 2.2 District-wise annual rainfall(mm) (year 2015-2017) and mean annual rainfall (past 10 years) of Gujarat

Region	District	2015	2016	2017	Average (1985-2016)
KUTCH					
1	Kutch	531	307	464	402
NORTH GUJARAT					
1	Patan	661	463	932	568
2	Banaskantha	929	466	1136	600
3	Mahesana	679	457	819	717
4	Sabarkantha	909	678	1068	825
5	Aravalli	717	953	887	856
6	Gandhinagar	641	690	1184	744
East-CENTRAL GUJARAT					
1	Ahmedabad	458	419	721	699
2	Kheda	436	554	858	816
3	Anand	470	492	715	771
4	Vadodara	344	514	578	894
5	Chhota Udepur	583	835	835	1012
6	Panchmahal	488	891	838	897
7	Mahisagar	478	721	606	753
8	Dahod	446	811	658	752
SAURASHTRA					
1	Surendranagar	444	355	856	555
2	Rajkot	606	585	821	645
3	Morbi	559	366	952	491
4	Jamnagar	499	732	674	615
5	Devbhumi Dwarka	411	618	689	609
6	Porbandar	389	624	648	686
7	Junagadh	687	959	879	883
8	Gir Somnath	666	996	1079	885
9	Amreli	780	711	604	633
10	Bhavnagar	569	647	585	584
11	Botad	439	532	754	565
SOUTH GUJARAT					
1	Bharuch	496	485	772	701
2	Narmada	596	733	989	1041
3	Tapi	886	1007	1092	1341
4	Surat	989	1085	1325	1365

5	Navsari	1134	1590	1673	1767
6	Valsad	1472	2500	2519	2162
7	Dangs	1368	2201	1384	2362

Source: Gujarat State Disaster Management Authority, Gujarat State, Gandhinagar

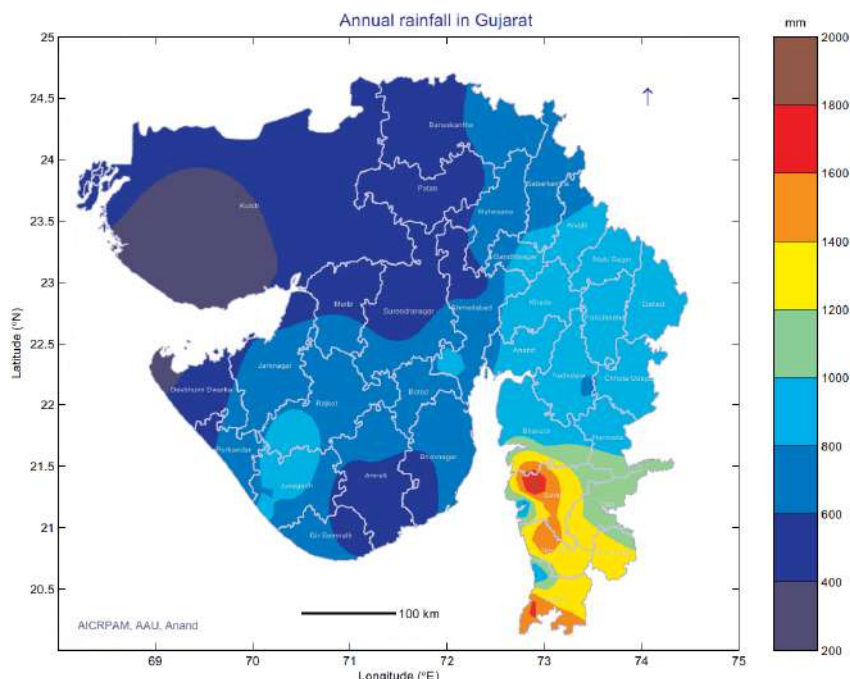


Fig.2.3 Annual Average Rainfall of Gujarat State

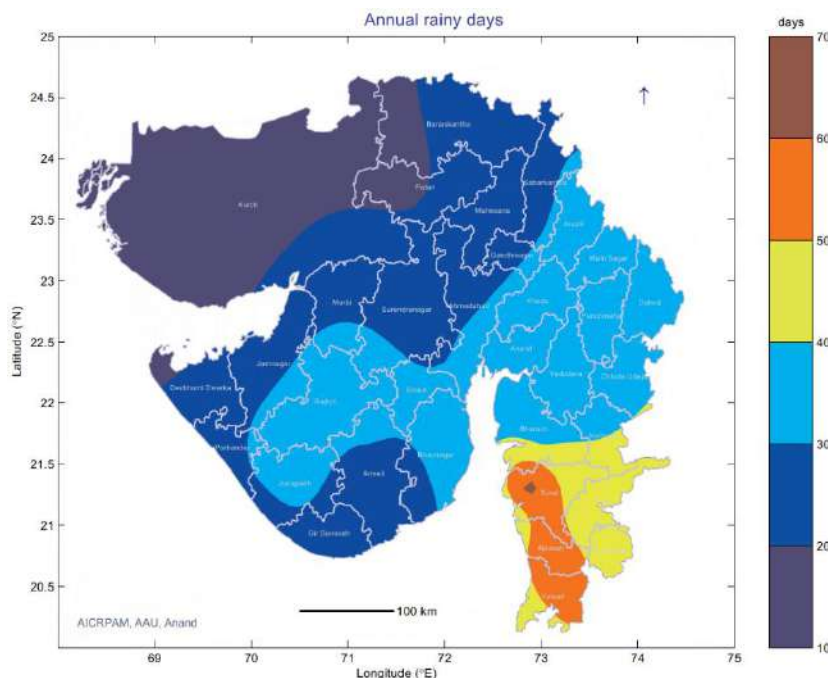


Fig. 2.4 Average Rainy Days of Gujarat State

The mean annual rainfall of the state is 845 ± 387 mm with a coefficient of variation of 49%. District wise rainfall receipt during last three years (2015, 2016 and 2017) with long period average is given in Table.2.2. Rainfall and rainy days' distributions over the state are given in Fig. 2.3 and Fig. 2.4, respectively. Extreme southern part of Gujarat receives the highest rainfall (>1400 mm) while west part of Kutch receives the lowest rainfall (200-400 mm). Middle

Gujarat, parts of south Gujarat and Junagadh region of Saurashtra receives rainfall in the range of 800-1000 mm. Rainfall receipt increases from middle to south Gujarat and most part of South Gujarat receives rainfall >1000 mm. Rest parts of the state show rainfall variability in the range of 400 to 800 mm. In general, isohyets align with south-north directions and rainfall decreases towards the west side of the state. Rainfall occurs more frequently over the southern part of the state and Pariya station of the part has 65 rainy days. Some stations of the Saurashtra-Kutch region receive rainfall for a very few days (8 rainy days) in a year.

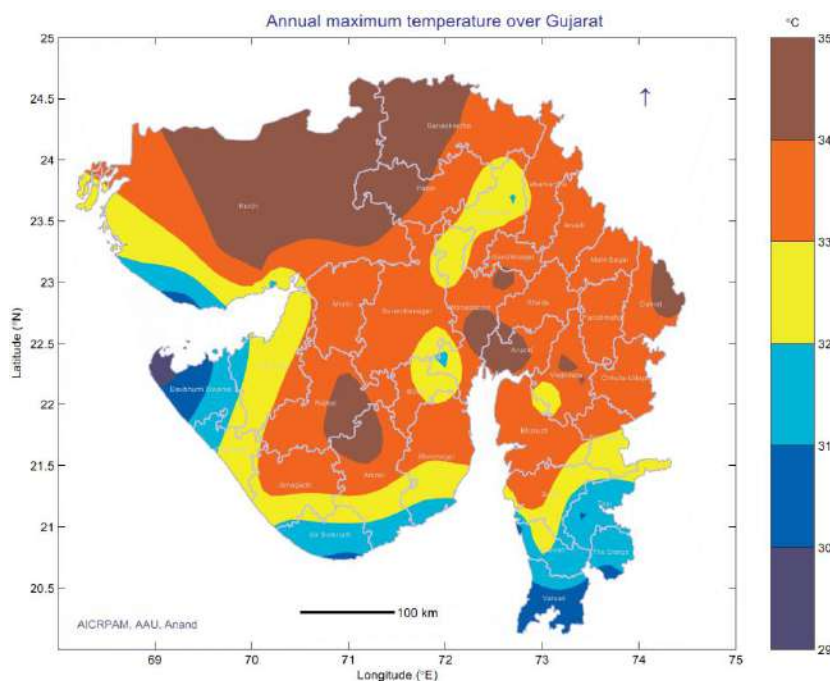


Fig.2.5 Annual Average Maximum Temperature of Gujarat State

Mean annual maximum temperature of Gujarat is 32.9°C. The spatial distribution of annual temperature (Map 95) shows a range of 29 to 35°C over the state. Highest temperatures (34 to 35°C) are observed in part of Kutch, part of north and middle Gujarat and central part of Saurashtra region.

2.1.3 Population:

The population of India is 121.06 crore (62.31 crore males and 58.74 crore females). The population of Gujarat is 6.04 crore (3.15 crore males and 2.89 crore females) comprising a rural population of 3.47 crore and urban population of 2.57 crore. The rural population has increased by 29.54 lakh and the urban population by 68.15 lakh (Figure 2.7) in the last decade (Census, 2011).

Rural & Urban Population of Gujarat

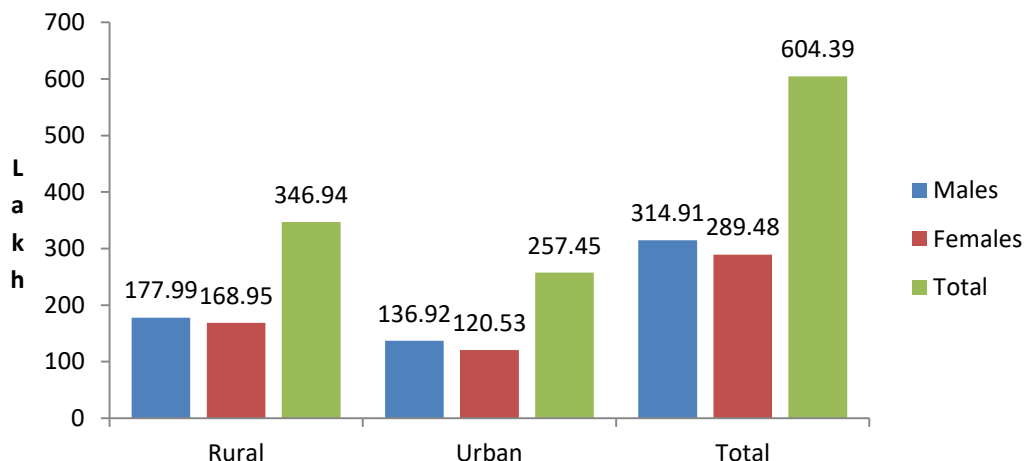


Fig. 2.6 Rural and Urban Population of Gujarat

Gujarat accounts for 4.99 % of the population of India. The three districts viz. Ahmedabad, Surat and Vadodara contribute 29 % of the population of Gujarat. Nearly 50 % of the State's population resides in seven districts viz. Ahmadabad, Surat, Vadodara, Rajkot, Bansakantha, Bhavnagar and Junagadh. The most populous districts include Ahmadabad (72.14 lakh) followed by Surat (60.81 lakh) and the minimum population was observed in Dang (2.28 lakh).

The literacy rate of Gujarat as per the population census 2011 is 78.0 %. In rural areas, the literacy rate is 71.7 % and in urban areas, it is 86.3%. The male literacy rate is 85.8 % (Rural 81.6 %, Urban 91.0 %) which is higher than the female literacy rate of 69.7 % (Rural 61.4 %, Urban 81.0 %). The increase in female literacy rate is significantly higher in all areas in comparison to the corresponding increase in male literacy rates of over the decade.

Rural and Urban Literacy Rate %

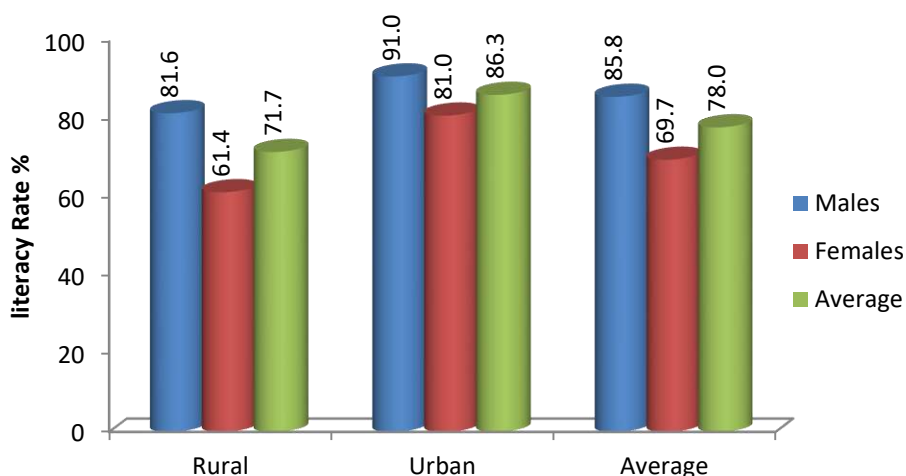


Fig. 2.7 Rural and Urban Literacy Rate of Gujarat

Table - 2.3 Glimpses on Census - 2011 - Gujarat

Sr. No.	Item	Unit	Year	Gujarat	India	% Share of State
1	Population					
1.1	Total Population					
	Persons	Lakh	2011	604.40	12105.70	4.99
	Males	Lakh	2011	314.91	6231.22	5.05
	Females	Lakh	2011	289.48	5874.48	4.93
1.2	Rural population					
	Persons	Lakh	2011	346.95	8664.63	4.16
	Males	Lakh	2011	177.99	42.76.33	4.16
	Females	Lakh	2011	168.95	4058.31	4.16
	"% of rural population to total population"	%		57.40	68.85	-
1.3	Urban population					
	Persons	Lakh	2011	257.45	3771.06	6.83
	Males	Lakh	2011	136.92	1954.89	7.00
	Females	Lakh	2011	120.53	1816.17	6.64
	"% of urban population to total population"	%		42.60	31.15	-
1.4	No. of Districts	No	2011	26	640	4.06
	No. of Talukas (Sub-districts)			225	5924	3.80
	No. of Towns			195	4041	4.83
	Statutory Towns					
	Census Towns			153	3894	3.93
	No. of Villages (includes un-inhabited villages)"			17843	597483	2.99
	Density of Population (Population per Sq. Km.)			308	368	-
1.5	Decadal Growth Rate					
	Persons	%	2001-2011	19.3	17.7	-
	Rural			9.3	12.3	-
	Urban			36.0	31.8	-
1.6	Scheduled Castes Population					
	Persons	Lakh	2011	40.74	2013.78	2.02
	Males			21.10	1035.35	2.04
	Females			19.64	978.43	2.01
	Rural			22.82	1538.50	1.48
	Urban			17.93	475.28	3.77
	"% age of S.C. population to total population"	%		6.74	16.63	-
1.7	Scheduled Tribe Population					
	Persons	Lakh	2011	89.17	1042.81	8.55
	Males			45.01	524.10	8.59

Sr. No.	Item	Unit	Year	Gujarat	India	% Share of State
	Females			44.16	518.71	8.51
	Rural			80.22	938.19	8.55
	Urban			8.95	104.62	8.55
	% age of S.T. population to total population	%		14.75	8.61	-
1.8	Sex Ratio (females per 1000 males)					
	Persons	No	2011	919	943	-
	Rural			949	949	-
	Urban			880	929	-
	Child Population in the Age-group 0-6"			890	919	-
1.9	Literate Population					
	Total					
	Persons	Lakh	2011	410.93	7634.99	5.38
	Males			234.75	4346.84	5.40
	Females			176.18	3288.15	5.36
	Rural					
	Persons	Lakh	2011	214.21	4826.54	4.44
	Males			124.68	2812.82	4.43
	Females			89.53	2013.72	4.45
	Urban					
	Persons	Lakh	2011	196.73	2808.45	7.00
	Males			110.07	1534.02	7.18
	Females			86.65	1274.43	6.80
1.10	Scheduled Caste					
	Persons	Lakh	2011	28.35	1137.60	2.49
	Males			16.26	664.77	2.45
	Females			12.09	472.83	2.56
	Rural			14.95	820.20	1.82
	Urban			13.39	317.40	4.22
1.11	Scheduled Tribe					
	Persons	Lakh		46.89	516.35	9.08
	Males			27.08	300.67	9.01
	Females			19.81	215.69	9.18
	Rural			41.19	446.32	9.23
	Urban			5.69	70.03	8.13
1.12	Literacy Rate					
	Total					
	Persons	Lakh	2011	78.0	73.0	-
	Males			85.8	80.9	-
	Females			69.7	64.6	-
	Rural					
	Persons			71.7	67.8	-

Sr. No.	Item	Unit	Year	Gujarat	India	% Share of State
	Males			81.6	77.2	-
	Females			61.4	57.9	-

Source: Socio-economic review, 2013

2.1.4 Land Utilization Statistics:

Total geographical area of the state is about 196.02 lakh ha. The reported area of the state is 188.10 lakh ha (Figure 2.9).

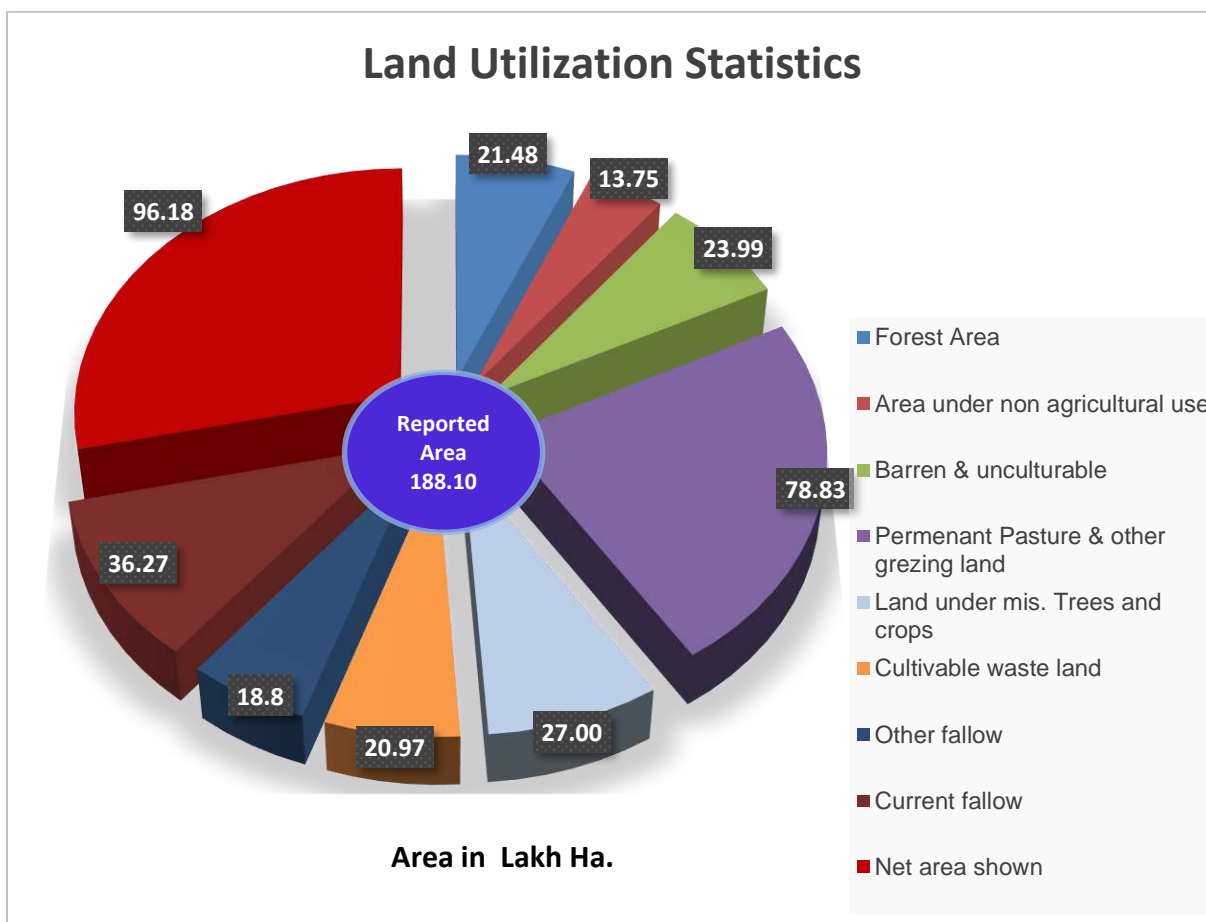


Fig. 2.8 Land Utilization Statistics of Gujarat

Table - 2.4 Provisional District-wise Land Utilization Statistics of Gujarat 2014-15 (Area 00 Hectors) Tentative Data

(Area in 00'ha)

Sr. No	Districts	Total Geographical Area	Total Reporting Area	Total Forest	Not available for cultivation		Other uncultivated land excluding fallow land				Fallow Land			Net area sown	Area sown more than once	Gross Cropped area
					Land put to Non Agricultural uses	Total Barren and Unculturable Land	Pasture & other grazing	Land under Miscellaneous	Culturable Waste	Total	Other Fallows	Current Fallows	Total			
1	Ahmedabad	7170	7090	196	974	514	302	0	277	579	2	124	125	4701	2210	6910
2	Banaskantha	10770	10771	1668	695	757	722	2	389	1113	18	180	198	6341	5794	12134
3	Vadodara	4312	4077	142	481	199	173	2	90	265	0	43	43	2947	103	3050
4	Bharuch	6524	5201	320	811	427	159	0	386	546	0	29	29	3068	23	3091
5	Narmada	2815	2815	1157	321	76	65	1	102	169	7	31	38	1054	237	1290
6	Valsad	3034	2965	992	193	82	24	5	117	145	18	52	70	1483	58	1541
7	Navsari	2211	2206	317	348	184	140	0	201	341	0	2	2	1014	108	1122
8	Dangs	1776	1776	1017	153	24	0	0	58	58	0	0	0	524	136	660
9	Gandhinagar	2163	2104	24	243	29	91	0	142	233	0	29	29	1545	721	2266
10	Kheda	3667	3442	107	276	134	214	0	98	312	19	78	97	2515	1116	3631
11	Anand	2777	2777	0	356	177	78	6	104	188	13	9	22	2034	1590	3624
12	Mahesana	4414	4414	89	512	54	110	0	140	251	1	53	54	3454	1797	5251
13	Patan	5771	5771	532	535	581	603	1	345	949	17	143	160	3014	1453	4466
14	Panchmahals	3281	3281	828	410	194	116	0	196	312	1	3	3	1533	545	2078
15	Dahod	3642	3641	880	205	184	87	0	24	111	3	3	6	2256	1386	3642
16	Sabarkantha	4233	4233	606	308	138	180	1	168	349	0	12	13	2820	1002	3822
17	Surat	4418	4339	532	537	326	120	0	267	387	0	107	107	2450	254	2704
18	Tapi	3249	3139	814	501	211	87	0	36	123	9	1	10	1480	410	1890
19	Amreli	7295	7295	427	489	232	557	1	125	684	18	15	34	5431	397	5828
20	Bhavnagar	8334	6768	365	571	223	459	1	388	847	13	250	263	4499	576	5075
21	Jamnagar	8441	5980	573	368	633	339	1	202	542	1	1	2	3862	86	3947
22	Junagadh	5496	5495	629	375	335	227	1	96	324	4	47	51	3782	1699	5481
23	Porbandar	2312	2313	297	252	187	255	2	70	327	3	12	15	1234	704	1938
24	Kachchh	45652	45376	5349	771	15200	703	0	15245	15948	0	1694	1694	6413	643	7056
25	Rajkot	7750	7750	255	794	349	510	1	140	652	1	13	14	5687	762	6448
26	Surendranagar	9271	9237	482	547	800	407	0	215	622	3	301	304	6482	1773	8255
27	Mahisagar	2508	2508	628	131	121	69	1	59	129	0	113	113	1386	524	1910
28	Chhota Udepur	3482	3482	740	333	145	99	0	204	304	1	97	98	1862	334	2196

GENERAL DESCRIPTION OF THE STATE

Sr. No	Districts	Total Geographical Area	Total Reporting Area	Total Forest	Not available for cultivation		Other uncultivated land excluding fallow land				Fallow Land			Net area sown	Area sown more than once	Gross Cropped area
					Land put to Non Agricultural uses	Total Barren and Unculturable Land	Pasture & other grazing	Land under Miscellaneous	Culturable Waste	Total	Other Fallows	Current Fallows	Total			
29	Aravalli	3217	3142	444	175	238	158	0	120	278	0	14	14	1993	1077	3070
30	Morbi	4950	4950	425	386	374	287	0	255	542	0	12	12	3212	548	3759
31	Devbhumi Dwa	4771	3995	263	375	485	290	0	211	501	1	39	40	2330	231	2561
32	Gir Somnath	3754	3289	332	225	220	181	0	388	569	11	82	93	1848	1624	3472
33	Botad	2564	2479	55	102	152	69	0	109	179	23	37	60	1932	211	2142
	Guj. State	196024	188102	21485	13753	23988	7883	27	20967	28877	188	3627	3815	96184	30127	126311

Source: Directorate Agri, Gujarat

2.1.5 Irrigated/Un-irrigated Land / Water Resources Development:

Gujarat state is having nearly 46 percent area under irrigation, by both the canal as well as the tube wells. The area under tube well irrigation is increasing at a much faster rate than the increase in area by canals. The government of Gujarat also took the initiative to increase water use efficiency of irrigated canal command area by adopting micro-irrigation techniques. Insufficient water and timely availability of canal water supply are the major constraints in irrigated command systems. Government initiatives toward *Jyoti Gram* scheme provided assured electric power supply to the tube wells to provide supplemental irrigation during crucial stages of crop production. The irrigation network of the state is shown in Figure 2.10.

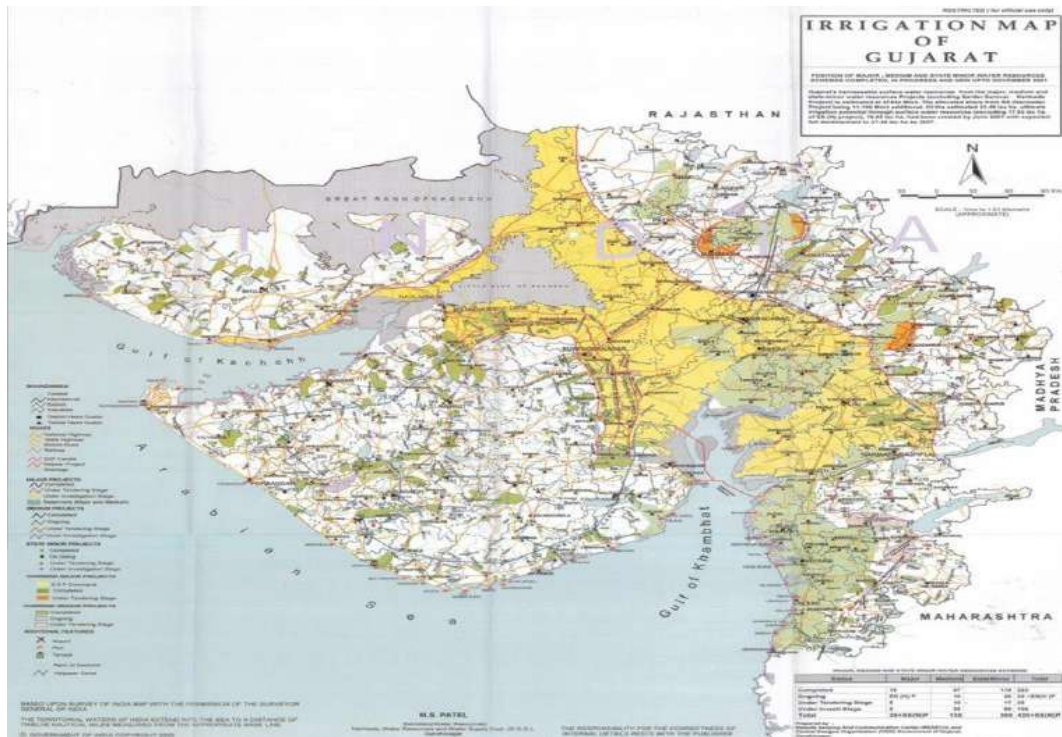


Fig. 2.9 Irrigation Network Map of Gujarat State

2.1.6 Soil Fertility Indices:

Dry black to medium black soils dominate the soil types in the State. The soil is low in nitrogen, medium in phosphorous and high in potash content. The soil of state is also deficient in iron, zinc and sulphur due to coarse texture of soils, intensive farming, less addition of farmyard manure and lesser use of legume crops in a cropping system.

In SAP, a special project on soil health maintenance is proposed. To tackle the problem of unbalance use of chemical fertilizers (ignoring the desired ratio of 4:2:1 N:P:K and application of needed micro-nutrients), site and crop-specific INM demonstrations are proposed along with educating farmers on RCTs and other related issues. Special emphasis has been given towards panchayat land reclamation and water harvesting on panchayat/common land pond for fish farming as an integrated farming system for the benefit of small and marginal farmers.

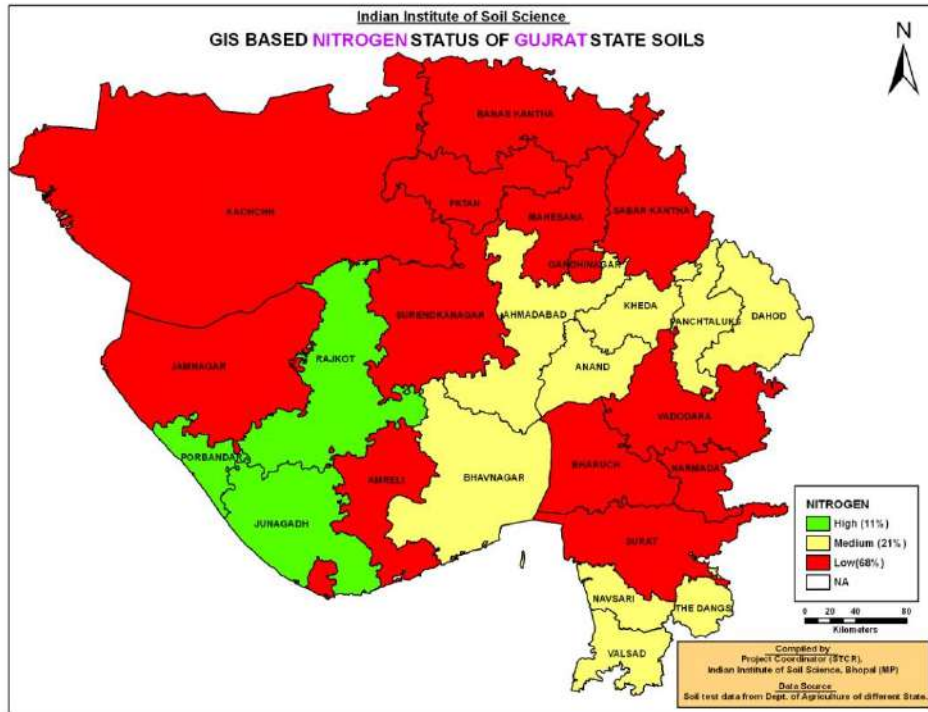


Fig. 2.10 Nitrogen status of Gujarat state soils

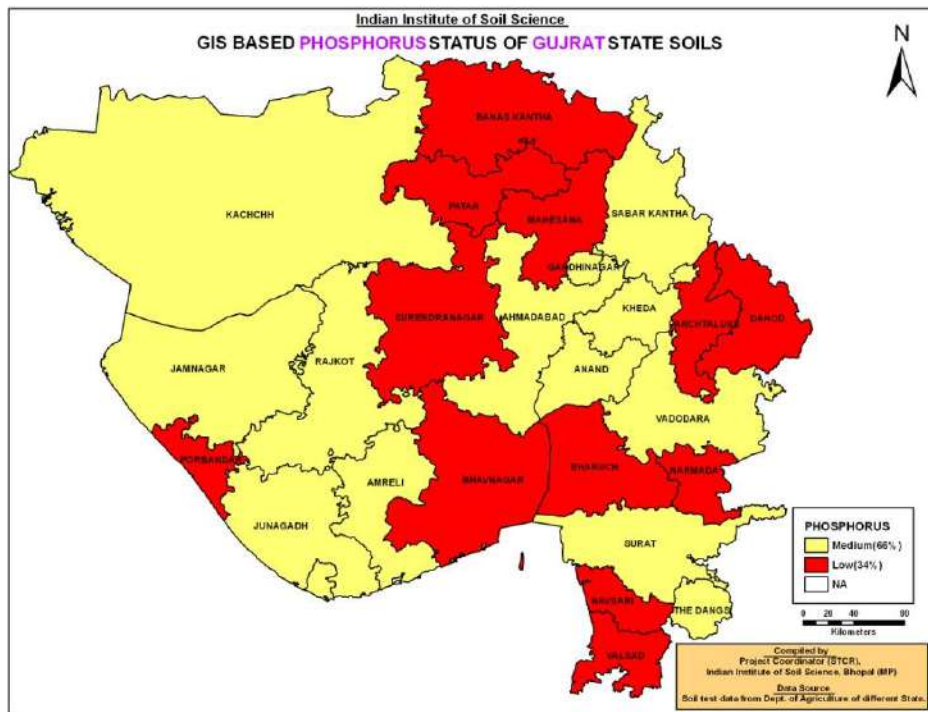


Fig. 2.11 Phosphorus status of Gujarat state

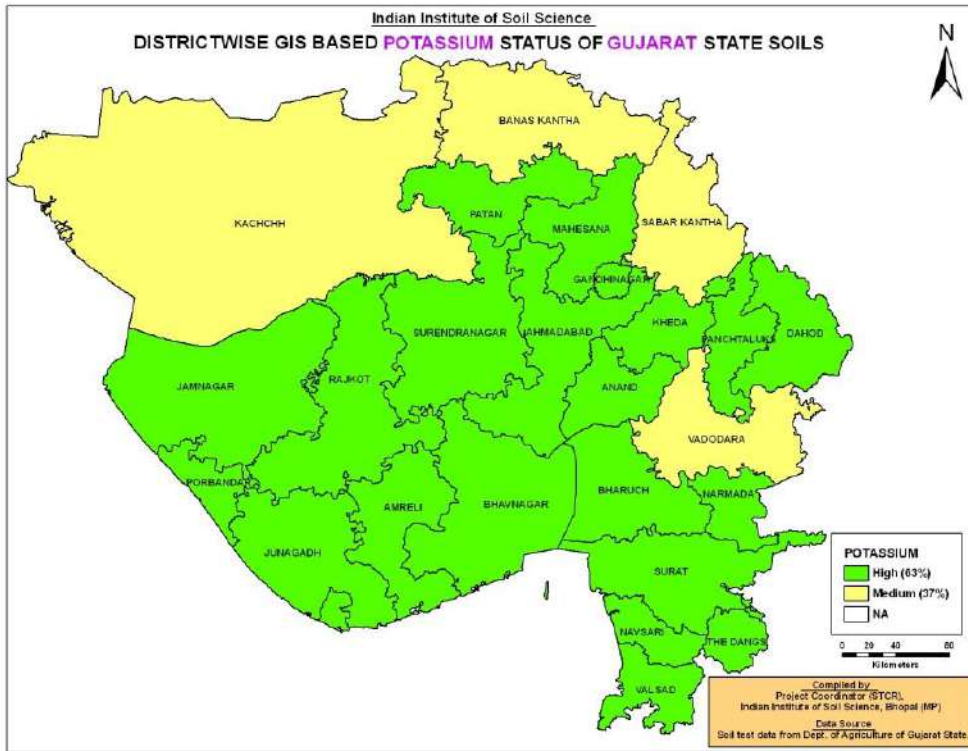


Fig.2.12 Potassium status of Gujarat state

As per the maps and nutrient indexing, nitrogen status of Gujarat state is overall Low, phosphorus status is Medium whereas for potassium status is High. So the status of the state for N P K is L M H (Figures 2.11 to 2.13). The soil of Gujarat state is saturated sufficiently with copper as is evident from Figure 2.14.

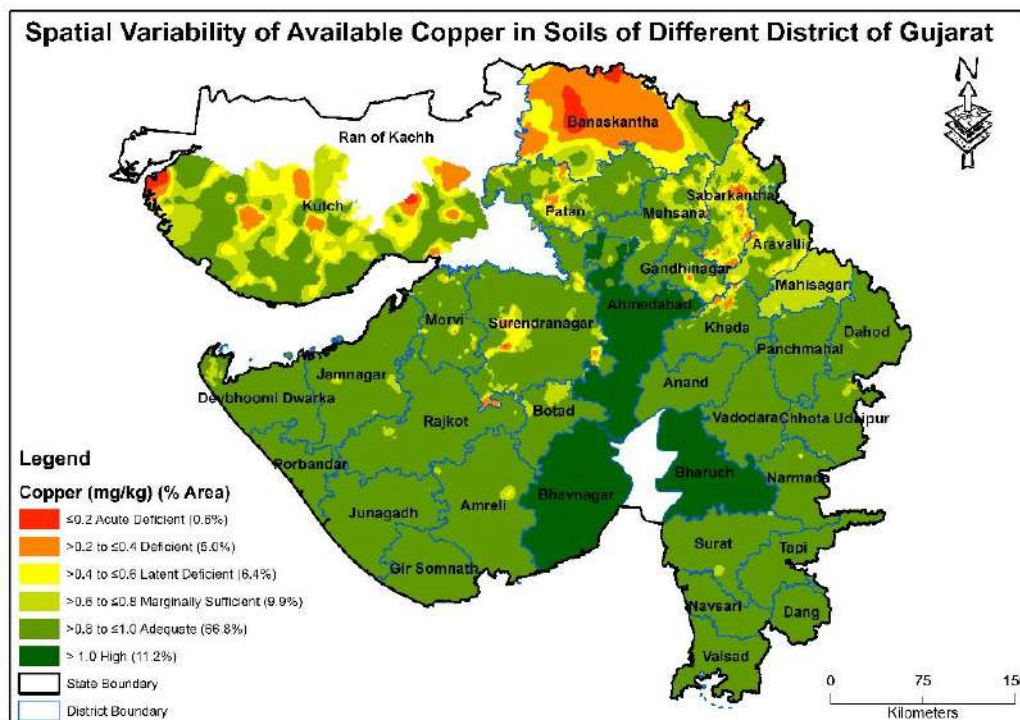


Fig. 2.13 Copper Status of Gujarat State

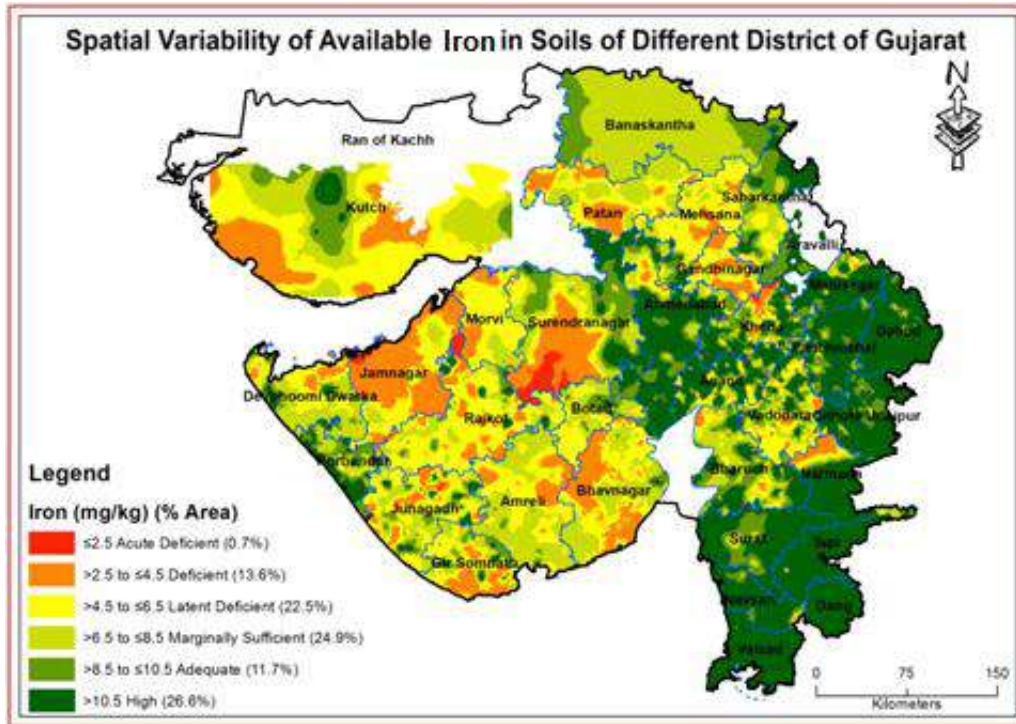


Fig. 2.14 Iron Status of Gujarat State

The iron status varied from very low to high status in Gujarat soils (Figure 2.15). Middle Gujarat except for Panchmahals region and Kachchh district recorded moderately high Fe status whereas, part of south Gujarat, Sabarkantha, Rajkot and Porbandar districts have high iron status. Surendranagar district found with very low iron status in their soils.

Manganese status in the soil of Gujarat state is presented in Figure 2.16, revealing that some parts of middle Gujarat, north Gujarat, Saurashtra and south Gujarat region have high Mn content. Sabarkantha, Jamnagar, Bhavnagar and some parts of south Gujarat region recorded the moderately high status of manganese in soil.

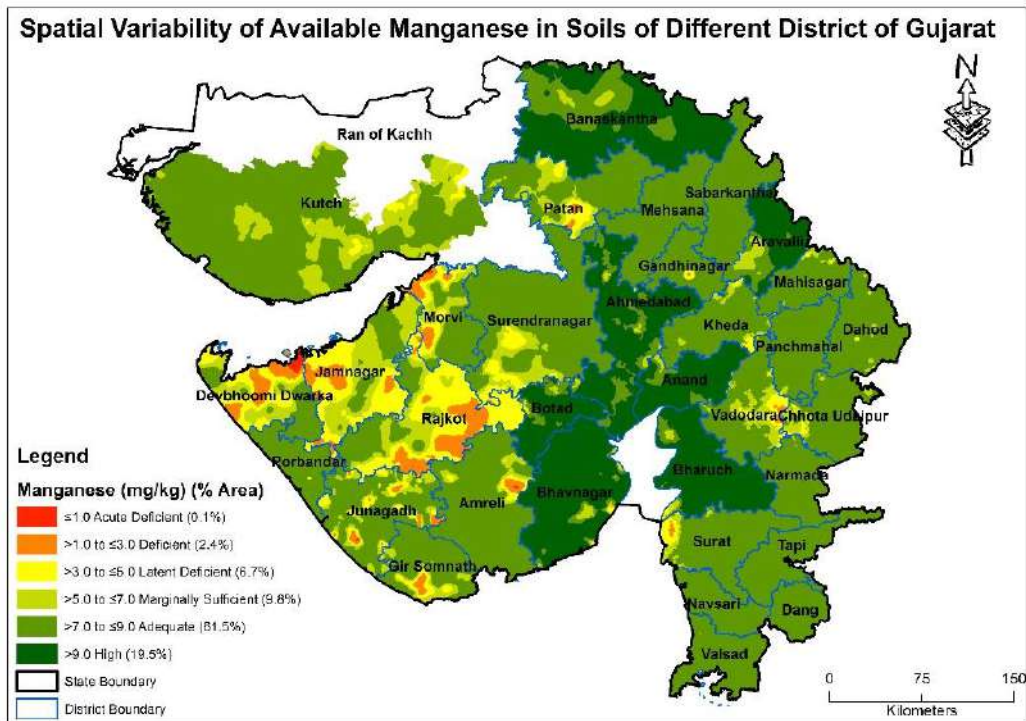


Fig. 2.15 Manganese Status of Gujarat State

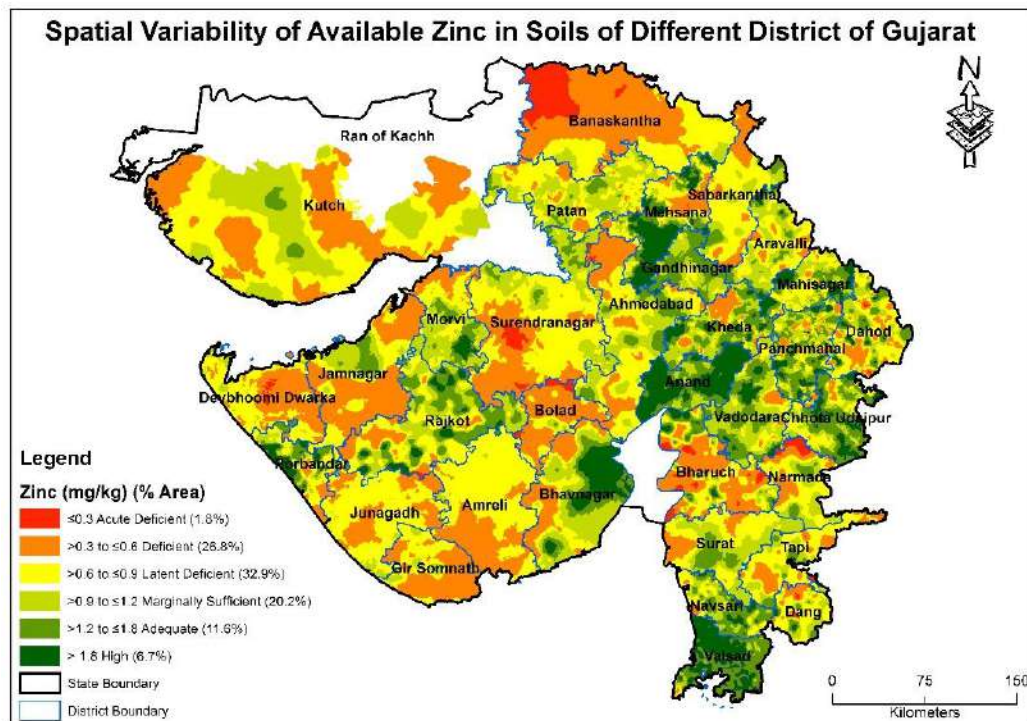


Fig. 2.16 Zinc Status of Gujarat State

Zinc status in soils of Gujarat as depicted in Figure 2.17, reveals that Bhavnagar and Amreli districts have very low zinc content, whereas some parts of south Gujarat (i.e. Surat and Navsari), middle Gujarat and Mehsana district fall under moderately high Zn content.

2.1.7 Major Crops (*Kharif, Rabi and Summer*) of Gujarat State:

Table - 2. 5.A Season-wise and Crop-wise Area, Production and Yield of Food and Non-food Crops for the Year 2011-12 to 2015-16

Area in '00 Ha, Production in '00 T, and Yield in Kg/ha

Crops Area	2011-2012			2012-2013			2013-2014		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Irrigated Rice	5144.00	11988.00	2330.48	4698.00	10951.00	2330.99	5740.12	13334.87	2323.10
Un-Irrigated Rice	2369.00	3230.00	1363.44	2022.00	3130.00	1547.97	2132.88	3390.99	1589.87
Total Kharif Rice	7513.00	15218.00	2025.56	6720.00	14081.00	2095.39	7873.00	16725.86	2124.46
Kharif Jowar	682.00	804.00	1178.89	495.00	760.00	1535.35	1494.68	2147.63	1436.85
Kharif Bajra	4338.00	5173.00	1192.49	3344.00	3468.00	1037.08	3635.25	4980.67	1370.10
Kharif Maize	3870.00	5394.00	1393.80	3732.00	6250.00	1674.71	3331.35	4219.15	1266.50
Kharif Ragi	162.00	133.00	820.99	173.00	165.00	953.76	143.26	140.82	982.99
Other Kharif Cereals	160.00	93.09	581.79	125.74	61.46	488.75	121.00	75.01	619.94
Total Kharif Cereals	16725.00	26816.38	1603.37	14589.74	24785.46	1698.83	16598.54	28289.15	1704.32
Kharif Tur	2444.00	2575.00	1053.60	2281.00	2702.00	1184.57	2098.70	2089.66	995.69
Kharif Mung	2000.00	877.00	438.50	916.00	399.00	435.59	1274.21	676.13	530.63
Kharif Math	457.00	227.00	496.72	141.00	54.00	382.98	308.87	149.65	484.50
Kharif Udad	962.00	676.00	702.70	944.00	596.09	631.45	864.13	527.16	610.05
Other Pulses	342.00	155.80	455.54	180.33	72.99	404.74	196.62	92.43	470.09
Total Kharif Pulses	6205.00	4514.55	727.57	4462.33	3824.08	856.97	4742.53	3535.03	745.39
Total Kharif food-grains	22930.00	31331.55	1366.40	19052.07	28609.53	1501.65	21341.07	31824.18	1491.22
Wheat (Irri.)	12668.00	40011.00	3158.43	9788.00	29118.00	2974.87	13531.51	44538.94	3291.50
Wheat (Un-Irri.)	838.00	710.00	847.26	447.00	322.00	720.36	645.37	549.39	851.27
Wheat Total	13506.00	40721.00	3015.03	10235.00	29440.00	2876.40	14176.88	45088.33	3180.41
Rabi Jowar	558.00	594.00	1064.52	301.00	313.00	1039.87	376.40	562.33	1493.98
Rabi Maize	1061.00	1999.00	1884.07	805.76	1572.68	1951.79	927.47	1968.28	2122.20
Other Rabi Cereals	533.00	528.79	992.10	334.55	352.26	1052.94	221.71	248.78	1122.09

Crops Area	2011-2012			2012-2013			2013-2014		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Total Rabi Cereals	15658.00	43850.00	2800.49	11676.31	31677.94	2713.01	15702.46	47867.72	3048.42
Gram	2399.00	2733.00	1139.22	1361.00	1331.00	977.96	2416.50	2986.47	1235.86
Other Rabi Pulses	240.00	175.72	732.17	193.35	142.25	735.71	205.24	154.45	752.53
Total Rabi Pulses	2639.00	2911.74	1103.35	1554.35	1473.25	947.82	2621.74	3140.92	1198.03
Total Rabi Food-grains	18297.00	46761.74	2555.71	13230.66	33151.19	2505.63	18324.20	51008.63	2783.68
Summer Bajra	4325.00	10947.00	2531.10	2650.00	6981.00	2634.34	3053.01	8529.05	2793.65
Summer Rice	842.00	2679.00	3181.71	291.00	892.00	3065.29	330.99	1055.05	3187.56
Summer Maize	228.00	473.00	2074.56	39.59	82.82	2091.93	65.41	133.59	2042.40
Total Summer Cereals	5395.00	14099.00	2613.35	2980.59	7955.82	2669.21	3449.41	9717.69	2817.20
Mung (Green Gram)	655.00	330.00	503.82	234.16	116.47	497.41	315.05	166.05	527.07
Udad	70.00	44.00	628.57	3.93	5.00	1272.26	12.53	8.01	638.99
Total Summer Pulses	725.00	374.00	515.86	238.09	121.47	510.20	327.58	174.06	531.35
Total Summer Food-grains	6120.00	14473.00	2364.87	3218.68	8077.29	2509.50	3776.99	9891.75	2618.95
Total Food grains	47347.00	92566.29	1955.06	35501.41	69838.01	1967.19	43442.26	92724.57	2134.43

Cotton Production in bales of 170 kg each, Productivity is in lint

Table - 2. 5.B Season-wise and Crop-wise Area, Production and Yield of Food and Non-food Crops for the Year 2011-12 to 2015-16

Area in '00 Ha, Production in '00 T, and Yield in Kg/ha

Crops Area	2014-2015			2015-2016			Average (2011-12 to 2015-16)		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Irrigated Rice	5498.60	13796.35	2509.07	5977.60	14162.56	2369.27	5411.66	12846.56	2373.86
Un-Irrigated Rice	2133.45	2916.71	1367.13	1432.82	1680.98	1173.20	2018.03	2869.74	1422.05
Total Kharif Rice	7632.05	16713.06	2189.85	7410.42	15843.55	2138.01	7429.69	15716.29	2115.34
Kharif Jowar	359.46	438.07	1218.68	746.97	1024.82	1371.97	755.62	1034.90	1369.61
Kharif Bajra	1788.40	2917.60	1631.40	1471.39	2388.18	1623.08	2915.41	3785.49	1298.44
Kharif Maize	3087.88	3875.61	1255.11	2975.88	3938.28	1323.40	3399.42	4735.41	1393.00
Kharif Ragi	200.78	171.40	853.69	192.35	150.13	780.49	174.28	152.07	872.57
Other Kharif Cereals	42.07	27.79	660.53	48.36	28.06	580.21	99.43	57.08	574.05
Total Kharif Cereals	13110.64	24143.53	1841.52	12845.37	23373.02	1819.57	14773.86	25481.51	1724.77
Kharif Tur	2198.23	2393.01	1088.61	2294.31	2818.32	1228.40	2263.25	2515.60	1111.50
Kharif Mung	823.14	406.87	494.29	1042.32	526.78	505.39	1211.13	577.16	476.54
Kharif Math	101.70	43.88	431.44	187.16	89.13	476.24	239.15	112.73	471.39
Kharif Udad	678.35	476.52	702.48	652.21	389.89	597.81	820.14	533.13	650.05
Other Pulses	100.28	46.01	458.78	55.17	25.78	467.24	174.88	78.60	449.45
Total Kharif Pulses	3901.70	3366.29	862.78	4231.17	3849.90	909.89	4708.55	3817.97	810.86
Total Kharif food-grains	17012.34	27509.82	1617.05	17076.54	27222.92	1594.17	19482.40	29299.60	1503.90
Wheat (Irri.)	11030.86	32392.14	2936.50	8409.57	23054.84	2741.50	11085.59	33822.98	3051.08
Wheat (Un-Irri.)	683.63	542.74	793.91	167.39	103.66	619.28	556.28	445.56	800.96
Wheat Total	11714.49	32934.88	2811.46	8576.96	23158.50	2700.08	11641.87	34268.54	2943.56
Rabi Jowar	336.85	479.97	1424.89	243.73	290.17	1190.54	363.20	447.90	1233.20
Rabi Maize	796.64	1696.61	2129.70	883.11	1848.17	2092.80	894.80	1816.95	2030.57
Other Rabi Cereals	151.89	191.26	1259.21	145.82	187.34	1284.76	277.39	301.69	1087.57

Crops Area	2014-2015			2015-2016			Average (2011-12 to 2015-16)		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Total Rabi Cereals	12999.87	35302.72	2715.62	9849.62	25484.18	2587.33	13177.25	36836.51	2795.46
Gram	1639.84	1678.21	1023.40	1140.92	1011.43	886.50	1791.45	1948.02	1087.40
Other Rabi Pulses	174.74	133.57	764.40	234.18	181.47	774.93	209.50	157.49	751.75
Total Rabi Pulses	1814.58	1811.78	998.45	1375.10	1192.90	867.50	2000.95	2106.12	1052.56
Total Rabi Food-grains	14814.45	37114.49	2505.29	11224.72	26677.09	2376.64	15178.21	38942.63	2565.69
Summer Bajra	2741.76	7183.67	2620.10	2440.29	6470.96	2651.71	3042.01	8022.34	2637.18
Summer Rice	312.40	1002.80	3210.00	331.40	1075.08	3244.04	421.56	1340.79	3180.55
Summer Maize	58.90	111.80	1898.15	60.22	111.69	1854.63	90.42	182.58	2019.15
Total Summer Cereals	3113.06	8298.28	2665.63	2831.91	7657.72	2704.08	3553.99	9545.70	2685.91
Mung (Green Gram)	359.84	182.50	507.16	252.25	133.32	528.53	363.26	185.67	511.12
Udad	13.51	8.76	648.77	28.52	18.20	638.29	25.70	16.80	653.56
Total Summer Pulses	373.35	191.26	512.28	280.77	151.52	539.68	388.96	202.46	520.53
Total Summer Food-grains	3486.41	8489.54	2435.04	3112.68	7809.25	2508.85	3942.95	9748.17	2472.30
Total Food grains	35313.20	73113.85	2070.44	31413.94	61709.25	1964.39	38603.56	77990.40	2020.29

Cotton Production in bales of 170 kg each, Productivity is in lint

Table - 2. 6. A Total Crop-wise Area, Production and Yield of Food and Non-food Crops for the Year 2011-12 to 2015-16

Area in '00 ha, Production in '00 T and Yield in Kg/ha

Crop Area	2011-2012			2012-2013			2013-2014		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Total Jowar	1240.00	1398.00	1127.42	796.00	1073.00	1347.99	1871.08	2709.97	1448.34
Total Bajra	8663.00	16120.00	1860.79	5994.00	10449.00	1743.24	6688.26	13509.71	2019.91
Total Rice	8355.00	17897.00	2142.07	7011.00	14973.00	2135.64	8203.99	17780.91	2167.35
Total Maize	5159.00	7866.00	1524.71	4577.35	7905.50	1727.09	4324.23	6321.03	1461.77
Total Mung	2655.00	1207.00	454.61	1150.16	515.47	448.17	1589.26	842.18	529.92
Total Udad	1032.00	720.00	697.67	947.93	601.09	634.11	876.66	535.17	610.47
Total Cereals	37778.00	84766.00	2243.79	29246.64	64419.21	2202.62	35750.41	85874.56	2402.06
Total Pulses	9569.00	7800.29	815.16	6254.77	5418.80	866.35	7691.85	6850.01	890.55
OILSEEDS									
Groundnut (Kharif)	14540.00	22731.00	1563.34	12194.00	6120.00	501.89	17485.99	52783.25	3018.60
Groundnut (Sum.)	2323.00	4437.00	1910.03	658.44	1505.65	2286.69	714.04	1364.45	1910.89
Sesamum (Kharif)	1757.00	815.00	463.86	1257.00	421.50	335.32	1090.72	570.01	522.60
Sesamum (Sum.)	708.00	345.00	487.29	36.54	17.25	472.14	562.24	280.22	498.39
Groundnut (Total)	16863.00	27168.00	1611.10	12852.54	7625.88	593.34	18200.03	54147.70	2975.14
Sesamum (Total)	2465.00	1160.00	470.59	1293.54	438.75	339.19	1652.96	850.22	514.36
Rapeseed and Mustard	2076.00	3273.00	1576.59	2128.00	3606.00	1694.55	2769.99	4884.31	1763.30
Castor	8777.00	18034.00	2054.69	7507.00	14930.00	1988.81	6278.18	13623.05	2169.90
Soyabean	421.00	334.00	793.35	465.65	362.71	778.94	599.54	477.47	796.40
Other Oilseeds (Total)									
Total Oilseeds	31298.00	50350.00	1608.73	24494.73	27056.18	1104.57	29500.70	73982.76	2507.83
CASH CROPS, VEGETABLES, SPICES & OTHER									
Cotton (Irrigated)	20859.00	89103.00	726.00	15183.00	41351.00	463.00	17408.37	84556.70	825.73
Cotton (Un-Irrigated)	9172.00	14643.00	271.00	9389.00	8158.00	147.00	8029.59	18231.72	386.00

Crop Area	2011-2012			2012-2013			2013-2014		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Cotton Total	30031.00	103746.00	587.29	24572.00	49509.00	342.53	25437.96	102788.42	686.93
Tobacco (Kharif)	626.00	1175.00	1877.00	439.00	772.00	1758.54	390.62	790.32	2023.24
Tobacco (Rabi)	954.00	1609.00	1686.58	798.64	1351.50	1692.25	600.03	1048.69	1747.73
Tobacco (Total)	1580.00	2784.00	1762.03	1237.64	2123.50	1715.77	990.65	1839.01	1856.37
Sugarcane (in Gul)	2019.00	127488.98	63144.62	1766.32	126128.10	71407.28	1730.65	115120.82	66518.84
Potato	778.00	17923.00	23037.28	715.00	17892.00	25023.78	793.04	21062.39	26559.05
Fennel	367.00	597.00	1626.70	158.35	292.00	1844.02	223.51	327.22	1464.01
Cumin	3706.00	2595.00	700.22	3053.00	1937.00	634.46	4293.74	3294.95	767.38
Chillies	80.00	74.00	925.00	64.52	66.03	1023.35	62.74	64.89	1034.25
Isabgul	196.00	137.00	698.98	67.00	40.00	597.01	81.78	62.94	769.69
Onion (Rabi)	636.00	18605.00	29253.14	145.00	3550.00	24482.76	686.88	20957.07	30510.53
Onion (Sum.)	92.00	2586.00	28108.70	21.78	563.99	25894.66	10.45	295.58	28284.87
Onion (Total)	728.00	21191.00	29108.52	166.78	4113.99	24667.14	697.33	21252.65	30477.18
Garlic	418.00	2614.00	6253.59	72.00	345.00	4791.67	380.87	2349.81	6169.59
Guar seed	1283.00	745.00	580.67	2071.00	1245.60	601.45	4065.83	3296.14	810.69
Banana	285.87	20541.37	71855.63	281.00	20006.00	71195.73	267.21	19446.35	72775.53

Cotton Production in bales of 170 kg each, Productivity is in lint, NA = Not Available

Source: Directorate of Agri., Gujarat

Table - 2. 6.B Total Crop-wise Area, Production and Yield of Food and Non-food Crops for the Year 2011-12 to 2015-16

Area in '00 ha, Production in '00 T and Yield in Kg/ha

Crop Area	2014-2015			2015-2016			Average (2011-12 to 2015-16)		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Total Jowar	696.31	918.04	1318.44	990.70	1314.99	1327.33	1118.82	1482.80	1325.33
Total Bajra	4530.16	10101.27	2229.78	3911.68	8859.14	2264.79	5957.42	11807.83	1982.04
Total Rice	7944.45	17715.87	2229.97	7741.82	16918.63	2185.36	7851.25	17057.08	2172.53
Total Maize	3943.42	5684.02	1441.39	3919.21	5898.14	1504.93	4384.64	6734.94	1536.03
Total Mung	1182.98	589.37	498.21	1294.57	660.10	509.90	1574.39	762.82	484.52
Total Udad	691.86	485.29	701.43	680.73	408.10	599.50	845.84	549.93	650.16
Total Cereals	29223.57	67744.53	2318.15	25526.90	56514.92	2213.94	31505.10	71863.84	2281.02
Total Pulses	6089.63	5369.33	881.72	5887.04	5194.33	882.33	7098.46	6126.55	863.08
OILSEEDS									
Groundnut (Kharif)	13320.76	25559.88	1918.80	13558.15	19355.64	1427.60	14219.78	25309.95	1779.91
Groundnut (Sum.)	513.75	945.89	1841.15	574.21	955.76	1664.48	956.69	1841.75	1925.13
Sesamum (Kharif)	1372.47	793.70	578.30	1525.65	552.91	362.41	1400.57	630.62	450.26
Sesamum (Sum.)	533.01	262.77	492.99	107.18	52.08	485.91	389.39	191.46	491.70
Groundnut (Total)	13834.51	26505.77	1915.92	14132.36	20311.40	1437.23	15176.49	27151.75	1789.07
Sesamum (Total)	1905.48	1056.47	554.44	1632.83	604.99	370.52	1789.96	822.09	459.28
Rapeseed and Mustard	1849.93	3366.11	1819.59	1901.52	2762.15	1452.60	2145.09	3578.31	1668.14
Castor	6935.27	14405.21	2077.09	7137.87	14096.32	1974.86	7327.06	15017.72	2049.62
Soyabean	580.47	450.95	776.88	803.54	634.71	789.89	574.04	451.97	787.35
Total Oilseeds	25105.66	45784.51	1823.67	25608.12	38409.57	1499.90	27201.44	47116.60	1732.14
CASH CROPS, VEGETABLES, SPICES & OTHER									
Cotton (Irrigated)	18761.38	76598.23	694.07	18683.31	58171.90	529.31	18179.01	69956.17	654.19
Cotton (Un-Irrigated)	10076.55	15735.14	265.47	8532.67	17252.41	343.73	9039.96	14804.05	278.40
Cotton Total	28837.93	92333.37	544.31	27215.98	75424.31	471.13	27218.97	84760.22	529.38

Crop Area	2014-2015			2015-2016			Average (2011-12 to 2015-16)		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Tobacco (Kharif)	481.48	904.41	1878.39	611.36	1093.01	1787.84	509.69	946.95	1857.88
Tobacco (Rabi)	1148.09	2139.40	1863.44	1357.11	2705.84	1993.83	971.57	1770.89	1822.70
Tobacco (Total)	1629.57	3043.81	1867.86	1968.47	3798.86	1929.85	1481.27	2717.83	1834.81
Sugarcane (in Gul)	2085.53	0.00	0	1571.30	0.00	0	1834.56	122912.64	66998.43
Potato	1016.63	26094.25	25667.40	1091.88	27730.81	25397.31	878.91	22140.49	25190.85
Fennel	294.75	445.63	1511.91	453.84	682.24	1503.26	299.49	468.82	1565.39
Cumin	2757.95	1866.28	676.69	2887.28	1997.42	691.80	3339.59	2338.13	700.12
Chillies	114.98	107.02	930.79	59.13	61.77	1044.66	76.27	74.74	979.91
Isabgul	78.63	51.98	661.10	97.94	65.33	667.05	104.27	71.45	685.26
Onion (Rabi)	388.09	10819.35	27878.46	528.85	14242.67	26931.39	476.96	13634.82	28586.68
Onion (Sum.)	82.35	2332.77	28327.46	100.91	2926.16	28997.71	61.50	1740.90	28308.20
Onion (Total)	470.44	13152.12	27957.06	629.76	17168.83	27262.49	538.46	15375.72	28554.88
Garlic	78.44	458.66	5847.22	75.94	423.05	5570.83	205.05	1238.10	6038.06
Guar seed	2773.30	2205.59	795.29	3134.28	1915.29	611.08	2665.48	1881.52	705.89
Banana	269.89	19900.76	73736.57	244.39	17681.64	72350.11	269.67	19515.23	72366.52

Cotton Production in bales of 170 kg each, Productivity is in lint, NA = Not Available

Source: Directorate of Agri., Gujarat

2.1.8 Horticultural Crops:

The annual production of all vegetable crops in Gujarat is around 13.16 million tonnes from 0.64 million hectares area with the productivity of 20.44 tonnes/ha contributing 8 percent of the total the country production in the year 2016-17. Tremendous growth in vegetable production sector in the state has been observed, with an increase in 212% acreage and 329% production in 2016-17 from 2000-01. In Gujarat, Banaskantha district holds first in both area (102.22 thousand hectares) and production (2.74 million MT) of vegetables in the Gujarat, which is followed by Bhavnagar (43.29 thousand hectares with production of 1.04 million MT) and Aravalli (26.01 thousand hectares with production of 0.78 million MT), respectively in 2016-17. However, in case of vegetable productivity, Aravalli district (29.79 MT/ha) tops the list which is followed by Sabarkantha (28.35 MT/ha) and Banaskantha (26.84 MT/ha), respectively. The district-wise average area, production and productivity are given in Table 2.7.

Table - 2. 7 Total Crop-wise Area and Production of Fruit, Vegetable, Spices and Flower Crops (2012-13 to 2016-17)

The area in ' ha, Production in M. T

Crop	2012-13		2013-14		2014-15		2015-16		2016-17	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
FRUIT CROPS										
Mango	141258	1003706	142691	1125606	150048	1219710	153180	1241593.54	161267	1424865.57
Chiku	28808	309885	28612	297019	29421	321318	29562	325151.39	30010	331542.71
Citrus	40791	433117	41079	449243	41742	462416	43270	562491.44	44964	586804.56
Ber	12158	128632	12313	123782	11880	120916	11808	120307.24	11957	121952.38
Banana	70577	4523485	66496	4225493	67016	4324357	64692	4185520.36	66309	4293233.39
Guava	10611	158054	10805	140815	11144	146058	11637	153038.48	12087	160808.11
Pomegranate	7374	78375	9375	99331	14768	171659	18538	278104.25	23176	350815.78
Date Palm	17172	138166	17658	152971	17882	164282	18226	168474.40	18847	173997.66
Papaya	19537	1189308	19587	1185473	19128	1170638	20174	1241274.40	20878	1289297.71
Custard Apple	5130	56244	5150	52202	5336	55041	5925	61177.03	6176	63626.38
Aonla	11745	112904	11378	108535	9669	95624	8544	85352.44	8298	83131.48
Cashew Nut	7966	24523	8357	26076	8422	27688	8552	28097.00	8742	15692.95
Coconut (1000 nuts)	21116	221876	21633	203054	22451	211700	22813	215197.15	24439	232169.80
Others	4126	152003	5605	41492	6390	48597	6965	54690.21	7258	57341.27

Crop	2012-13		2013-14		2014-15		2015-16		2016-17	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
TOTAL	398369	8530278	379106	8028037	392846	8328302	401073	8505272.17	419968	8953109.95
VEGETABLE CROPS										
Potato	81272	2499725	73638	2294950	98200	3097391	112400	3549380.00	122528	3797816.11
Onion	28847	704380	72787	1840370	44500	1126590	53200	1355784.00	51609	1290168.85
Brinjal	76746	1341053	76013	1476987	74014	1469646	74057	1471156.82	74339	1486553.25
Cabbage	30924	663525	30352	661399	30029	654522	27858	608163.11	28339	637619.75
Okra	65655	723328	65999	759036	73843	857486	73786	859468.10	76029	908676.75
Tomato	44002	1156721	44565	1259098	46228	1313701	46397	1319113.30	48758	1411851.99
Cauliflower	28621	532276	27695	601479	24890	540954	25018	544705.69	25838	568950.54
Clusterbean	39768	354480	41105	410032	41752	421304	39203	397018.24	38397	391248.35
Cow Pea	26540	283741	26883	285327	30470	322084	30431	322094.53	29564	313576.22
Cucurbits	74753	1202827	72423	1127039	81356	1275094	84325	1326632.04	86832	1389027.80
Others	40506	1058621	50820	872321	59684	970477	59533	928763.18	61644	965762.00
Total	537634	10520677	582280	11588039	604966	12049249	626208	12682279.01	643877	13161251.61
SPICES CROPS										
Cumin	372584	338192	454900	364648	266700	251432	295400	300938.00	278751	291488.32
Fennel	39801	78733	22100	45020	30200	63845	45400	96773.87	40909	87821.66
Chilli-Dry	46991	77934	19045	33304	14775	26936	14723	26910.85	14039	26031.02
Garlic	19081	145413	40600	318197	7600	59710	8000	63046.35	10125	81472.28
Coriander	15396	43946	44060	64381	92100	143378	88600	138799.77	121199	189518.03
Ginger	5926	105504	5868	118229	5343	116948	4679	102577.30	4651	102848.99
Turmeric	3893	65948	3151	52063	3289	64067	3552	69247.90	3711	73148.53
Fenugreek	5394	15436	5299	10087	6675	13371	7042	14166.79	14963	28923.80
Isabgul	15752	23929	8100	9258	9400	11647	9100	10920.00	15572	16455.30
Ajwan	7558	8471	6429	5021	6340	5781	1552	1470.85	5315	5047.07
Suwa	16962	21601	7400	9014	7800	10515	7200	8484.36	17087	20547.56
Total	549338	1254363	616952	1029223	450222	767630	485248	833336.04	526322	923302.56

Crop	2012-13		2013-14		2014-15		2015-16		2016-17	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
FLOWER CROPS										
Rose	4424	35479	4123	37364	4037	36745	4282	39103.52	4530	41525.17
Marigold	7014	66541	7215	68931	8154	78241	8500	81704.94	8807	84947.19
Mogra	739	4434	821	7757	834	7928	826	7383.58	844	7640.78
Lilly	3311	27882	3345	33094	3605	35799	3666	36451.30	4097	40833.01
Others	1794	14936	1879	16463	2158	18919	2224	19516.88	2363	21035.68
Total	17282	149272	17383	163609	18788	177632	19498	184160.22	20641	195981.82

Note: Production of COCONUT is in number of nuts, area and production of coconut is not calculated in total area and production of fruit

Major horticultural crops of Gujarat are mango, banana, sapota, lemon, guava, tomato, potato, okra, onion, cumin, garlic, isabgul and fennel grown over 13.54 lakh ha of land with 173.00 lakh tons production of horticultural crops in 2010-11. Gujarat has the highest productivity in onion, potato, cumin and fennel and second highest productivity in banana and tomato. However, it has third highest productivity in pomegranate, guava, lime, papaya and isabgul in the country. The mandate horticultural crops of South Gujarat are mango, banana, sapota, papaya and vegetables. Lately, floriculture has made inroads in South Gujarat in a big way. Gerbera, Chinese rose, Gladiolus, Anthodium and Sword Lilly are being grown in protected condition boosting the economy of the area and adding new dimensions to agriculture.

During the year 2012-13, the production of fruits, vegetables, spices and flowers has been reported to be 85.30, 105.21, 12.54 and 1.49 lakh tonne respectively. During the year 2013-14, the production of fruits, vegetables, spices and flowers is estimated to be 80.28, 115.88, 10.29 and 1.64 lakh tonne respectively. From the year 2013-14, area and production of coconut are not calculated in total area and production of fruit.

2.1.9 Forestry:

The Forest area of Gujarat is approximately 21820.12 sq.km. in the year 2015-16, which is about 11.13 % of the total geographical area of the State. The state has 23 wildlife sanctuaries and 4 National Parks covering about 8.47 % of the total geographical area of the State. Gujarat Forest Department has launched a "Social Forestry Programme" for planting trees on non-forest lands and become a pioneer and leading State in social forestry field.

The state of Gujarat is one of the most ecologically diverse regions with rich biodiversity encompassing around 2,200 naturally occurring plant species. Gujarat state is composed of four forest types viz., i. Tropical Moist Deciduous Forests (Type 3B: South Indian Moist Deciduous Forests), ii. Littoral and Swamp Forests (Type 4B: Swamp/Tidal Forests), iii. Tropical Dry Deciduous Forests (Type 5A: Southern Tropical Dry Deciduous Forests) and iv. Tropical Thorn Forests (Type 6B: Northern Tropical Thorn Forests), that includes over 30 sub-types of the forest. As per recent data, the forest cover of Gujarat is 14,757 Sq. Km contributing 7.52 percent of the state's geographical area. Area wise, Kachchh, Junagadh and The Dangs districts represented the maximum forest area of 2,312 and 1634 and 1368 Sq. Km, respectively. However, percent forest cover is highest in The Dangs district (77.5% of district's geographical area), followed by Narmada (34.2% of district's geographical area) ISFR, 2017). The total carbon stock of the forests in the State is 110.697 million tonnes, which is 1.56 percent the total forest carbon of the country.

The dominant timber species of the state include *Tectona grandis*, *Lagerstroemia parviflora*, *Butea monosperma*, *Diospyros melanoxylon*, *Wrightia tinctoria*, *Anogeissus latifolia*, *Morinda tomentosa*, *Terminalia crenulata* (Syn: *T. elliptica*), *Careya arborea*, *Schleichera oleosa*, *Dalbergia sissoo*, *Ougeinia oojeinensis*, *Pterocarpus marsupium*, *Acacia nilotica*, *Albizia lebbek* and *Gmelina arborea*.

Considering trees outside the forests, the top ten ranking species are *Azadirachta indica*, *Prosopis chilensis*, *Acacia nilotica*, *Eucalyptus species*, *Mangifera indica*, *Tectona grandis*, *Ailanthus excels*, *Prosopis cineraria*, *Pithecellobium dulce* and *Zizyaphus maunitiana*. Similarly, major NTFP resources of the State are bamboos, different types of commercial grasses, Gum Kaday, seeds of *Sapindus*, *Emblica officinalis*, *Pongamia pinnata*, *Cassia tora*, *Jatropha curcus*, *Buchanania lanzan*, *Pithecellobium dulce*, Mahuva flowers, fruits and seeds, honey and wax, and other minor fruits.

As per the estimation, over 175 million trees outside forests (ToF) are being cut annually to meet the demand for timber and pulp wood in the state. Among them, *Azadirachta indica*, *Acacia nilotica*, *Ailanthus excelsa*, *Tectona grandis*, *Pithecellobium dulce*, *Eucalyptus species*, *Acacia auriculiformis* and *Mangifera indica* are major timber producing species harvested from ToF. These plants are largely harvested from farm fields under agroforestry systems to get a higher income from the farming community. High yielding clones of *Eucalyptus species*, *Ailanthus excelsa*, *Tectona grandis* and *Casuarina equisetifolia* are gaining popularity.

Table - 2.8 District wise forest cover of Gujarat [Source: ISFR, 2017]

Districts	Forest Cover (Sq. Km)				% Forest Cover to the total State's geographical area	Changes in two years	Scrub
	Very Dense Forest	Mod. Dense Forest	Open Forest	Total Forest			
Ahmedabad	0	12	117	129	1.6	-1	52
Amreli	0	63	188	251	3.4	1	66
Anand	0	18	45	63	2	0	19
Aravalli	*	*	*	*	*	*	*
Banaskantha	0	372	176	848	7.9	1	208
Bharuch	0	71	243	314	4.8	2	26
Bhavnagar	0	47	230	277	2.8	5	76
Botad	*	*	*	*	*	*	*
Chhotaudepur	*	*	*	*	*	*	*
Dahod	1	118	419	538	14.8	1	45
Devbhumi Dwarka	*	*	*	*	*	*	*
Gandhinagar	0	11	81	92	4.3	0	50
Gir Somnath	*	*	*	*	*	*	*
Jamnagar	0	55	380	435	3.1	12	99
Junagadh	15	956	663	1634	18.5	17	60
Kachchh	0	301	2011	2312	5.1	11	752
Kheda	0	20	74	94	2.4	0	37
Mahesana	0	13	146	159	3.6	-1	64
Mahisagar	*	*	*	*	*	*	*
Morbi	*	*	*	*	*	*	*
Narmada	20	464	479	963	34.2	-2	32
Navsari	18	125	159	302	13.4	2	15
Panchmahal	0	219	518	737	14.1	-5	57
Patan	0	1	101	102	1.8	1	126
Porbandar	0	16	108	124	5.3	0	20
Rajkot	0	3	138	141	1.3	0	37
Sabarkantha	29	304	474	807	10.9	1	130
Surat	5	294	216	515	11.3	1	90
Surendranagar	0	6	169	175	1.7	-2	36
Tapi	80	479	251	810	25.8	1	7
The Dangs	210	743	415	1368	77.5	1	3
Vadodara	0	145	484	629	8.3	0	60
Valsad	0	344	594	938	31.2	1	27
Total	378	5200	9179	14,757	7.52	47	2194

*Newly created districts and data not present



Fig.2.17 Forest Area of Gujarat State

2.1.10 Livestock population

Gujarat has 235.15 lakh livestock and poultry in the state comprised of mainly 79.76 lakh cattle and 87.74 lakh buffaloes. Gujarat is the home of important breeds of cattle (*Gir* and *Kankrej*), buffaloes (*Mehsani*, *Jafrabadi*, *Surti* and *Banni*), horses (*Kathiawadi* and *Marwadi*), camel (*Kachchhi*), sheep (*Patanwadi* and *Marwadi*) and goats (*Surti*, *Mehsani*, *Kachchhi* and *Zalawadi*). Animal Husbandry has been making a significant contribution to state's Agriculture GDP amounting to 23.5 percent of the share of Gujarat state and has very well developed dairy sector. In the dairy sector, Gujarat has 18 District Milk Producers' Unions, 18,549 Milk Cooperative Societies, more than 34 lakh members of milk cooperatives in last decade, Gujarat's milk production has risen by 68 percent and reached to 150 lakh liters/day.

Table - 2.9 Large Animal Population and Total Milk Production

Districts		Large Animal Population in 000 No.		Total Milk Production ('000 T)
		Cattle	Buffaloes	
1	Ahmedabad	217	344	347.93
2	Amreli	269	201	312.92
3	Anand	147	407	486.01
4	Aravalli	143	140	172.48
5	Banaskantha	660	955	1203.58
6	Bharuch	122	154	152.44
7	Bhavnagar	340	334	410.66
8	Botad	99	97	119.09
9	Chota Udaypur	247	119	96.86
10	Dahod	589	284	230.62
11	Dang	70	21	22.45
12	Devbhoomi Dwaraka	59	146	169.39

Districts		Large Animal Population in 000 No.		Total Milk Production('000 T)
		Cattle	Buffaloes	
13	Gandhinagar	148	364	423.47
14	Gir Somnath	102	75	94.74
15	Jamnagar	350	257	326.69
16	Junagadh	481	377	523.63
17	Kheda	150	414	361.62
18	Kutchh	389	226	383.43
19	Mahisagar	166	306	257.78
20	Mehsana	216	568	774.95
21	Morbi	44	18	20.38
22	Narmada	141	59	65.73
23	Navsari	156	102	219.80
24	Panchmahal	501	524	405.11
25	Patan	131	364	360.33
26	Porbandar	83	105	134.30
27	Rajkot	452	362	478.52
28	Sabarkaktha	621	775	913.98
29	Surat	227	247	374.14
30	Surendranagar	347	290	373.20
31	Tapi	215	176	202.81
32	Vadodara	482	462	401.46
33	Valsad	308	96	167.93
Total for the Gujarat State		8670	9369	10988.42

Source: Directorate of Animal Husbandry, Gujarat State

Table- 2.10 District-wise Milch Animals and Poultry by Livestock Censuses

Sr. No.	State/District	No. of Milch Cows and Buffaloes		No. of Total Poultry	
		17 th Census 2003	18 th Census 2007	17 th Census 2003	18 th Census 2007
1	Ahmedabad	277796	271399	32088	452470
2	Amreli	176541	180190	13990	15896
3	Anand	239857	278901	2312691	4593181
4	Aravalli	@	193869	@	
4	Banaskantha	558905	671837	123698	272255
5	Bharuch	114116	112350	173000	271136
6	Bhavnagar	288795	195872	597142	1250961
7	Botad	@	105470	@	
8	Dahod	204167	226274	417493	592998
9	Devbhoomi Dwaraka	@	92094	@	
10	Gandhinagar	233697	265007	58297	185376
11	Gir Somnath	@	134806	@	
12	Jamnagar	235932	138142	35231	38591
13	Junagadh	317717	202210	103602	67355
14	Kutch	260477	292993	25618	23175
15	Kheda	331610	325014	468339	460173
16	Mahesana	350700	400171	55468	114299
17	Mahisagar	@	225325	@	
18	Morbi	@	102990	@	

Sr. No.	State/District	No. of Milch Cows and Buffaloes		No. of Total Poultry	
		17 th Census 2003	18 th Census 2007	17 th Census 2003	18 th Census 2007
19	Narmada	74419	57306	143802	123847
20	Navsari	120132	104521	558333	610494
21	Panchmahal	394205	251956	410532	481557
22	Patan	180803	261083	12640	23313
23	Porbandar	76755	80815	17044	29371
24	Rajkot	311396	240312	132171	182339
25	Sabarkantha	548062	376334	292132	401369
26	Surat	365897	218435	953965	767148
27	Surendranagar	246734	289779	5374	1706
28	Tapi	@	135926	@	502832
29	The Dang	23203	20573	151533	156242
30	Vadodara	334833	349042	336964	710493
31	Valsad	107894	117481	722085	1044331
	Gujarat	6374643	6918477	8153232	13372908

@ - 17th livestock census 2003. District was not formed.

Source: Directorate of Animal Husbandry, Gujarat State

2.1.11 Fisheries:

Table - 2.11 District Wise Inland Fish Production Since 2013-14 to 2016-17

S.N.	District	Production in MT			
		2013-14	2014-15	2015-16	2016-17
1	Valsad	8060	8324	10220	10019
2	Navsari	10583	10512	15469	10019
3	Dang	0	0	0	18866
4	Surat	10174	14901	18197	0
5	Tapi	10004	10478	10245	18902
6	Bharuch	10000	18812	11243	10307
7	Narmada	6822	6202	5848	11728
8	Vadodara	7683	7691	7100	5885
9	Chota Udepur	N.A.	N.A.	503	7261
10	Panch Mahals	3487	3442	2635	497
11	Dohad	763	826	771	2547
12	Anand	6527	6552	6312	681
13	Kheda	3785	4831	4483	6527
14	Mahisagar	N.A.	N.A.	698	4338
15	Ahmedabad	7717	5812	5745	718
16	Gandhinagar	9	0	0	5477
17	Mahesana	497	329	316	0
18	Patan	21	46	44	313
19	Sabarkantha	1436	1519	931	41
20	Aravalli	N.A.	N.A.	520	953
21	Banaskantha	825	998	899	498
22	Surendranagar	3735	2972	2818	898
23	Rajkot	8838	4803	2733	2793

24	Morbi	N.A.	N.A.	2100	2842
25	Bhavnagar	668	909	758	2009
26	Botad	N.A.	N.A.	117	712
27	Kachchh	67	58	59	131
28	Jamnagar	267	343	240	56
29	Devbhumi Drawaka	N.A.	N.A.	119	302
30	Porbandar	236	375	294	135
31	Junagadh	591	580	457	282
32	Gir Somnath	N.A.	N.A.	186	458
33	Amreli	118	167	172	209
		102913	111482	112232	116625
Reservoir		21362	26264	25980	26672
B.W. Prod.		9858	27058	31664	36608
Riverine		30333	21674	20583	20598
Esturine		15016	9012	8837	8944
Pond & Tank Prod.		9313	8918	8439	8747
Mkt. & Other		12249	13712	11841	10256
Lake		4782	4844	4888	4900
TOTAL		102913	111482	112232	116725
GROWTH RATE		8.41	8.33	0.67	4.00

Source: Commissioner of Fisheries, Gujarat

**Table - 2.12 Species Wise Inland Fish Production of Gujarat State from
2013 -14 to 2016 – 2017**

(Production in MT)

SR. NO.	Name of fish	2013-14	2014-15	2015-16	2016-17
1	Catla	13568	12034	12022	12341
2	Rohu	14303	14503	14401	14423
3	Mrigal	13237	11626	11688	11701
4	Kalbasu	1373	1104	1106	1111
5	Minor carp	152	34	20	20
6	Wallagoatta	2681	1930	1933	1908
7	Scorpion	898	716	649	619
8	Murrel	2768	2121	2123	2137
9	Catfish	4754	4664	4658	4659
10	Bomby duck	588	600	632	649
11	Hilsa	1567	449	449	427
12	Mullet	2635	2824	2790	2791
13	Eel	858	983	994	1018
14	Shrimps	2215	1621	1619	1532
15	Prawns (M)	12606	29806	33265	38183
16	Prawns (J)	405	69	77	74
17	Bekti	124	595	543	169
18	Crabs	442	1068	1051	523
19	Levta	1064	301	186	765
20	Mahaseer	0	0	0	0
21	Misc.	26675	24434	22026	21675
TOTAL		102913	111482	112232	116725

Source: Commissioner of Fisheries, Gujarat

Table - 2.13 Table-4.5.5 Species wise Marine Fish Production (in MT) Since 2013-14 to 2016-17

SR.NO.	NAME OF FISH	Year			
		2013-14	2014-15	2015-16	2016-17
1	White Pomfret	7633	6589	6993	7080
2	Black Pomfret	2414	3511	3676	3729
3	Bombay Duck	79630	83219	82680	82871
4	Thread fin	2894	3261	3197	3251
5	Jew fish	5432	6668	7019	7051
6	Hilsa	1397	1821	1794	1795
7	Other clupeids	9060	10654	10684	10701
8	Coilia	11695	18603	17991	18163
9	Shark	9864	9921	9320	9389
10	Mullet	5138	5127	4760	4843
11	catfish	27704	22286	21912	22104
12	Eel	3098	2795	2928	2962
13	Leadher Jacket	5208	4135	4678	4634
14	Seerfish	8309	8931	8050	8114
15	Indian Salmon	726	1441	1693	1712
16	Ribbonfish	65972	63110	63170	63376
17	Silver Bar	5921	5057	5003	5009
18	Perch	16841	14116	14684	14754
19	Small Sciendes	177326	148074	146549	146419
20	Shrimp	40484	41378	42479	42821
21	Prawns (M)	7863	7670	8400	8592
22	Prawns (J)	1081	1405	1511	1550
23	Lobster	686	858	904	911
24	Crab	8615	4686	4541	4617
25	Levta	3673	2349	2267	2272
26	Squid/Cuttles	26095	35466	35958	36099
27	Tuna	3942	2600	2896	2890
28	Carangies/Mecrel	10438	8405	8654	8682
29	Ranifish	17490	16992	16940	16900
30	Sole	10889	3681	3310	3338
31	Miscellaneous	118063	153639	152685	152204
Total		695580	698450	697328	698832

Source: Commissioner of Fisheries, GoG, Gandhinagar

Table-2.14 Item-Wise/ Species wise Foreign Export of Fish and Fish Products from Gujarat (2013-14 To 2015-16)

Qty. in T and Value in Rs.Crore

Major Item	Q	Year				India Export		Gujarat's Share In India's Export
	V	2013-14	2014-15	2015-16	2015-16%	2015-16	%	
Frozen Shrimp	Q	7409	7684	7497	3.59	373866	39.53	2.01
	V	299.65	335.72	313.39	8.79	20045.50	65.89	1.56
Frozen Fish	Q	157690	148202	117420	56.28	228749	24.18	51.33
	V	2169.80	1866.45	1840.26	51.59	3462.25	11.38	53.15
Frozen Cuttle Fish	Q	19138	24244	21838	10.47	65596	6.93	33.29
	V	366.68	492.32	506.06	14.19	1636.11	5.38	30.93
Frozen Squid	Q	18570	17900	21449	10.28	81769	8.64	26.23
	V	278.22	278.52	377.31	10.58	1615.21	5.31	23.36
Dried Items	Q	2275	1297	2785	1.33	43320	4.58	6.43
	V	153.07	95.19	24.98	0.70	725.58	2.39	3.44
Live Items	Q	0	0	0	0.00	5493	0.58	0.00
	V	0	0	0	0.00	308.81	1.02	0.00
Chilled Items	Q	137	158	164	0.08	33150	3.50	0.49
	V	3.96	5.14	6.09	0.17	809.50	2.66	0.75
Other Items	Q	46701	45949	37471	17.96	113949	12.05	32.88
	V	387.19	571.89	499.15	13.99	1817.87	5.98	27.46
Grand Total	Q	251920	245434	208624	100.00	945892	100.00	22.06
	V	3658.57	3645.23	3567.24	100.00	30420.83	100.00	11.73

Source: The Marine Products Export Development Authority, Kochi, India

2.1.12 Organic Farming:

Gujarat has a wide variety of soils, climate, cropping patterns and extent of water availability and its quality. It is therefore implicit that each and every situation arising out of various combinations of the factors above would provide separate technological inputs for organic farming. From the viewpoint of physical features, the state is having land plains, hills as well as the hilly peninsular region. A wide variety of soils are present in different regions of the state *i. e.*, black soils, mixed red and black soils, residual sandy soils, alluvial soils, saline-alkali soils, desert soils, lateritic soils, hilly soils and forest soils. Water erosion is the major problem causing loss of top soil and /or terrain deformation in 5.21 m ha (26.5 %) of the total area throughout the state (Raman *et al.*, 2000). It can be solved by adopting organic farming technologies. The influence of human-induced chemical deterioration causing salinization alone and/or in combination with water erosion, winds erosion and flooding has been observed in 2.8 m ha representing 12.7 percent of the total area. In Gujarat, 68.43% of the land is undergoing desertification. The most significant process is water erosion (34.64%) followed by salinisation (14%) vegetal degradation (13.97%) and erosion (2.77%). Groundwater of 31 talukas are overexploited, 22 districts have nitrate more than permissible level (GOF, 2015).

In order to get rid of these problems, it is mandatory to switch over to organic farming. Both rainfed as well as an irrigated area are present in Gujarat. Out of the 112 lakh ha gross cultivated area in the state, 36 lakh ha is irrigated (32 %) (Raman *et al.*, 2000).

However, there are challenges for adoption of this technology, as it requires scientific explanation, formulation of a package of practices, post-harvest technology for organic produce, quality of its inputs and produce, certification of farm produce and processing etc. So, our strategy should therefore be clearly worked out, which may be the prioritization of area and crop for organic production, development of infrastructure and database as well as market intelligence, development of equivalent standards for organic produce, involvement of organic farmers in production, processing and marketing, development of courses and training models for organic agriculture, transfer of appropriate technologies etc. It requires combined efforts of scientists, field functionaries, NGOs and farmers. So, the Government should also encourage its adoption, in a phased manner through the creation of infrastructure and by giving tax incentives.

Current status of organic farming in Gujarat

The seventy percent of Gujarat's population is either wholly or significantly dependent for their livelihoods on agriculture, horticulture, animal husbandry or fisheries. The Geographical area of Gujarat is about 196 lakh ha. Total 47.38 lakh operational land holdings engaged in farming, the majority of the farmers are small and marginal. An average land holding size is 2.11 ha (GOFP, 2015). The area under organic certification (including wild harvest) in Gujarat was 41,978.94 ha (APEDA, 2011-12). The NCOF annual reports in the year 2011-12 say that Gujarat is having certified cultivated organic area (42267.48 ha), in conversion cultivated area (6251.43 ha) and total cultivated area under certification process is 48518.91 ha. It is very evident that this area is increasing day by day. In the state, a total of 3963.42 Mt carrier based biofertilizers (*Azotobacter*, *Azospirillum*, *Rhizobium*, PSB, KMB, ZSB, VAM and *Acetobacter*) and liquid-based biofertilizers of 2873.317 KL are produced in the year 2015-16 (NCOF Annual Report 2015-16). The organic manure produced or available in the state is 358 lakh mt of FYM, 0.50 lakh mt of vermicompost and other manures (5 lakh mt) (NCOF, 2011-12). So, the state has strong potential for organic farming.

The state is bestowed with a wide variety of natural resources and the Government is promoting organic farming in order to protect the environment, sustaining the crop production as well as ensuring human and animal health. Our Government became the 9th Indian state who declared organic farming Policy. The Gujarat government has already declared the tribal district, Dangs, as 100 percent organic. The government is also in-force to convert Ahva, Vaghai, Subir, Kaprada, Dhampur and Vansda taluka under organic.

2.1.13 Biofertilizer:

- Biofertilizer annual production in India has increased 20 times in past two decades reaching 1,12,992 tons during 2015-16, including liquid formulations.
- All India Liquid Biofertilizer capacity and production of liquid biofertilizers was 6240.89 KL (2015-16) wherein the Lion share 2873.30 KL was from Gujarat
- Gujarat is one of the major players, produced 3,963.42 tonnes and 2,873.30 KL of solid and liquid biofertilizer, respectively during 2015-16, with an annual increase of 8% and 3%, respectively as compared to the previous year 2014-15
- Due to ease of use and effective application liquid biofertilizer is gaining popularity among a farming community of the state. For liquid biofertilizer, Gujarat state has an annual production capacity of 11,75,000 Liters and produced 7,38,257 Liters during 2016-17, which is 46% of total production of India (Biofertilizer Statistics, 9th ed. 2016-17, FAI, New Delhi).

Table -2.15 Details of Biofertilizer Production in Gujarat State (2011-12 to 2015-16)

Type of Biofertilizer	Production/Year					During 2015-16 % Increase over 2011-12
	2011-12	2012-13	2013-14	2014-15	2015-16	
Solid (tones)	2,037.35	978.48	6,411.43	3,667.93	3,963.42	+ 95%
Liquid (KL)	-	-	-	2,800.50	2,873.30	+ 100%
Total	2,037.35	978.48	6,411.43	6,468.43	6,836.72	+ 236%

Table -2.16 Unit wise Biofertilizer Production in Gujarat State (2016-17)

Sr. No.	Unit	Production	
		Solid (Tonnes)	Liquid (Liters)
1	Anand Agricultural University, Anand	0.00	8,429.00
2	GSFC Agrotech Ltd., Vadodara	0.00	22,850.00
3	Indian Farmers Fertilizer Cooperative Ltd., Kalol	12.20	1,23,960.00
4	Krishak Bharati Cooperative Ltd., Hajira, Surat	0.00	5,63,420.00
Total		12.20	7,18,659.00

Over and above many players like Navsari Agricultural University, Junagadh Agricultural University, Gujarat Agro Industries Corporation Limited, GUJCOMASOL, and many private organizations are in production of biofertilizers.

CHAPTER - 3

SWOT ANALYSIS

3.1 Introduction:

SWOT analysis is a simple but effective tool of analysis which helps in policy formulation. It visualizes the future on the basis of present status. The strengths of the sector are the result of successful strategies of the past and the opportunities can be reaped with a blend of new and old strategies. The weaknesses and threats are the hurdles for development may be due to past mistakes and newly emerging trends. The present chapter devotes its attention to the SWOT analysis with a focus on agriculture and allied sectors.

The SWOT analysis provides direction, indicates a framework for researchers or planners to identify and to prioritize the agricultural plans and to further identify the strategies of achieving them and serves as a basis for the farm's sector goals. Once all of the Strength, weaknesses, opportunities, and threats of the sector have been listed, the information should be combined and strategies are developed. Plans are drawn up to take advantage of the Strength and opportunities, countering the threats if possible, and minimize or reduce the weaknesses.

Therefore, the SWOT analysis has been attempted first for the state economy, as a whole and then for the agriculture sector as well as allied sectors like horticulture, agriculture engineering, agricultural marketing, animal husbandry, dairying, fisheries etc.

3.2 Agriculture of Gujarat:

Strength:

- Varied agro-climatic zones with different varieties of soil, crops (more than 40)
- The predominance of non-food, high-value crops like *cotton, castor, tobacco, isabgul, cumin, fennel, mango groundnut, banana*
- Enthusiastic and highly entrepreneurial farmers
- Longest sea coastline
- Well-developed infrastructure
- Congenial single window agro-industries policy
- Well-developed co-operatives
- Dominance in the milk sector
- Good governance + original initiatives
- Relatively strong marketing network
- Recent attention to post-harvest management
- The State is endowed with favourable agro-climate and abundance of natural resources for diversified agriculture production
- Highly productive soils with a predominance of fertile alluviums which are responsive to different inputs and management practices.
- Well-developed irrigation infrastructure facilitating higher cropping intensity potential for further development especially of groundwater resources.
- The technologies of crop production are also constantly changing due to research and development activities of the SAUs in the state. Constantly changing technologies are the essentials for agricultural development.
- Well-developed agro-based cotton and sugar-industries added Strength: for the rapid growth of the economy.
- People in the state are always industrious and hard-working and hence a science-based technological back-up can go a long way in improving agricultural production.
- The rail as well as road transport system, which are essentials for agricultural development, are also well – knitted in the state and

- Both urban and rural electrification is almost 100 percent in the State and acts as the catalyst for the growth of the State economy.
- As the urbanization and industrialization are on the accent in the recent years, the demand for quality agricultural products and protective foods like milk, fruits and vegetables is getting increased. These indicate the opportunities for increasing the yield per acre, the milk production, vegetables and fruits production etc. in the years to come. The demand for ready to cook as well as ready to eat foods is also increasing. Thus, there is ample opportunity for the agri-processing units to flourish in the years to come in the State.
- The agricultural development department in the State is also well equipped with technical human power and the much-needed infrastructure, to keep agricultural development going.

Weaknesses:

- 70% area depend on rain
 - (After completion of *Sardar Sarovar* Project it will be 49%)
- Uneven distribution of rain
 - *i.e. In Kachchh – 400 mm & In South Gujarat -1500 mm*
- Drought-prone area
- Arid and semi-arid area
 - *19.61% & 9.46% Respectively share in India*
- Saline and waterlogged area
- Low technology assimilation capacity in rural areas
- The high cost of power
- Flood /erosion
- Adverse impact on soil health and productivity due to imbalances in fertilizer application coupled with intensive agriculture. Application of organic fertilizers is very low with less than 10% area coverage
- Inadequacies in the availability of quality seed/plant material for all the major crops grown in the State resulting in low levels of seed replacement
- The post-harvest glut in commodities and price crashing
- Uneconomic size of the very large number of marginal and small farms and poor economic status of the farmers and the low literacy level among farmers affect the full adoption of scientific technologies.
- Declining land holding due to urbanization has reduced the scope of agriculture which directly affects the related processed food industry.

Opportunities:

- GM crops, Biotechnology
- Horticultural development
- Agri export zone
 - *i.e. Potato, Castor, Isabgul, Fruits. Datepalm, Duram wheat etc*
 - Organic farming: Special Zone, Market for organic product
- Agro-processing industries
 - *i.e. Cotton, Oilseed, Tomato, Cumin, Isabgul, Castor, Papaya, Fruits & Vegetables*
- Export potentiality
 - *i.e. Cotton, Cumin, Onion, Garlic, Castor, Isabgul, Mango, Other fruits & vegetables, Flowers, Duram wheat, Processed maize etc*
- Corporate and contract farming
- Investment in the agriculture sector
 - Private Market, Terminal Market, E-market

- IT network
- A public-private partnership, NGOs work
- Better organic input supply through development of 'Organic Inputs Production Hubs', promotion of FYM and vermicomposting at farmers' fields
- Rational utilization of groundwater resources through the adoption of the micro irrigation system. Promotion of rainwater harvesting structures for groundwater recharging and supplemental irrigation.
- Augmenting seed production through promotion of seed villages for production of certified seed with centralized processing/quality control facilities at block /district level.
- Export market potential can be tapped further especially for flowers, fruits and vegetables.
- Installation of agri-processing units can be taken up at an early date
- Production of milk in Gujarat is very high (12,2,62,000 Liters in FY 15-16) which can be used to make milk solids. Gujarat is Agri. export zone for Potato, Castor, Isabgul, Fruits. Date palm, Duram wheat etc.
- Agro-processing Industries are developing in Gujarat.
- There is export potentiality in Gujarat for the products like Cotton, Cumin, Onion, Garlic, Castor, Isabgul, Mango, other Fruits & Vegetables, Flowers, Duram Wheat, Processed Maize etc
- Investment in Agriculture Sector has been increased recently which is a positive sign of growth.
- Use of solar energy in agriculture will be beneficial for the environment also will make the cost of production less.

Threats:

- Inadequate and erratic nature of rainfall
- Frequent draught
- Soil erosion, Depletion of the water table, Salinity ingress / Sea water ingress
- Market Fluctuation
- Inadequate processing facilities
- Smaller land holdings limiting the scope for adoption of intensive crop production technologies, which are capital intensive
- Increasing production costs especially labour due to proximity to metro city coupled with unremunerative/ fluctuating prices for produce severely affecting the profitability of agriculture
- Excessive use of chemical fertilizers & pesticides limiting the scope for adherence to quality standards with special reference to exports
- Changes in socio-economic conditions, with younger generation from farming community preferring urban employment in place of agriculture
- High fluctuations and non-remunerative prices of farm products and consequent non-profitability of the farm business perforce many farmers to quit the agricultural profession itself.
- Fast urbanization and industrialization and indiscriminate conversion of agricultural lands to non-agricultural purposes pose a great threat of contraction of land put to agricultural uses and consequent reduction in production.
- Frequent market fluctuation will create the instability in development of crops.

3.3 Horticulture of Gujarat:

Strength:

- Varied Agro - Climatic Conditions
- The available surplus in Spices, Onion and Cucurbits

- Strong Cooperative Credit and marketing structure
- Strong production base for horticulture crops especially fruits and vegetables with scope for further development, processing and value addition.
- The horticulture development department in the State is also well equipped with technical human power and the much-needed infrastructure, to keep agricultural development going.

Weaknesses:

- Erratic monsoon
- Fragmented Processing industry
- Dependence on groundwater
- Total dependence on other states like Punjab for meeting the seed potato requirements. The absence of exclusive cold storage facilities for seed potato affecting seed quality and viability
- Though the State is a major producer of fruits and vegetables, inadequate post-harvest handling and cold storage facilities for perishable horticulture produce including potato is resulting in seasonal gluts and distress sales besides huge losses.
- Shortcomings in marketing, the absence of adequate ice plant and cold storage facilities at the production point.
- The major weakness is the high-cost of high-tech horticultural crops.
- Most of the fruit crops are highly season-bound and hence the year-round production is not possible.
- Lack of adequate demand for processed fruit and vegetable products and infrastructure facilities for processing value-added products.
- An inadequate network of horticultural extension machinery in the State.
- Highly perishable nature of horticulture products.

Opportunities:

- Scope in area expansion of fruits crops
- Potential to increase production and export of Banana, Mango, Potato, Onion, Cumin, Fennel & *Isabgol*
- Sardar Sarovar Project will provide irrigation facilities for additional 17.9 lakh ha
- Vast potential for cultivation of medicinal and aromatic plants
- Shifting consumer preference
- Investment in infrastructure
- Value Addition & processing
- Season-bound production, highly perishable nature of products and the year-round demand provide an excellent opportunity for the agro-processing entrepreneurs.
- Crop diversifications from low-return field crops to high-earning crops and raising the horticultural crops are the other possible opportunities.
- Gujarat State Horticulture Mission (GSHM) a registered society has been set up for implementation of NHM in the state. The State has strong cooperative credit & marketing structure, along with 213 cold storages having 9.50 lakh mt.

Threats:

- Drought-prone
- Prone to cyclone
- High-cost of high-tech involved in raising horticulture crops and low financial capability of the majority of farmers
- High perishability and inadequate post-harvest care also pose threat to grow horticultural crops
- The post-harvest glut of season-bound fruits and rock-bottom prices are the other threats confronted by horticultural farmers.

3.4 Animal Husbandry of Gujarat:

Strength:

- The Animal husbandry department in the State is also well equipped with technical human power and the much-needed infrastructure, to keep agricultural development going.
- Additional sources of income to farmers
- Easy marketability and heavy demand
- Consumers' preference towards mutton and Savon on is more
- Suitable climatic condition and the local breeds
- Low input requirement
- Easy flock/herd management
- Low investment requirement
- Sizable sheep and goat population and
- Availability of wastelands and fallow lands
- Specialized line departments with a good network of animal health care facilities addressing subspecific extension needs including door-step delivery of AI services.
- Sizable cattle population in the State
- Readily available bank credit
- A ready market for fluid milk and its by-products
- Involvement of private dairy farmers is also on the increase in milk procurement and distribution
- The propensity of dairy farmers to market the surplus milk through co-operatives and an excellent network of dairy co-operatives

Weaknesses:

- Unorganized/conventional slaughtering methods
- Pricing of sheep by subjective assessment and exploitation of farmers by the Middleman
- Inadequate grazing land / seasonal grazing in cropped fields during the off-season.
- Unrecognized breeds of goat/sheep in the State
- Non-availability of veterinary aids within the easy reach of sheep/goat farmers
- Lack of quality germplasm
- Lack of technological interventions
- Lack of scientific method of feeding, breeding and health management
- Scarcity of fodder
- Improper/insufficient housing leading to low productivity and disease problems
- Creation of social problems due to indiscriminate grazing at the gardens of neighbours
- High susceptibility to mastitis due to a nomadic type of herd farming Indigenous non-descriptive cattle population with low milk productivity account for 70% of the cattle population due to non-availability of Quality animals with better productivity.
- The potential for commercial ventures in poultry farming is not fully exploited

Opportunities:

- Quality germplasm production and distribution by private entrepreneurs
- Popularizing proven improved and less labour intensive farming system
- Reducing mineral deficiency related problems and
- Adoption of technology interventions by illiterate shepherds
- Constantly increasing demand for milk and milk products from both domestic and export markets.
- The performance of genetically up-graded non-descript local breeds are quite promising in terms of increased milk productivity

- Financial institutions, especially the commercial banks, are liberal in extending
- credit facilities for starting mini-dairy farms
- Technology empowerment on scientific dairy farming among farmers / rural women to boost milk production.

Threats:

- Resistance to adopt new technologies by illiterate shepherds
- Reaching the nomadic type of shepherd with goat and sheep herd farming
- Non-availability of shepherds for tending the sheep/goat herd.
- Frequent occurrences of killer diseases like Bluetongue, sheep pox, PPR etc.
- Inadequate / non-availability of sufficient quantity of vaccines
- Cyclone, heavy and continuous downpour of rainfall and flooding and
- Inadequate disaster management infrastructure
- Diminishing grazing land area
- Increasing cost of feeds
- Non-availability of labour and high labour cost

3.5 Dairying of Gujarat:**Strength:**

- Largest milk producer
- Fast growing economy
- Annual highest milk production growth
- Emerging competent regulatory system and authority
- New Food safety and standard law
- Trained S&T human resource
- Research and Educational Institutes
- Strong successful cooperative movement', in particular, parts of India

Opportunities:

- Large rural market
- Increasing quantity of available milk for processing
- Fast growing economy
- Diversification
- large market and investment opportunity
- Increasing income of consumers,
- Changing lifestyle and preference for milk and milk products,
- Number of adult consumers,
- Untapped indigenous milk products market
- Low-cost human resource and employment generation

Weaknesses:

- Low milk productivity Poor veterinary services
- Lack of data on the dairy sector
- Weak organized retailing and established a cold chain
- Large unorganized dairy sector
- Poor raw milk quality
- Lack of Good dairy practices
- Weak financial services
- Low dairy plants efficiency
- Inappropriate milk collection system in certain areas

Threats:

- Food safety
- Unhygienic practices by farmers at the farm

- Uncontrolled use of antibiotics and medicines on milch animals
- Unfriendly WTO regime and Imports from other countries
- Drought and flood

3.6 Post-harvest Management of Gujarat:

Strength:

- The state has high-value perishable crops which possess high nutrition value, due to soil and climatic conditions.
- Perishable produce is supported well by the horticulture development in the form of National Horticulture Mission, State Agricultural Universities etc. Moreover, State has got the entire needed technical where-withal, supported by a separate Horticulture Department in the State.
- The innovation of cost-effective post-harvesting equipment has been undertaken by the universities which satisfy the needs of farmers.
- Much leading agro-processing equipment and machinery manufacturers are also located.

Weaknesses:

- Most of the fruit crops are highly season-bound and hence the year-round production is not possible.
- Lack of scientific technical and administrative manpower.
- Lack of scientifically trained manpower to handle the processing machinery. Mostly mechanics operate and control the operation, hence penetration of new innovations are difficult.
- Lack of supporting infrastructural facilities.
- Lack of appropriate supply of perishable produce and fluctuating quantities.

Opportunities:

- As the urbanization, industrialization and the family income have shown an increasing trend in the recent years, the effective demand for protective foods is growing. Hence there exists ample demand for the quality of fresh perishable production in the State.
- Existing agro-processing equipment is not capable of producing the desired quality product for upper-class segment and export and hence technologies need to upgrade the existing processing infrastructure.
- With an increased income of Indian middle class and exposure to international processed products is increasing day by day. Hence there is ample opportunity for domestic processed product hence many upcoming entrepreneurs are willing to take up agro-processing business.
- Government is providing 100 percent rebate on profit for the first five years and 25 percent for next five years. 100 percent FDI is allowed in the processing industry.
- The crops of Indian origin due to their unique aroma and flavour are being sourced by developed countries at a premium price. Hence their value addition and processing for export is getting the attention of private players.

Threats:

- High-cost of high-tech cultivation of horticulture crops and low financial capability of the majority of farmers. Increase in a number of small and marginal farmers.
- Lack of awareness among the conventional processors about quality and safety codes and standards.
- Long and fragmented supply chain, tiny and fragmented holdings and low technology.
- Costly and inefficient transportation of raw and finished products.
- Comparatively high cost of packaging and storage cost of finished produce

3.7 Agricultural Mechanization of Gujarat:

Strength:

- The average size of holdings in 1995–96 was 2.62 ha compared to the national average of 1.41 ha. The area under medium and large holdings was 51.3% of the total cultivated area. This figure increased to 78.7% if semi-medium holdings were grouped with medium and large holdings.
- Plains dominate the topography.
- Alluvial soils and medium black cotton soils which are suitable for mechanized cultivation account for 70% of the area under cultivation.
- Soil and ambient temperatures favour cultivation of commercial crops like groundnut, cotton, vegetables, selected fruits and spices which imparts economic viability to mechanization.
- Survey data confirm that the number of tractor users is much larger than the number of tractor owners and relatively few farmers depend on draught animals and labour alone for power. The multi-farm use of tractors and farm equipment has already become a common practice.
- Good draft cattle are available for mechanization of crop production operations under poor traction conditions (heavy black cotton soils) using the animal-drawn equipment.
- Good infrastructure, extensive banking network and a strong industrial sector have created the potential for manufacture, marketing and the introduction of better farm power sources and equipment.
- Sardar Sarovar project will increase the area under irrigation which will raise the intensity of cropping and land productivity and encourage investment on mechanization.
- Remittance of money by non-resident *Gujaratis* who have their roots in Gujarat villages offers a source of funds for investment in agricultural machinery and power units.
- The government has planned substantial increase in production, productivity and cropping intensity in the next few years.
- Govt. plans to expand and Strength: en agro-processing activities, particularly for export purpose, which will require good quality raw produce.

Weaknesses:

- Twelve out of 26 districts of Gujarat are drought prone. Without assured irrigation, the risk of crop failure is too high. This discourages investment on mechanization.
- Heavy allocation of irrigation resources to grow crops like rice and wheat, which yield below the national average, restricts the potential to shift to the cultivation of high return crops.
- The State does not have any policy or plan to encourage and promote the use of better power sources and machinery.
- Capacity and facilities for manufacture and repair and maintenance of farm machinery are inadequate.
- Extension and training programs to acquaint the farmer with the development in agricultural mechanization, to carry out farm machinery demonstrations, to help the farmer in the selection of farm equipment and train him in its operation and maintenance and to train rural/small town artisans in repair and maintenance of farm machinery do not exist.
- The Department of Agriculture is short of well trained and experienced agricultural engineering experts to plan and execute agricultural mechanization programme.
- R&D programme in agricultural mechanization is very limited.

Opportunities:

- A time-bound programme to extend water conservation activities to all drought-prone areas to achieve better crop stand and extend the growing period can greatly reduce the risk of crop failure.
- A judicious allocation of irrigation resources will allow an increase in the production of commercial crops which will give higher returns to the farmer and improve his capacity and bankability to invest in mechanization.
- Efficient irrigation techniques like drip irrigation, production techniques like raised bed cultivation and precision in seed placement and application of fertilizers and plant protection chemicals will not only increase production but also improve the quality of products and reduce the expenditure on cash inputs.
- Keeping in view the small holding nature where individual ownership of farm equipment is not a feasible and viable proposition, the concept of "**Farm Machinery Hub**" has wide opportunities in the state.

Threats:

- In view of the diminishing contribution of agriculture to State GDP, agricultural development in general and its mechanization, in particular, may be relegated to a position of low priority.
- In its anxiety to absorb more people in agriculture, State may deliberately discourage agricultural mechanization
- The emphasis on self-sufficiency in cereals like rice and wheat, a carryover from the days of general shortage and ban on inter-State movement of these commodities, may lead to status quo in respect of allocation of irrigation resources and prevent shift in favour of commercial crops which could have created adequate financial capacity at the farmer's end to improve production technology including the use of better power sources and equipment.
- Lack of attention to water conservation-oriented practices including irrigation, around water mining may accelerate and adversely affect the agricultural development programs.
- In the absence of proper equipment and technologies, quality of raw material may be too poor to produce processed products of acceptable/ marketable quality.

3.8 Cereal Crops:**3.8.1 Overall SWOT Analysis of Rice in the Gujarat State:****Strength:**

- Ever increasing demand as a major staple food. High productivity/day.
- A lot of scope for cultivation of rice organically.
- HYVs available with different grain types and different maturity duration.
- A number of promising varieties for different ecological niches in the basket of choice of farmers.
- Easy transportation as Paddy / Rice.
- Feasibility of summer cultivation with high yield potential and high productivity per day.
- Feasibility in the summer season of hybrid rice seed production programme.
- The diseases and insect pest pressure are in general at a very low profile.

Weaknesses:

- Erratic/uneven rainfall and mid-season withdrawal hamper the production target.
- Due to more than recommended dose/overuse of chemical fertilizers, the **Soil Health** is poor.
- Continuous Paddy-Wheat cultivation reduces soil fertility.

- Salinity ingress in the Coastal saline area.
- Secondary salinization is aggravating in canal command areas due to waterlogging conditions.
- Poor coordination among consumers, farmer producers, rice millers, processors and traders.
- Injudicious (unwise) use of insecticides/pesticides eradicates the beneficial insect pest creating an imbalance in the ecosystem.
- Labour intensive hybrid rice seed production program.
- Due to out of proportion application of recommended dose of insects/pests, the target pest problem aggravates in proportion.
- The paddy fields release methane gas (CH₄) causing the global warming/climate change.
- Higher / unreasonable input cost and unavailability of important inputs at a proper time / proper crop stage.

Opportunities:

- Feasibility of inclusion of legume crops for sustainable soil fertility in Paddy-Wheat cultivation.
- The availability of elite varieties like MAS products, due to technology innovations. A number of varieties available for value-added products like popped rice (*mamra*) and flattened rice / beaten rice (*poha*).
- The good export potential of nonbasmati/fine and long slender grained rice varieties as well as organic rice products.
- To mitigate the harmful effects of methane gas (CH₄) **methanogens** (harmful methane (CH₄) producers) and **methylophs** (beneficial methane (CH₄) suppressors) microflora are available in the low land paddy soil.
- Feasibility of improvement of drainage structure for excess rainwater harvesting in low land irrigated / rainfed area for Rabi /Summer, other crop/rice cultivation.

Threats:

- The global warming and climate change may result in erratic rainfall and erratic withdrawal of rains hampering the production target.
- Due to an acute labour shortage and poor mechanization in the major area of the state, the farmers are discouraged to grow rice.
- Competition with cash crops due to drudgeries in rice cultivation.
- Lower / fluctuating unreasonable market price for the producer farmers.

3.8.2 Overall SWOT Analysis of Wheat in the Gujarat State:

Strength:

- High productivity/day
- Pest risk-free *i.e.* no seed-borne diseases
- Good grain appearance
- High sedimentation value
- Better chapatti & bread quality
- Good hectoliter weight
- Easy accessibility to ports
- Good institutional network Entrepreneurial society

Weaknesses:

- Short & mild winter
- Narrow temperature window
- Soil problems
- Poor coordination among consumers producers, millers, processors and trades

Opportunities:

- Maybe exploited as quality wheat zone
- New quality durum varieties are available
- Good for value-added products
- Good export potential

Threats:

- Competition with cash crops
- Less awareness about quality aspects

3.8.3 Overall SWOT Analysis of Bajra in the Gujarat State:**3.8.3.1 Saurashtra:****Strength:**

- C4 type crop so has high biomass productivity.
- Per day productivity is higher among cereals crop.
- Atmospheric condition suited for its semi rabi cultivation
- High mineral content.

Weaknesses:

- Not suitable under ready to cook system.
- Low storage capacity.
- Products have a rough texture so less prefer by the consumer.
- At harvest in case of lodging grain and fodder quality deteriorate.
- Bird damage in standing crop.

Opportunities:

- Alternative uses for poultry and animal feed.
- Value addition of fodder through chopping.
- Better opportunity as an iron rich food in the scenario of iron deficiency in the normal diet.

Threats:

- Susceptible to lodging in cyclone prone coastal region in kharif.
- Germination problems in crust forming soil.
In case of congenial condition outbreak of diseases, heavy losses may occur.

3.8.3.2 North West Gujarat (Kachchh):**Strength:**

- Good knowledge and experience as far as the cultivation practices are concerned.
- New high yielding varieties are available.
- Highly potential area for the production.

Weaknesses:

- Risk bearing capacity seems to be limited.
- Not adopting recommended dose of fertilizer and insecticide.
- Non-judicious use of fertilizers due to lack of knowledge.

Opportunities:

- Crop provides both grain and fodder.
- Provides best quality of fodder for cattle.
- Require less input.
- Suitable for marginal lands.

Threats:

- Drought
- Less available ground water.
- Lack of awareness/ knowledge regarding recommended technology.

3.8.3.3 North Gujarat:

Strength:

- Knowledge for the cultivation of *bajra*.
- Availability of short duration varieties suited to this area.
- Can be Grow under limited irrigation facilities.
- Farmers have innovative ideas for raising good crops.
- Soil characteristics of this region is most suited for pearl millet.

Weaknesses:

- Lack of awareness about new varieties.
- Unavailability of drought-resistant varieties for *kharif* and heat tolerant variety for summer.
- No use of fertilizer in *Kharif* crop
- Lack of awareness about seed treatment and IPDM

Opportunities:

- Congenial atmosphere and soil for this crop.
- Provide food as well as fodder.
- Short duration varieties.
- Opportunities for potato and pearl millet ecosystem.
- Provide fodder during the summer period.

Threats:

- Nonavailability of sufficient quantity of improved varieties seed.
- Irregular rain restricts the crop growth and yield.
- Labour problems for plant protection operation.
- Use untreated seeds.
- Early monsoon during *kharif* damage the summer crops.

3.8.3.4 Middle Gujarat:

Strength:

- Have a potentiality for biofuel production, bio-butane.
- Fewer inputs requirement and highly responsive to inputs.
- *Bajra* is best cropping system in all AES.
- High mineral content.

Weaknesses:

- Rancidity develops in short period of time in flour.
- Bird damage in standing crop.
- Lack of awareness/ knowledge regarding a recommended package of practices.

Opportunities:

- There is an opportunity for seed production during semi rabi season
- Possible to cultivate in all the three seasons
- Provides best quality fodder for cattle
- Transplanting can reduce total cultivated period.

Threats:

- In case of congenital condition outbreak of diseases, heavy losses may occur.
- Lack of awareness/ knowledge regarding recommended technology.
- Labour problems for plant protection operation.

3.8.4 Overall SWOT Analysis of Maize in the Gujarat State:

Strength:

- A lot of scope of organic maize cultivation as tribal farmers are traditionally growing maize with easy available natural organic resources

- Specialty maize is a high remunerative cash crop in the irrigated area
- Maize grows under a wide environment with the varied topography of Gujarat.
- Short to medium late maturity hybrids/varieties manipulate to take subsequent crop in a year
- Suitable for the micro irrigation system in winter/ *rabi* season
- Well established research and extension network and e-communication
- Suitable government policy
- Good input supply network
- Good co-operative based network for selling of maize.

Weaknesses:

- Erratic and uneven distribution of rainfall usually long spell of drought during crop growth.
- Low water retention and fertility soil in undulated topography land.
- Monocropping with water logging conditions that degrades soil fertility.
- Farmers especially tribal are followed traditional practices for cultivation
- At present no concrete organic maize policy in the state and lack of organic input supply chain
- Inadequate use of high yielding hybrids/varieties of maize
- Farmer saved seed utilization in sowing purpose

Opportunities:

- Improvement of drainage structure with the development of water harvesting structure in the rainfed area which will help to promote micro-irrigation.
- Adequate facilities of APMC to sell the maize produce for tribal farmers at Taluka level.
- Scope for organic maize cultivation which gives high prices to farmers and establishing input supply chain
- Involvement of family labour in cultivation
- Up gradation of marketing network, storage and improved testing facility at the co-operative base
- Scope for mechanization
- Mize crop under C₄ and highly cross-pollinated category, therefore, yield potentiality is very high
- Strengthening research for good quality public sector single cross hybrid
- Scope for organic matter incorporation through proper waste /stalk management
- Low pest and disease incidence in rabi maize.

Threats:

- The problem of occurrence of drought at pick period
- The high cost of single cross hybrid seed
- Unstable and fluctuating/ lower market price

3.8.5 Overall SWOT Analysis of Sorghum in the Gujarat State:**Strength:**

- Sorghum is dual purpose cereal crop with high-quality grain and fodder.
- It can be grown throughout the season.
- It is most nutritive green and dry fodder crop to feed cattle of well-developed dairy industries in the state.
- It shows tolerance to draught which facilitates the *rainfed* cultivation.
- Sorghum grain has high nutritive content and slow digestibility, it has great potential in the present health awareness by the consumer.
- Potential to reach fodder shortage on account of cash crop cultivation in *khariif* season, due to high growth rate and high nutritive fodder value.

- Sweet sorghum can be used as a source of ethanol production.
- Sorghum syrup from sweet sorghum has increased demand in the premium hotels.
- It is best suitable as a climate resilient crop.
- For Semi-Arid, it is the economically viable and suitable crop.
- Rich gene pool.
- The best option for organic farming also it can be grown most of the type of soil even in marginal land.
- Silage needs to pack well to protect the quality and minimize shrink, Sorghum silage is best stored horizontally in bags or bunks due to its high moisture content.
- High potential to develop entrepreneurship and export-oriented value-added products.

Weaknesses:

- Less economic importance
- In Gujarat state, cash crop scenario for cotton, castor, pigeon pea, groundnut etc. the cultivation of cereal crop including sorghum is decreasing in *kharif* season in high input system.
- Thus sorghum is mostly grown under low input system by poor and marginal farmers on poor fertile soil and on totally under low rainfall area without supplementary irrigation with less fertilizer and other inputs.
- Sorghum is one of the fast nutrient uptakes with the C4 type of nature.
- Due to cultivation in low input system, productivity and ultimate economic return are low as compared to the cash crop.
- On account of above situation, there are constant reduction trend in the cultivated area of sorghum
- The problem of disease and pest like Grain mold, sugary, shoot fly are observed in *kharif* season
- Inadequate involvement of other stakeholders due to lack of policy support from the government side.
- Lack of awareness about hygiene and packaging technology among processors and handlers of sorghum.

Opportunities:

- Good food for health, particularly for digestion
- In the present health awareness is increasing in the consumer, the sorghum has great potential due to its many health benefits like help in improving digestive health, cancer, heart disease and diabetic patient, protects against osteoporosis and arthritis because it is gluten-free, high in fiber, good source of antioxidants, slowly digested and balance blood sugar
- Dairy industries are fast growing in the state so that there is a demand for valuable fodder because of green fodder is an economical source of nutrients for the dairy animals. Micro-organisms present in green fodder help in improving digestibility of crop residues under mixed feeding system also helps in maintaining good health and improving the breeding efficiency of animals.
- Due to the cultivation of cash crop in *Kharif* season, there is a shortage of dry fodder. The sorghum has the potential for cultivation after cash crop on account of the high value of fodder and grain. Multi-cut fodder sorghum cultivars can catch the demand of green fodder.
- The possibility of exploitation of sorghum for industrial use, particularly in sugar industries.
- Sweet sorghum can be used as a source of ethanol production. Thus it is useful to reach the demand of ethanol for blending in petrol and providing employment to labours

throughout the year by working sugar factories during none availability of sugarcane for cursing.

- Thus increasing the value of sweet sorghum as biofuel production and an excellent source of second-generation energy.
- Sorghum syrup from sweet sorghum has increased demand in the star hotels.
- The scope of cultivation in saline soil through the development of saline resistant genotype.
- New Food Processing Policy and reformed government rules for entrepreneurship development through various schemes.

Threats:

- Farmers tend to cultivate cash crops in kharif season instead of cereal due to high economic return.
- It will lead to a shortage of food and fodder and increasing malnutrition.
- Within short future, there might be a shortage of fodder for livestock.
- *Rabi* sorghum has yet to achieve high production potential.
- The absence of attractive Government policy for bio-energy production.
- Lack of consumer awareness regarding nutritive value and value addition in sorghum
- Lack of motivation of farmers for cultivation of sorghum in high input system and utilization of improved high yielding cultivars.
- It is the Indian food and If not properly handled the threat of vanishing the traditional food of tribal and village people of India.

3.8.6 Overall SWOT Analysis of Small Millets (Ragi (Nagli) & Vari for Dangs District) of Gujarat State:

Strength:

- Nagli and Vari are traditional staple and livelihood crop of tribal farmers of the Dang district.
- Availability of hill millet research station in Dangs.
- Availability of high yielding varieties in the district.
- Utilization of sloppy land for cropping
- Govt. departments are working for increasing area, production and productivity of small millets.

Weaknesses:

- Lack of availabilities of value addition units such as little millet 'Moreyo' preparation units, Nagli biscuits, papad etc. production unit and so on.
- Traditional cropping system with non-adaptation of scientific technologies
- Farmers use local seeds.
- Poor market price realization as no marketing facilities are available
- Less availability of high yielding new varieties seeds of Ragi and Vari towards farmers.
- Heavy incidence of pest and diseases in locally adapted varieties of Nagli and Vari.
- Poor adaptability of weeding practices.
- Rabbing practices instead of seedbed preparation.

Opportunities:

- Creating awareness about small millets as Nutri-cereals crop through various media and recourses.
- Awareness about value addition of different products prepared from Nagli and vari.
- Increasing trend of farmers towards new and improved high yielding varieties.
- Skill and knowledge up gradation through training.

- Various line Departments working to provide high-quality seed materials and financial assistance.

Threats:

- Giving importance to major crops like rice and its cultivation practices doesn't give justification to small millets crops.
- Weeds and Pest- disease is the main problem in production.
- Poor traditional crop management practices lower the crop production.
- Late rain or early withdrawal of rain affect production.

3.8.6.1 Overall SWOT analysis of Small Millets (Dang/Valsad/Navsari):**Strength:**

- New varieties are available with universities.
- Agricultural and forest waste available.
- Water flows from high to low altitude.
- Emphases govern by government departments and NGO.
- KVK's of University and Government extension department.
- Government support.

Weaknesses:

- Lack of Scientific information.
- Lack of awareness of the availability of quality seed and agricultural marketing.
- Lack of knowledge about balance use of fertilizers.
- Lack of know how.
- Poor knowledge of rainwater harvesting and storage.
- Poor responsive nature of tribal farmers.

Opportunities:

- Marginal farmers can get higher income through seed farms
- Organic farming.
- Infrastructure for establishing an industry for food processing.
- Employment generation.
- Increase production through a scientific approach.

Threats:

- The possibility of seed born disease if not treated.
- Decrease in production
- Change in cropping pattern may change demand of seeds.
- Farmers may shift to other occupations to another area.

3.9 Oilseed and Pulse crops:**3.9.1 Overall SWOT Analysis of Groundnut in the Gujarat State:****Strength:**

- Leading state for groundnut area, production and productivity
- Traditional knowledge of groundnut cultivation in a perfect manner
- High productivity/day
- High remunerative crop
- Good kernel appearance
- Amenable to cultivate in all types of soils
- Well established research and extension network
- Good marketing network
- Better quality of the produce due to dry climatic conditions
- Easy accessibility to ports

- Good institutional network
- Entrepreneurial society

Weaknesses:

- Groundnut is mostly cultivated under rainfed conditions
- Erratic and unequal distribution of rainfall in major groundnut growing areas
- Lowering water table and the problem of drought
- Mono-cropping
- The spread of soil-borne diseases
- Labour intensive cultivation and acute shortage of labourers in a major part of the state
- Soil health problems
- High seed rate and the high cost of seeds
- Poor coordination among consumers producers, millers, processors and trades
- Limited adoption of micro-irrigation

Opportunities:

- Maybe exploited as quality groundnut zone
- New high yielding varieties are available
- Good for value-added products
- Good export potential
- Scope for organic cultivation which gives high prices to farmers
- Scope exists for bringing some additional new areas under groundnut crop during kharif and summer seasons.
- Expansion of area under irrigated crop

Threats

- Competition with cash crops
- Less awareness about quality aspects
- Aflatoxin problem in kernels
- Unstable market prices
- Acute shortage of labourers
- Irregular and erratic rainfall threat timely sowing
- The spread of soil-borne diseases (stem rot, collar rot)
- The widespread occurrence of *Aspergillus flavus* causing contamination of kernels with aflatoxin
- Possible replacement of area by more profitable crops in traditional groundnut belts
- Competition from other countries in international markets
- Changes in temperature and rainfall pattern due to climate change
- Erratic and excessive rainfall due to climate change may force farmers to shift to another crop

3.9.2 Overall SWOT Analysis of Sesame in the Gujarat State:**Strength:**

- Low-cost crop, fitting well with the inter-cropping system
- APEDA has sanctioned Agri-Export Zone in Gujarat covering Amreli, Bhavnagar, Surendranagar Rajkot and Jamnagar districts
- There is a good research support for sesame from State Agricultural Universities. Junagadh Agricultural University has bred high yielding cultivars and made available to the farmers.

Weaknesses:

- Lack of biotic and abiotic stress resistance/tolerant varieties
- Erratic and uncertainty of rain restricts the yield

- Insufficient irrigation water restricts this crop to grow in the summer season

Opportunities:

- Gujarat in general and Saurashtra, in particular, is producing very good quality sesame in the country
- Mundra Port is located in Saurashtra and many importer countries are close to this port compared to other sesame exporter countries
- Vast scope for organic sesame production
- Healthy available market. Gujarat sesame seeds getting higher price compared to another state.
- Narmada canal irrigation facility in some pockets of Surendranagar and Kutch district will boost summer sesame production

Threats:

- Problems of soil born diseases
- High rainfall causes failure of the crop
- Risk in the germination due to improper placement of seeds in the soil

3.9.3 Overall SWOT Analysis of Soybean in the Gujarat State:

Strength:

- Low-cost crop, fitting well with the inter-cropping system
- Highly protein-rich with a good amount of oil-containing crop
- Maintaining soil fertility due to Leguminosae plant

Weaknesses:

- Lack of biotic and abiotic stress resistance/tolerant varieties
- Germination go down within a year
- Shattering nature

Opportunities:

- The vast scope of exporting soybean and its preparations
- Gives good quality oil.

Threats:

- Problems of a blue cow
- Rainfall at maturity causes quick sprouting of a seed

3.9.4 Overall SWOT Analysis of Niger in the Gujarat State:

Strength:

- Know how to exist in the Universities.
- Related Government schemes exist.
- Agriculture and forest waste available.

Weaknesses:

- Marginal and resource-poor tribal farmers
- Lack of knowledge about balance use of fertilizers
- Poor resources management
- Poor facilities for soil and water testing

Opportunities:

- Integrated farming
- Agroforestry
- Organic farming
- Green Houses-floriculture/vegetables
- Soil conservation & rainwater harvesting
- Infrastructure for establishing an industry for Food Processing & Farm machinery

Threats:

- Decrease in production
- Conversion to wastelands
- Change in rain pattern as well as climate

3.9.5 Overall SWOT Analysis of Castor in the Gujarat State:**Strength:**

- The productivity of castor in the state is highest in the world.
- Castor-based cropping sequence, inter/ relay cropping is increasing
- Castor-based cropping sequence is more remunerative
- Farmers are innovative.
- Congenial atmosphere of soil and climate for castor cultivation.
- Irrigated area is increasing
- High yielding and wilt disease resistant hybrids/ varieties were released
- Higher yield potential.
- Well established marketing network and castor oil extraction units

Weakness:

- Unavailability of certified seed on suitable time
- Unawareness about suitable hybrids/ varieties matching with farmer's resources
- Improper sowing time and crop geometry
- Poor crop management
- Unbalanced application of fertilizers and negligible application of sulphur, micronutrients and organic matter.
- Poor irrigation management and adoption of MIS
- Lack of awareness about the cost-benefits ratio.
- Increasing tendency of monoculturing creates a conducive environment of wilt/ root rot disease outbreak.
- Lack of knowledge for use of beneficial microorganisms
- Injudicious use of pesticides

Opportunities:

- Castor-based cropping system (inter & relay cropping) is best suited and possess higher remuneration
- Farming operations are easy and require fewer labours.
- *Rabi* castor cultivation is a new window to increase total cultivated area particularly in non-traditional areas (rice fellow; *Kyari* land) of the south and central Gujarat
- Rainfed castor cultivation may increase cultivated area
- Short duration hybrids/ varieties with synchronized maturity
- Demand for organic castor cultivation is increasing particularly in Kutch district
- Increasing castor oil processing industries are to add value and export potential

Threats:

- Erratic and uncertainty rainfall.
- Climate change may lead to reversion of female flower to male flower which causes heavy yield loss.
- Drought and desiccating & salty winds in coastal areas of Kachchh and Saurashtra
- Very limited availability of good quality irrigation
- Lack of adoption of good agricultural practices.
- Fluctuation in market price may affect the sustainability.
- Mono-culturing may pose threats of a higher incidence of insect pest and diseases.
- Area replacement by other cash crops.

3.9.6 Overall SWOT Analysis of Mustard in the Gujarat State:

Strength:

- Higher yield potential and productivity
- Suitable to fit in various cropping sequence, inter / mix cropping
- Congenial atmosphere of soil and climate for this crop.
- Suitable for rainfed as well in irrigated conditions
- Suitable for salt affected soils
- Requires less irrigation water as compared to other *Rabi* cash crop
- Increasing irrigated area
- High yielding, early/ late sown and suitable to Gujarat conditions varieties were released
- Well established marketing network and mustard oil extraction units

Weakness:

- The abrupt rise in temperature at sowing time and maturity stage causes drastic yield losses
- Unawareness about suitable varieties matching with farmer's resources
- Improper sowing time, method and thinning to maintain optimum crop geometry
- Poor weed management
- Poor irrigation management particularly unawareness about critical irrigation stages
- Unbalanced use of fertilizers and negligible use of sulphur, micronutrients and organic matter.
- Lack of awareness about the cost-benefits ratio.
- Higher incidence of powdery mildew, white rust & aphid and injudicious use of pesticides
- Lack of knowledge for use of beneficial microorganisms

Opportunities:

- Mustard cultivation in the non-traditional area (rice fellow; *Kyari* land) of the south and central Gujarat can increase total cultivated area.
- Mustard based cropping sequence is best-suited sequences, possess higher yield potential.
- Mustard cultivation may increase in the salt-affected area of Kutch, Patan, Mehsana and other districts.
- Mustard cultivation has greater potential in Narmada command area in north Gujarat and Kutch regions
- Inter & mix cropping can provide more net return than other crops in certain areas.

Threats:

- Climate change may fluctuate yield potential due to uncontrolled temperature and lower rainfall.
- Lack of knowledge of good agricultural practices.
- Fluctuation in market price may affect the sustainability.
- Reduction in production and productivity due to the expansion of Bt and other competing cash crops

3.9.7 Overall SWOT Analysis of Pulse Crops in the Gujarat State:

Strength:

- The state has 8 agro-climatic zones, with varied soil condition
- Fifth largest pulses producing a state.
- The state average yield per hectare is higher than national average yields.
- Suitability of pulse crops to be grown under the dry farming situation.

- Minimum support price.
- Provides nutritional security.
- Demand pulses as a green vegetable.

Weaknesses:

- No major area for rabi pulses like Field pea and Rajmash.
- Short & mild winter
- A huge area having alkaline soil and saline soil.
- Almost 70% of the area is rain-fed and drought-prone.
- Low SRR.

Opportunities:

- Maybe exploited as quality Pulses zone
- As intercrops in widely spaced crops and horticultural crops.
- Good for value-added products especially in Moth bean and Gram.
- The good export potential of Guar.
- Sufficient rainfall during Kharif to grow short duration crops like Mung bean and Cowpea.

Threats:

- The threat from major diseases and pest.
- Competition with cash crops.
- Less awareness about quality aspects.

3.10 Horticulture Crops:**3.10.1 Overall SWOT Analysis of Fruit and Flower Crops in the Gujarat State:****Strength:**

- Favorable soil and climate for the production of different fruit crops like banana, mango, papaya and citrus as well as flowers like rose, tuberose, marigold, goldenrod, lilly, etc.
- Leading state in Kesar mango production and is being famous at international level.
- Lot of scope of organic mango cultivation, production and its export
- Geographical Indication Registration (GIR) No. 185 was made for Kesar mango as "*Gir Kesar Mango*"
- Fruit and flowers are a highly remunerative cash crop
- The proximity to the huge market at Ahmedabad, Baroda and Bombay with road and rail connectivity

Weaknesses:

- Erratic and uneven distribution of rainfall
- Poor quality of underground water in coastal belts of the state limiting the cultivation of some fruit and flower crops
- Lesser availability of quality seeds and planting material of fruit and flower crops in time.
- Lack of knowledge against hi-tech horticultural practices
- Lack of infrastructural facilities like cool chains, pack houses, processing units, etc.
- At present no organic concrete policy in the state and lack of organic input supply chain
- Lack of systemic marketing/auction center

Opportunities:

- Develop water harvesting structure in rainfed area for promotion of arid/minor fruit crops.
- Huge scope for organic fruit cultivation particularly mango, banana, guava, etc. which gives higher prices to farmers
- Scope for increasing production through high-density planting (HDP) in fruit crops

- Up gradation of post-harvest and marketing network and facilities
- Scope for mechanization and use of renewable resources
- Strengthening research for good quality production of fruit and flower crops
- Scope for production of a lot of products through waste management in fruit crops

Threats:

- The problem of salinity and waterlogging in some coastal area
- Climate change particularly highly fluctuation in temperature, humidity and sunshine intensity during flowering and fruit setting in mango
- The problem of unhygienic cultivation of mango restrict the export potentiality
- Weaker post-harvest management and modern marketing facilities like cold storages/chains, pre-cooling and waxing centers.
- Unstable and fluctuating/ lower market price

3.10.2 Overall SWOT Analysis of Vegetable Crops in the Gujarat State:**Strength:**

- More nutritive and therapeutic values and being high remunerative as compared to field crops in the irrigated area
- A lot of scope of organic cultivation as well as hybrid seed production
- Offseason and early sowing provide ample opportunity for fetching a premium price and income
- Early harvest and six to seven times more yield and high export potentiality as compared to field crops
- Our state is being blessed with the unique gift of nature due to diverse climates and distinct seasons. It makes possible to grow an array of vegetables whose number exceeds more than a thirty.

Weakness:

- Poor infrastructure for sale and purchase at the right time
- Labour intensive cultivation and acute labour shortage in major parts of the state
- Higher input costs and non-availability at the proper stage
- Lack of concrete organic vegetable policy in the state
- Not as much of knowledge for off-season vegetable plug nursery in low-cost poly-house

Opportunity:

- As against the per capita per day requirement of 300 g by WHO, the present intake and availability of vegetables is only 170 g.
- Looking to the vegetable production potentiality in Middle and South Gujarat, Government of Gujarat has already declared this area as Agri Export Zone for vegetables and fruits Vide its Resolution No. MIS/1022001/G.57.K5 Sachivalay, Gandhinagar, dated 5-9-2002.
- The export potentiality is more from the Middle and South Gujarat, as this area has assured irrigation facilities for continuous vegetable supply.
- The area under vegetable crops has increased by assured water availability from Sardar Sarovar Project
- Promoting micro-irrigation and preserve the soil.
- Vegetable is fit for precision farming, protected cultivation and other high tech Olericulture practices.

Threat:

- Most of the vegetables are perishable to semi-perishable in nature
- Unstable and fluctuating/ lower market price
- Too many hybrids/varieties (costly) have unstable performance over years

- Irregular and erratic rain threat growing season
- Lack of long-term export policy

3.10.3 Overall SWOT Analysis of Seed Spices Crops in the Gujarat State:

Strength:

- Greater potential to grow in arid and semi-arid regions
- Short duration in nature
- Less requirement of inputs
- High remunerative and dominant foreign exchange earning crops
- Better grain quality
- Excellent marketing facilities
- Suitable for organic farming
- Less risky crops like ajwain and dill seed

Weaknesses:

- Cultivation is traditionally in marginal lands with low fertility
- Limited surface water resources in major growing areas
- Limited variability available in germplasm of seed spices
- Lack of disease resistant, fertilizer responsive and suitable varieties for rainfed agro-climatic conditions
- Slow germination and initial slow growth rate
- Insufficient production technology particularly for rain fed and organic production system
- Problems of post-harvest storage management
- Slight change in climate may increase disease intensity
- Irrigation facilities

Opportunities:

- The long range of value-added products
- Has high medicinal value
- Fast-growing demand in domestic as well as international markets
- More earning of foreign exchange through value-added products

Threats:

- Wilt and root rot problem in cumin and sugary problem in fennel
- Non availability of farm labour
- Urbanization
- Poor adoption of farm mechanization
- Chemical residues in seed may affect export potential
- Less awareness about value-added products

3.10.4 Overall SWOT Analysis of Agroforestry in the Gujarat State:

Strength:

- Well established forest and agriculture departments with field staff up to taluka and village level
- The state has vast scope for increasing the forest area due to various climatic situations through social and agro-forestry
- A large number of well-established forest nurseries are readily available for the supply of good planting materials of valuable species

Weaknesses:

- Deficient of trained manpower in the field of agro-forestry
- Availability of super quality planting materials of commercially important species, except few species like teak, casuarinas and eucalyptus.

- Stringent rules and regulations for logging, harvesting and transportation of timber and wood-based products from agro-forestry

Opportunities:

- Increasing area under forests through the plantation in community lands
- Increasing area under agroforestry and urban forestry
- Demonstrations and training including farmers and field officials towards forestry and agroforestry activities
- Demonstrating high income generating forest tree species so that farmers can easily plant in their farmland
- Wasteland or unused lands of agriculture can be improved through tree plantation
- Establishment of windbreak and shelterbelts in the farm to protect crops against wind and soil erosion
- Promotion of wood/plywood industries
- Introduction of new short rotation tree species under agro-forestry
- Development of suitable agro-forestry models in different agro-climatic zones
- Promotion of high-value trees (including threatened species)
- Crop diversification and ecological improvement through agro-forestry
- The potential for higher income generation and livelihood promotion
- Promotion and value addition of forest products from agro-forestry
- Meeting increasing demand for wood-based industries

Threats:

- Long rotation of tree species
- Lack of marketing for minor forest products including medicinal and aromatic plants
- Small land holding
- Poor acceptance of technologies due to linkage gaps
- Poorly skilled person
- Poor literacy rate
- The shortage of skilled labourers in agricultural operations
- Price fluctuations
- Lack of wood-based or processing industries
- Lack of value chain in marketing

3.11 Cash Crops:

3.11.1 Overall SWOT Analysis of Cotton in the Gujarat State:

Strength:

- Leading state in cotton production and productivity, lot of scope for organic cotton cultivation as well as hybrid (Bt and non Bt) seed production
- High remunerative cash crop
- Bt cotton cultivation provides opportunity for second crop
- Well established research and extension network
- Major focus of government policy towards cotton
- Good input supply and marketing network

Weakness:

- Erratic and uneven distribution of rainfall (Climate change & Drought)
- Shortage of quality irrigation water & depletion of ground water table
- Many Bt hybrids from private sector of different durations and non-compliance of refuge (Hemizygous gene expression in hybrids)
- Mono-cropping of Bt cotton favor incidence and resistance development in pest
- Labour intensive cultivation and hybrid seed production as well as acute labour shortage in the state

- Spurious and un-approved Bt cotton seeds
- Higher input costs reduce profit margin
- Lack of organic input supply chain for organic cotton production
- Poor crop residue management and utilization
- High fluctuation in cotton market price
- Consumption of raw cotton in the state is poor

Opportunity:

- Good scope for organic cotton cultivation for value addition
- Availability of various quality of cotton fibers
- Good scope for farm mechanization & High Density Planting of Compact varieties
- Scope for promotion of micro-irrigation/ground water recharging
- Promotion of Inter-cropping, ICM, IPM/IRM & HDPS
- Up gradation of storage and testing facility at Ginning & Pressing units
- Scope for renewable energy (bio coal and bio gasifier)
- Strengthening research for public sector GMS based Bt / Desi hybrid
- Development of compact, long staple and Bt stable variety
- Scope for proper waste /stalk management for organic matter
- Scope for increasing domestic consumption of cotton through upgrading/ innovative small scale textile handloom and power loom sector.
- Up gradation/ modernization of subsidiary industries for trapping the potential of linters and animal feed from cotton seed
- Potentiality for absorbent and surgical cotton from desi cotton

Threat:

- Climate change
- Too many Bt cotton hybrids of varied duration and spurious seeds
- Unstable and fluctuating/ lower market price
- Resistance build up / resurgence/ residue/ poisoning due to over exploitation of chemicals/ technologies
- Labour shortage and poor mechanization

3.11.2 Overall SWOT Analysis of Sugarcane in the Gujarat State:**Strength:**

- Sugar factories are 100 % on Cooperative basis.
- Sugarcane survive in different agro climatic conditions
- Sugarcane crop produce maximum bio mass
- C4 plant utilized more CO₂ from nature
- Different products and bi- products
- Good genetic variability and coordination at National level
- High recovery and high productivity zone.

Weaknesses:

- Long duration crop
- Low recovery and productivity
- Low seed production ratio
- Lack of certified seed and quarantine
- Complex genetic constitution and seed loose its germinability in very less time

Opportunities:

- Differences in sugarcane cultivation
- Increasing demand of sugarcane as fodder
- Lots of variety products from sugarcane
- Employment opportunity in rural areas

- Opportunity to export
- Increasing internal demand of sugar

Threats:

- Biotic stress (New pest and diseases)
- Biotic stress (Soil health)
- Damage to natural factors which is related with crop production
- Increasing cost of cultivation
- Other sugar producing crops (Sugar beet, Stevia)
- Problem of burned cane
- Competition with other short duration crops, private sugar factory, khandsari and Jaggery production
- labour problem

3.12 Animal Husbandry:**3.12.1 SWOT Analysis of Cattle and Buffaloes (Large Animals):****Strength:**

- The strong presence of co-operative dairy sector
- Enhanced marketing potential in the neighborhoods (states)
- Large-scale participation of private players
- Well established recognized breeds of cattle like *Gir, Kankrej, Dangi* and buffalo *Jaffrabadi, Surti, Mehasana, Bani* etc.
- Adoption of innovative and scientific Animal Husbandry practice by farmers.

Weaknesses:

- Green fodder scarcity
- Inadequate healthcare
- Endemic for Anthrax and Foot & Mouth Disease.
- Non-availability of grazing land/pasture land.
- The apathy of rich farmers towards Animal Husbandry.

Opportunities

- Good identified recognized breeds of cattle & buffalo.
- Developed agricultural practices & Animals Husbandry practices.
- An innovative approach to A.H. in the state.

Threats

- Genetic drain to other states.
- Diseases of zoonotic importance.

3.12.2 SWOT Analysis of Small Ruminant (Sheep and Goat) in Gujarat State:**Strength:**

- Among the 23 well recognized goat breeds in India, Gujarat is blessed with 5 breeds of goats (*Surti, Mehasani, Zalawadi, Gohilwadi* and *Kachchhi*) and one breed of sheep (*Patanwadi*).
- Nomadic rearing, vast uncultivable land and rain fed area have lot of scope to promote sheep and goat rearing.
- Sizeable breedable population of both the species is available.
- Consumer's preference: milk of goat is very valuable for young children and convalescents. The goat milk *paneer* is in demand for sweet making.
- Meat: There are no social taboos for consumption of sheep and goat meat and it is always in high demand.
- By-products of sheep and goat viz., wool, leather etc. are efficiently utilized.

- Preparation of organic manure from Sheep and Goat droppings by using various methods and its marketing. This has good scope for sale in urban areas for gardening.

Weaknesses:

- Non-availability of superior purebred Rams and Bucks, due to the sale of best animals for meat. Hence need to supply superior male for community breeding purpose.
- Unorganized marketing and exploitation of animal owners resulting in wide price variation and financial loss to the farmers.
- The absence of financial assistance to small ruminant owners.
- Lack of scientific knowledge in livestock owners about sheep and goat keeping.

Opportunities:

- To provide livelihood opportunities and upliftment of peri-urban, rural and tribal youth and women.
- To develop milk and milk by-products of goat milk as a subsidiary occupation. Goat milk is valuable for children and old and debilitated person. The aspect of milk production is underutilized. Hence it is envisaged to develop organized Co-operative dairy sector for goat milk in few pockets.
- Capacity building in the animal owner is a must to make it a sustainable enterprise.
- To provide pure bred elite buck/rams to breeders of goat and sheep. This will help to upgrade the goat and sheep flocks.
- Though wool is an important by-product of sheep, the scientific work done on this aspect is scanty.
- To strengthen market linkages and renovate market yards for sheep and goat with better facilities.

Threats:

- Majority of sheep and goat flocks are maintained by nomadic communities hence their vaccination, deworming and basic health care are at very low level. This is the biggest threat to their viability resulting in high mortality.
- During the summer season there is no grazing/foilage available for sheep and goat flocks, hence they migrate from one region to another. The health of animals declines due to nonavailability of feed and fodder from natural resources.
- There is water scarcity during summer leading to dehydration of animals, which is very dangerous to the animal.

3.12.3 SWOT Analysis of the Poultry Production and Health in Gujarat State:

Strengths:

- Poultry farming generates early and regular income and has shorter generation interval.
- Poultry and poultry products constitute an important component of human diet. The consumption is also increasing at a rapid rate due to low-fat content, easy availability and cost-effectiveness.
- Poultry is the least cost alternative food source next to fish only and produces more animal protein from the same amount of feed. Two eggs provide 160 calories of energy constituting more than 20% of the daily requirement of Proteins, Vitamin A, D & B₁₂, Riboflavin, Folic acid, Pantothenic acid, Phosphorus and Iodine along with fat.
- According to a nutritional Advisory committee of India, at least half an egg should be made available to an average individual which workout to be 180 eggs/annum. Poultry farming requires less area with a high and quick return than any other animal husbandry and agriculture activities.
- Good infrastructure like road, rail, ports, airports, reliable electricity power and easily approachable to major cities of adjoining states.

Opportunities:

- Growing demand for egg and poultry meat.
- Land requirement for poultry unit is less.
- A sizable population of unemployed rural/tribal youth and women.
- Rising export potential.

Weaknesses:

- Social taboos in the adoption of poultry entrepreneurship.
- Seasonal consumption pattern.
- Highly capital investment required for commercial poultry farming.
- Slow adoption of automation in a production system.
- Unorganized market.
- Inadequate cold chain facilities for vaccines and cold storage facilities for poultry products.
- Lack of chicken based food processing industries.
- Raising the cost of feed ingredients and additives.

Threats:

- Outbreaks of emerging and re-emerging diseases.
- High price fluctuations of poultry products

3.12.4 SWOT Analysis of the Fisheries in Gujarat State:**Strength:**

- Leading state in Marine fish production and productivity, lot of scope of commercial Fish/Prawn/Shrimp production through Aquaculture.
- Relatively healthy fish populations and natural environment
- Very good natural water resources (Freshwater and Brackish water) available
- Technology for aqua-farming available
- Suitable government policy
- Good input supply network
- Good marketing network

Weaknesses:

- Poor adoption of modern technology of fish farming by the farmers,
- Lack of awareness about scientific fish farming and its benefit,
- Lower education among fishermen
- Higher input costs and non-availability at proper stage (as and when needed)
- Poor infrastructure at Taluka places for fish sale and purchase
- Non availability of training with respect to improved onboard handling procedures
- High labour and other costs, lack of economies of scale due to low production levels
- No subsidy to fish farmers for electricity, as is given to Agriculture farmers
- Developing and disseminating accurate information on the environmental sustainability of finfish aquaculture is a challenge.
- Poor transfer of technology to the fish farmers

Opportunities:

- Very good scope for utilization of natural water resources for fish production.
- Scope for organic aqua farming which gives high prices to farmers and establishing input supply chain.
- Up gradation of marketing network, storage and improved testing facility at the co-operative level
- Scope for mechanization and use of renewable resources
- Strengthening research for good quality fish, prawn and shrimp seed for aquaculture

- Scope for Cage and pen culture in rivers, canals and reservoirs

Threats:

- Potential resource declines due to oceanographic and climate changes, pollution, and urban encroachment
- Lack of public and community support for the commercial fishery unstable and fluctuating/ lower market price
- Labour shortage
- Lack of technology to face scenario of climate change

3.12.4.1 SWOT Analysis of Inland Fisheries:

Strength:

- Government Circular Carp Hatchery for IMC seed in districts of middle and south Gujarat.
- Vast unfulfilled demands for fish with easy market accessibility.
- Technical, financial and marketing assistance by Government agencies for promotion of this sector.
- Recent amendments in Fisheries Act/FFDA related to increasing lease period from 3 years to 10 years (long-term investment of worth would be feasible for leaseholder).
- Regional Research Centre of Central Institute of Freshwater Aquaculture (CIFA) and CIFRI of ICAR, Fisheries Colleges at Veraval and Navsari, Inland Fisheries Training cum Demonstration Centre (IFTC) at Anand and Navsari.
- Greater people participation and generation of employment opportunities especially for landless and marginal farmers.

Weaknesses:

- Weak infrastructure for fish seed production, fish seed rearing and genetic up gradation.
- Lack of farmer oriented activities e.g. training, demonstrations, exposure visits, awareness camps etc. to scientific update farmers' fish production and management practices.
- Inadequate quality seed availability of high yielding freshwater prawn and exotic carps.
- Infestation of aquatic weed (like Echoria).
- Poor maintenance of common or Panchayat pond.

Opportunities:

- Immense scope for fish seed (fingerlings) production to cater to the needs of fish farmers of the state.
- Ample scope for mobilizing untapped water resources such as waterlogged area, village pond for aquaculture.
- High cattle population releasing organic manures in ponds help in the growth of natural food for fish.
- Greater opportunities for diversification of traditional fish culture and agriculture to the culture of high-value fish species such as Rohu, Catla, Mrigal, Grass carp, Silver carp, Ornamental fish and Freshwater Prawn.
- Introduce 'pen' and 'cage' culture technologies in village ponds of the district to produce fish fingerling, yearling as well as ornamental fish.
- Provision of financial assistance for popularizing integrated fish farming with agriculture, horticulture, dairying, poultry, piggery and duckery.
- Develop integrated farming system model for marginal and small farmers.

Threats:

- High mortality in fish spawn, fry and fingerling.
- The absence of reputed center/source of feed mill, fisheries management institute.

- Lack of post-harvest management practices by farmers.
- Poor facilities for soil and water sample testing, disease diagnosis and post-harvest infrastructures.
- Stocking of Thai magur (Exotic catfish) in village ponds which affect the domestic fish species.
- Sewage of urban area and villages pollute the village ponds which affect the fishes by means of reducing the dissolved oxygen and mass mortality of fishes.

3.12.5 SWOT Analysis of the Dairying in Gujarat State:

Strength:

- India is number one milk producer in the world and Gujarat stands at No. 4 among its states.
- A strong network of cooperative dairies.
- Strong marketing channel- the presence of Gujarat Co-operative Milk Marketing Federation.
- Progressive and cooperative farmers.
- Technologies are available for large-scale milk processing and manufacture of dairy products.

Weaknesses:

- Quality of milk is relatively poor
- Low productivity of animals
- Lower shelf-life of milk
- Large-scale handling of milk by unorganized traders in an unscientific manner.
- Consumption of a large amount of water and generation of effluent
- A higher level of energy consumption in dairy processing operations

Opportunities:

- Increase processing capacity.
- Improve infrastructure to improve quality of milk.
- Promote milk and milk products to tackle the problem of malnutrition and food insecurity in the state.
- Technical competence available to develop value-added products for better returns to farmers.
- Promote buffalo milk, camel milk, goat-sheep milk for special types of products targeting nutritional and health benefits.
- Promote milk from indigenous breeds of a cow for human health.

Threats:

- Competition from multinationals and use of imported milk and milk ingredients.
- Global warming and climate change may further reduce the productivity of animals and contribute to reducing the shelf-life of milk.
- Increase the cost of milk production.
- Migration from villages and youth not preferring animal rearing.
- The problem of waste disposal and consumption of a large amount of water.
- The problem of adulteration of milk causing health issues and loss of reputation.

3.12.6 SWOT Analysis of Pack Animals:

Strength:

- The sizeable strength of pack animals.
- The high requirement for local transportation of commodities.
- Sufficient availability of camel milk which is highly nutritious and therapeutic values.

Weaknesses:

- Lack of accounting camel milk as a food item.
- Reduction in the utility of pack animals due to atomization in the transport system.
- Lack of organized market for camel milk and wool.
- Insufficient feed for camel in Kachchh and North Gujarat.
- Insufficient Veterinary facilities for pack animals.
- Nutritional deficiency affects the draft power of horse and donkey

Opportunities:

- Alternative local transportation facilities.
- Well established institute to deal with the researchable issue of pack animals.
- Premium price for camel milk and a strong cooperative network of dairy industries.

Threats:

- Extinction of existing breeds of pack animals in the arena of climate change
- Lack of financial ability to manage the pack animals

3.12.7 SWOT analysis of Animal Health in Gujarat State:**Strength:**

- The different milk unions have established milk cooperative societies in every village.
- The road connectivity between rural and urban areas is good.
- Awareness about animal husbandry and animal health exists amongst the rural mass especially the women.
- The area has Sardarkrushinagar Dantiwada Agricultural University with veterinary college at Sardarkrushinagar and an advance veterinary clinical complex at Deesa.
- The area has got famous cattle breed of Kankrej and Mehsana breed of buffalo respectively known for their efficient draught and milk capacity.
- The dairies have the infrastructure for clean milk production and also for marketing their products.
- There is the availability of animal vaccine institute at Gandhinagar.

Weakness:

- The area remains to be drought-prone to draught proven.
- The literacy rate is low with high drop out of children at primary school children.
- Due to low literacy rate, people are superstitious and not fully adopting scientific human and animal health practices.

Opportunities:

- Animal husbandry has gained popularity in income generation among the rural people.
- Though literacy rate is low they can be easily motivated and trained in animal health and husbandry considering their affection for their animals.
- Saving animals and improving the productivity of the animals in the area can improve the income of landless and marginal farmers.
- Zoonotic diseases like brucellosis, Tuberculosis can be controlled through control of these diseases in animals.

Threats

- The districts have interstate borders and the introduction of unvaccinated infected animals can cause the disease outbreaks.
- There is no disease surveillance system on a regular basis
- There are occasional episodes of plant/pesticide poisoning in the area.
- The area is drought prone and scarcity of fodder can affect the production as well as the cost of production.

3.12.8 SWOT Analysis of Fodder Production (Forage) in Gujarat State:

Strength:

- Storage and transportation facility is to be improved including silage facility.
- Poor prices of fodder. As higher prices of fodder are not bearable by poor cattle holder.
- Most of the green fodders at variable/ earlier growth stage contain one or more toxic factors. So early cutting is problematic.

Weaknesses:

- Low priority crops.
- The crops are basically bred for herbage, thus low in seed productivity.
- Most of the forage crops are shy seeders.
- The high cost of seed production because of low productivity.
- Non-synchronous flowering and maturity in most of the grasses and legumes.
- High cost involved in seed production especially in species of uneven maturity.
- Poor extension machinery responsible for the poor popularization of improved varieties.
- No organized seed outlet for marketing because of the uncertainty of demand.
- Cultivation of forage crop is only on need base instead of the commercial base.

Opportunities:

- Livestock is an important component of state rural and urban economics. However, the low productivity of livestock is a matter of concern which is primarily due to insufficient fodder and feed resources. So there is a great demand for fodder and feed.
- There is a scope of value-addition in fodder.
- Growing forage crops as a sole crop or in existing cropping systems, utilizing marginal and problematic soils is practiced to a varying degree throughout the country.

Threats:

- Poor availability of Hybrids in forage crops.
- Low germination of grass seeds.
- Nonavailability of male sterile lines in most of the crops.
- Flower structure is very small and delicate in most of the forage crops which make difficult the breeding work.
- The storage facility is very meager.
- The problem of salinity and waterlogging in some coastal area.

3.13 Other Sectors:

3.13.1 SWOT Analysis of Integrated Pest and Disease Management:

Strength:

- Better control of insect pests
- Effective management of diseases
- Reduction in cost of plant protection
- Minimize residue problem
- Reduction in resistance and resurgence of pests
- Minimize the adverse effect of pesticides on pollinators

Weaknesses:

- Lack of knowledge of IPDM in the farming community
- Lack of adoption of IPDM
- Lack of scientific knowledge of pests and diseases
- Limited availability of pest and disease resistant varieties
- No adoption on co-operative bases
- Less use of scientific advisories

Opportunities:

- Less development of resistance in insect pests and diseases
- Maintenance of natural balance
- Less residue and resurgence problem
- Effective and economic control of pests and diseases
- More activities of pollinators

Threats:

- Nonadoption on co-operative base
- The effectiveness of IPDM components
- Introduction of new insect pests and diseases
- Fluctuation in environmental factors
- The outbreak of insect pests and diseases
- Favorable environmental conditions for insect pests

3.13.2 SWOT Analysis of Soil Health:**Strength:**

- The state has four SAU's and five Central Research Institutes available for technical and scientific support.
- Well established soil testing laboratories network

Weaknesses:

- Nearly 12 districts of the state have problematic soils and soil productivity is declining.

Opportunities:

- Soil Health Card is a scientific tool to address soil health issues.

Threats:

- Erratic behavior of monsoon and lack of scientific understanding among the farmers for soil health related issues.

3.13.3 SWOT Analysis of Organic Farming:**Strength:**

- Food and environmental safety
- High quality and improved nutrition
- Sustainable crop production
- Improved soil health
- Premium prices
- Environmental sustainability
- Preserves traditional varieties and biodiversity
- Varied agro-climatic zones with different varieties of soil and crops

Weaknesses:

- Productivity gaps
- Lack of established markets
- Inadequate processing units
- Low R&D investments in organic farming research
- Lack of strategy for the development of organic market
- Disjointed producers, processors and traders
- Insufficient organic inputs
- Adulteration and poor quality of organic inputs
- A large number of small farms with weak organizational building
- Intensive in nature and high labour costs
- 70 % area depends on rain
- Uneven distribution of rain (In Kachchh- 400 mm and in South Gujarat- 1500 mm)

- Saline and waterlogged area
- Arid and Semi-arid area (19.61 % & 9.46 % respectively share in India)

Opportunities:

- Big and growing market potential
- Growing purchasing power of consumers
- Growing health awareness
- Biodiversity
- Earn high export earnings
- Corporate and contract farming
- Investment in the agricultural sector: Private market, Terminal market, E-market *etc.*
- Public-private partnerships
- The government of Gujarat declared Middle and South Gujarat as Agri Export
- Zone for vegetables and fruits as this area has assured irrigation facilities
- The state has the highest share of renewable energy potential (25%) in the country

Threats:

- The high cost of organic food
- Costly and complex organic certification process
- Lack of infrastructure facilities (like labs) and certification bodies
- Only export regulated organic market
- Low awareness about organic inputs
- Most of the fields are contiguous and the problem of contamination
- Introduction of GM crops
- Frequent drought
- Soil erosion, depletion of the water table, salinity ingress/ sea water ingress
- Less interest of rural young generation in agriculture due to heavy loss and low revenue

3.13.4 SWOT Analysis of Farm Mechanization:**Strength:**

- The average size of holdings in 1995-96 was 2.62 ha compared to the national average of 1.41 ha. The area under medium and large holdings was 51.3% of the total cultivated area. This figure increased to 78.7% if semi-medium holdings were grouped with medium and large holdings.
- Plains dominate the topography.
- Alluvial and medium black cotton soils which are suitable for mechanized cultivation.
- The multi-farm use of tractors and farm equipment has already become a common practice and few farmers depend on draught animals and labour alone for power.
- Sardar Sarovar project will increase the area under irrigation which will raise the intensity of cropping and land productivity and encourage investment on mechanization.
- The government has planned substantial increase in production, productivity and cropping intensity in the next few years.

Weaknesses:

- Twelve out of 26 districts of Gujarat are drought prone. Without assured Irrigation, the risk of crop failure is too high. This discourages investment on mechanization.
- The farm mechanization is not even recognized as an important input to upgrade state's agriculture.
- Capacity and facilities for manufacture and repair and maintenance of farm machinery are inadequate.

- The selection of farm equipment and train him in its operation and maintenance and to train rural/small town artisans in repair and maintenance of farm machinery do not exist.
- The Department of Agriculture is short of well trained and experienced agricultural engineering experts to plan and execute agricultural mechanization programme.
- R&D programme in agricultural mechanization is very limited.

Opportunities:

- A time-bound programme to extend water conservation activities to all drought-prone areas to achieve better crop stand and extend the growing period can greatly reduce the risk of crop failure.
- Efficient irrigation techniques like drip irrigation, production techniques like raised bed cultivation and precision in seed placement and application of fertilizers and plant protection chemicals will not only increase production but also improve the quality of products and reduce the expenditure on cash inputs.

Threats:

- In its anxiety to absorb more people in agriculture, the state may deliberately discourage agricultural mechanization.
- In the absence of proper equipment and technologies, quality of raw material may be too poor to produce processed products of acceptable/marketable quality.

3.13.5 SWOT Analysis of Post-Harvest Management and Value Addition of Horticulture Crops:**Strength:**

- Leading state in horticultural production and productivity, a lot of scope of organic cultivation.
- High remunerative crop in irrigated area and having soil which is most suitable for horticultural crops.
- Early production/harvesting providing an opportunity for more return.
- Well established research and extension network and e-communication
- Suitable government policy
- Good input supply network
- Good marketing network

Weaknesses:

- Erratic and uneven distribution of rainfall
- Lowering water table and the problem of salinity and drought
- Labour intensive cultivation and acute labour shortage in major parts of the state
- Higher input costs and nonavailability at proper stage (as and when needed)
- At present no concrete organic crop production policy in the state and lack of organic input supply chain
- Poor infrastructure at Taluka places for sale and purchase of produce
- Poor infrastructure for storage, packaging and processing.

Opportunities:

- Improvement of drainage structure in high rainfall zone and to develop water harvesting structure in rainfed area and promoting micro-irrigation.
- Scope for organic crop cultivation which gives high prices to farmers and establishing input supply chain and development of brand organic products.
- Area wise promotion of intercropping, ICM, IPM/IDM
- Up gradation of marketing network, storage and improved testing facility at co-operative, private Pressing units, collection centers.
- Scope for mechanization and use of renewable resources.

- Strengthening of the facility for research pertaining to storage, packaging And processing.
- Scope for organic matter incorporation through proper post-harvest and waste management.
- Research scope for increasing domestic processing of horticulture produces through innovative research and upgrading techniques.

Threats:

- The problem of salinity and waterlogging in some coastal area
- Irregular and erratic rain threat.
- Unstable and fluctuating/ lower market price
- Labour shortage
- Un-experienced labourer and poor work efficiency especially in post-harvest management.

3.13.6 SWOT Analysis Post-Harvest Management and Value Addition of Field Crops:

Strength:

- Availability of multi-disciplinary scientists to take up inter-disciplinary research projects.
- Well-developed laboratories for processing of cereals, pulses and oilseeds, engineering properties, biochemistry. Electrical engineering, drying and dehydration, storage, canning plant, low-temperature storage structures, onion storage structures and dairy and food engineering and computer cell.
- Training facilities for processing of fruits and vegetables and also for cereals, pulse and oilseeds and their value addition.
- Close linkages with State Departments, Manufacturers, other research & development organizations.
- A network of cooperating centers of AICRPs in different agro-climatic zones is efficient outlets for new technologies and inlets for objective feedback.
- Transfer of technology through Agro Processing Centers,

Weaknesses:

- Scientific manpower not commensurate with vast and numerous challenges.
- The absence of specialized scientific manpower in frontier areas of processing in horticultural crops, food engineering research.
- Local manufacturers averse to the adoption of modern manufacturing technology and new product range in the area of processing machinery.
- Non-availability of space planting of costly, small, lightweight post-harvest machinery.
- Lack of storage facilities for onion & garlic.

Opportunities:

- The significance of timeliness of operations, drudgery, comfort, cost reduction and value addition and overall benefits to farmers and entrepreneurs has been recognized.
- Importance of engineering interventions has been realized all-round, from farmers to policymakers to provide an opportunity for the early adoption of post-harvest equipment.
- Due to the limited attention paid to gender issues in the development of processing technologies
- Availability of about 100 MT/annum of surplus crop residues and agro-processing waste that can be converted for domestic fuel utilization.

- Due to lack of proper post-harvest technology, about 40% of horticultural produce, 10% of food grains and, 10-12% of animal products are lost in handling, storage and transport. Tremendous scope exists for a reduction in the level of post-harvest losses.
- Scope exists to increase the returns to farmers by establishing agro-processing units in production catchments.
- With increasing agricultural production and income of people, there has been an upward swing in the demand for processed and high-quality foods. Scope for development of technology package for value addition to by-product and safe waste disposal.
- Opportunities exist for export of value-added agro-products.
- Scope for the introduction of groundnut based foods as widespread malnutrition is prevalent in rural areas.
- Scope for entrepreneurship development for the custom hiring of high capacity and costly post-harvest machinery.
- The opening of Agro-processing centers at village level itself.
- Standardization of export-oriented agro-processed products.
- Potential of employment generation through Agro-processing centers at village level itself.
- Mandatory utilization of modern processing machinery to avoid post-harvest losses and energy

Threats:

- Depletion of scientific and technical manpower in post-harvest engineering and food technology discipline in R&D institutions.
- Shortage of electric power supply in rural India – vital for agro-processing ventures in production catchment.
- The existence of long marketing channel with a large number of middlemen results in low returns to the growers
- The storage and transport infrastructure is highly inadequate resulting in high post-harvest wastage and losses.
- The domestic demand for processed products is quite low due to seasonal availability of some fresh fruits or vegetables throughout the year
- Mostly ventilated storage is used at the farm level. Use of cold storage at *mandis* is very limited.
- Sorting/Grading is very limited. Mostly by visual inspection. Some large marketing agencies use weight-based grading systems.
- The preparatory activities like grading, sorting, cleaning and slicing are done mostly manually except in a few large units. The large-scale units up semi-automatic/ automatic processing units

3.13.7 SWOT Analysis of Soil and Water Management:

Strength:

- Fertile lands for agricultural cultivation
- Good monsoon season with varying degree of rainfall.
- Availability of good industrial growth in different sectors
- Gir Kesar variety of mango registered for Geographical Indication (GI).
- Availability of ample solar and wind energy around the year
- Largest producer of Groundnut, Cotton, Potato, Rice, Banana and Spice crops, etc in the country.
- All major crops have higher productivity than the national average.

- Good transportation, port and marketing facilities attract many industries in the state
- The good potential of exportable fish fauna, marine fish catching and fish processing industries.

Weakness:

- Large area under rainfed farming, and less area under irrigation.
- Groundwater is saline and prevailing deep water table conditions.
- Erratic, spatial and uneven distribution of rainfall
- Waterlogging, salinity and sea ingress problems restrict productivity in coastal areas
- The long duration of the crop & Mono and sole cropping of cotton
- Labour intensive cultivation and acute labour shortage during peak requirement in major parts of the state
- Higher input costs and non-availability of seeds and water at proper stage (as and when needed)
- Poor infrastructural facilities at Taluka places

Opportunities:

- Improve water use efficiency and irrigation efficiency through the micro irrigation system (MIS) and productivity enhancement.
- Conjunctive use of surface and groundwater
- Watershed management for water harvesting and Soil and Water conservation.
- Drainage of waterlogged saline and degraded soils.
- Treatment of wastewater & reuse for irrigation to enhance agricultural productivity.
- Modernization and renovation of existing irrigation projects
- Better design, planning and management of canal networks including lining
- Creation of water user associations and developing mechanisms for proper operation & maintenance of the irrigation infrastructure.
- Protected cultivation in greenhouse and shade net (low cost) for off-season vegetable cultivation.
- Linking of local rivers/ponds at macro and micro level for increasing irrigation productivity.
- Expansion of inland and brackish water aquaculture.
- Scope for export of processed food products to other countries.
- Utilization of nonconventional energy sources solar, wind and sea waves in agriculture to meet the energy demand for pumping groundwater.
- Improvement of drainage structure in high rainfall zone and to develop water harvesting structure in rainfed area and promoting micro-irrigation.
- Development of equipment for wastewater treatment and separation technology
- Development of new methods process configurations for water production from wastewater.
- Development of low cost and wastewater specific membranes for water reuse/reclamation.
- Improvements in membrane performance including the development of lower pressure membranes (e.g. reduce fouling, increase flux, improve rejection, increase integrity, increased longevity, etc.).
- Development of energy efficient advanced oxidation for organic and recalcitrant compounds in wastewater.
- Alternative disinfection systems for wastewater including ozone, UV, chlorine dioxide and gaseous/liquid chlorine.
- Improvements and cost reductions in thermal processes for chemicals and energy recovery such as evaporation and plasma incineration.
- Development of treatment options/packages for country-specific wastewaters.

- Delineation of treatment option/schemes to reduce energy consumption and hazardous wastes disposal.
- Development of instrumentation package for automation of the treatment package and bringing down the cost of components.

Threats:

- Seawater intrusion in aquifers of coastal talukas and overexploitation of groundwater to cater the needs of drinking and irrigation.
- Climate change is a threat to sustaining productivity from the field and horticultural crops.
- Deteriorating quality of rivers and soil due to the discharge of Industrial and residential effluents without treatment
- Out of 225 talukas of the state, as many as 56 talukas are drought-prone which suffer from drought or scarcity condition at regular interval
- Drought, Flood and Cyclone raise after some interval badly affect agriculture of the state and also the economy of the farmers.
- Heavy rain after long dry spell also affect the standing crops and also soil erosion
- Improper technological combination for wastewater treatment is discouraging water reuse and recycling.
- No separate treatment units to deal with hazardous and toxic effluents.
- Less interest of rural young generation in agriculture due to heavy loss and low revenue.
- The problem of salinity and waterlogging in the coastal area.
- Irregular and erratic rain threat timely sowing and sometimes re-sowing.
- Labour shortage and Un-experienced laborers for irrigation cause wastage of irrigation water.

3.13.8 SWOT Analysis of Renewable Energy:

Strength:

- **Energy Security:** Abundant renewable sources like solar, wind and biomass for energy generation. Conversion of organic waste into fuel will lead to energy security because the fossil fuel is not going to last forever.
- **Food Security:** The energy security will help to improve farm productivities, handling, storage and processing activities in the rural area causes food security for the nation.
- **Pollution Control:** Normally fossil fuels lead to the emission of greenhouse gases like carbon dioxide or carbon monoxide. The renewable energy sources are eco-friendly reduces greenhouse gas emission and helps in arresting depletion of the ozone layer. This is likely to earn carbon credits.
- **Rural Sanitation:** With proper management of animal and other agriculture/organic wastes/ village will be clean leading to better health and hygiene in rural areas.
- **Reducing Drudgery:** Rural families particularly women would benefit from reduced drudgery and saving time from collecting wood and water from a long distance and minimizing health hazards of cooking in Smokey kitchen.
- **Employment generation** Creates jobs especially in rural areas so helps to reduce migration to the city.
- **Socio-Economic Upliftment:** The energy security creates better income, facilities and an additional distribution channel for agricultural products and rises the income for farmers hence improves socio-economic status of the rural people
- **Subsidies:** Feedstock production for energy purposes can reduce agricultural premiums and subsidies.

- **Government Policies:** Highly congenial environment for the development in the state and country.

Weaknesses:

- Usually, Renewable Energy Sources are variable depends on nature, expensive, time-consuming, less popular, compared with fossil energy hence extensive R & D is required.
- Less investment in production and popularization, Fluctuation in Govt. policies for the promotion of RES, no energy tax/CO₂.
- Pricing incentives, (as in German model), a metering mechanism for biogas supply, legislation for the bottling of CBG,
- No feed-in-law for thermal applications, No Demand Side Management (DSM) incentives for the housing/transport sectors.
- Extensive R & D is required to make compatible with conventional energy.
- There is lacking scientific and technical manpower at State to carry out qualitative R & D work and produced a sufficient number of skilled manpower to meet the target. Needs to find and train the staff members in quite restricted local conditions.

Opportunities:

- Gujrat has the highest share of renewable energy potential (25%) in the country.
- Out of total energy being consumed only 18.0 % comes from the RES as compared to TN 40.46%, Karnataka 28.63% and Rajasthan 26% despite state is very rich in Renewable Energy Sources.
- The Gujarat state has the very high potential for solar energy utilization for different applications like crop drying, cooking, power generation, greenhouse crop production, etc.
- There is a good scope to replace a large percentage of fossil fuels with Biofuel.
- The state has Out of total potential wind energy generation only 15% is yet to be explored, Biomass generation and utilization for energy has tremendous scope in Gujarat using biomass gasification and co-generation technology. The another important RES is the biogas for cooking and vehicle fuel need to be paid attention.
- There is good opportunity to carry out R &D activities in the above areas and new areas like a fuel cell, small windmill and Hydrogen fuel technology and other RES to obtain better efficient and adaptive technology.
- Further, there is hardly technical manpower is available for the construction, testing, installation, operation, and maintenance of renewable energy technologies/devices causing lack of interest in utilization & popularization of technology.

Threats:

- The market for transport fuels is dominated by fossil fuels and will likely be so in the foreseeable future.
- The political lobby for RE is weak when compared to the lobby of fossil fuels.
- Discoveries of new oil fields rapidly decreased in the last few years The RE market is a relatively new market
- Restricted resources for R & D (financing and human capital - researchers). Restricted innovation resources.
- Restricted job opportunities for the Graduates.

3.13.9 SWOT Analysis of Bio-fertilizer:

Strengths:

- More than 60 recommendations for the farming community on the use of bio-fertilizers in various crops by SAUs to curtail the cost of cultivation with yield increase as well.

- Recently introduced new technology for Bio NPK consortium supplementing all macronutrients for crops in single product application.
- Adverse impact on soil health and productivity due to imbalances in fertilizer application coupled with intensive agriculture can be mitigated through live microbial inputs.
- Save up to 25% of chemical NPK and improve soil health
- Can be produced/multiplied throughout the year without any seasonal effect
- Longer shelf life 12- 24 months for Liquid biofertilizer and high microbial population can be maintained throughout the storage period
- Quality control protocols are easy and quick
- Better survival on seed and soil
- Very much easy to use by farmers
- Can be used in drip irrigation in foliar spray and greenhouse

Weaknesses:

- The expectation of quick response by the farming community after application of biofertilizer as against chemical fertilizers
- Application of organics and bio-fertilizers is very low with less than 10% area coverage
- Bio-fertilizers yet not reached to the end users effectively.
- Very less awareness among farming community regarding use and benefits of biofertilizers.
- Inadequate biofertilizer production facilities and marketing

Opportunities:

- The large gap between supply and demand
- Only input which can provide the highest nutrient per unit
- Rising demand in organic agriculture and Integrated Nutrient Management throughout the year
- Land requirement for biofertilizer production unit is very less
- Very high output as against the initial capital cost
- Global Biofertilizers Market is expected to Grow at CAGR 14.08% by 2022 and the main drivers are Increase in Demand for Fertilizers inputs, Development in Biofertilizer Manufacturing Technologies, Research and Markets
- Indian Biofertilizer Industry has grown 3 times from 25 to 80 thousand tons in last 6 years and expected to grow due to various Growth Drivers viz. strong push by GOI to promote bioagriculture to conserve the environment, widening the demand-supply gap of food crops, increasing demand of organic food

Threats:

- Biofertilizers being live microbial product their quality and shelf life play a crucial role and require constant monitoring and quality analysis at the state level.

3.13.10 SWOT Analysis of Promotion of Extension Activity & ICT:**Strength:**

- Well established extension units like EEI, KVK, FFS etc....
- Well-developed co-operatives and NGO's
- Good governance
- Strong and successful co-operative movement in Gujarat state
- Linkage and comprehensive work between research & extension activities
- Strong extension institutional setup and technically skilled human resources
- The training and visiting (T & V) of extension
- Well established agri-clinic, KVKs, SHGs, ATMA and DOA and convergence work
- *Krusha Mahotsav*

Weaknesses:

- Less access to information from different sources (TV, Radio, Folders, Articles etc.)
- Less number of farmers' interest group in village level
- Insufficient attention towards extension personnel's
- Slow release of funds to extension units
- Smallholders are shown less interest in seeking advice

Opportunities:

- e-learning through email etc.
- m-learning through text & voice messages
- Use of KIOSK
- Effective radio & TV talk
- *Kisan* call center
- Market facilitation

Threats:

- Lack of knowledge/education
- The private sector is professional

3.13.11 SWOT Analysis of Environment, Climate Change and Weather**Forecasting:****Strength:**

- A good network of agricultural research stations
- Academic programs in agricultural meteorology and climate change
- Centre for excellence in environment, climate change, weather forecasting and agro-advisory services
- Agro-meteorological database at Anand
- Eight agro-met advisory service centers of IMD, one in each agro-climatic zone

Weaknesses:

- Lack of long period climatic data of taluka and districts
- Lack of standard agro-meteorological observatories at all research stations
- Lack of trained manpower for meteorological observation and analysis
- Lack of knowledge on weather variability and climate change
- Lack of knowledge on the impact of climate change on agricultural production
- Lack of knowledge on an understanding of weather forecasting
- Lack of coordination in climatic data sharing
- Inadequate data on environmental health monitoring

Opportunities:

- Establishment of a network of the agro-met observatory at each agricultural research stations
- Setting up of automatic weather stations (AWS) in each taluka
- Weather-based assessment of crop growth and production
- Sharing of past and current climatic data
- Establishment of weather forecasting centers
- Making climate smart village
- Weather-based advisories at the village level

Threats:

- Increase in environmental pollution
- Increase in extreme weather events
- Natural disasters may cause losses
- Large inter and intra-seasonal variability in rainfall
- Uncertainty in the behavior of monsoon

CHAPTER - 4

DISTRICT WISE DEVELOPMENTAL PLANS FOR AGRICULTURE AND ALLIED SECTORS

4.1 CEREAL CROPS:

Vision:

- ✓ Sustaining food and nutritional security through enhancing rice productivity by increasing input use efficiency and reducing cost of cultivation
- ✓ Welfare of the present and future generations of rice farmers and consumers by ensuring food and nutritional security
- ✓ To spur food and nutritional security by enhancing production and quality of wheat with concomitant sustainability of natural resources base
- ✓ Gujarat, a harbinger in sorghum production and yield through technology and innovations
- ✓ To increase the area and production of small millets particularly *Nagli (Ragi)* and *Vari* (Little millet) through latest technology and innovations

Mission:

- Develop technologies to enhance rice productivity, resource and input use efficiency and profitability of rice cultivation without adversely affecting the environment
- Ensuring food security of state by enhancing the productivity and profitability of wheat on an ecologically and economically sustainable basis and making Gujarat a leader in wheat production
- To augment production, yield and quality of sorghum in the state: Sorghum is an important crop of semi-arid tropics with immense climate resilient and food security potential and livelihood support for marginal and poor farmers. The crop is a rich source of minerals, dietary fiber and well balanced protein. Sorghum is staple food for tribal population of Gujarat. But, the bottle neck of the region is marginal to poor soil. Therefore, short life span sorghum variety with high yield, better grain quality in rainfed hilly area of tribal zone in Gujarat will assure food security of tribal's and poor farmers, thus will meet the goal of national food security mission
- To augment the area, production and yield of small millets in the state, the yield gap in rain fed without risking natural resources, further develop breeding as well as new technology development process to meet ensuing climatic changes

Crop/Area Issues:

- Lack of adequate supply of irrigation water and high pumping cost
- Seed supply: Use of inferior quality seeds, seed replacement rate very low
- Acute paucity of labour during peak seasons in major area of state
- Escalating cost of input resources and poor resource use efficiency

- Climate change impact
- Sustainability and reduction in cost of crop cultivation
- Weed management
- Macro/ micro nutrient management
- Development of saline resistant, draught resistant and thermoresilient genotype
- Standardizing the design of storage structures and improving the storage conditions
- Fluctuating market prices

Priorities for Crop Cultivation:

- Exploitation of useful bio-agents and microorganisms for expanding swathes of natural base
- Exploitation of smart irrigation techniques and frugal tillage for judicious management of water
- Varieties with enhanced yield, Water Use Efficiency(WUE) and Nitrogen Fertilizer Use Efficiency(NUE)
- Development of extra early varieties with high yield to fit in late sowing conditions
- Contract/corporate farming for versatile value chain of quality crop from field to fork (shift to agril marketing)
- Product specific varieties
- Innovate the progressive farmers for seed production at village level
- Standardizing the design of drip irrigation and irrigation scheduling based on soil, water, atmosphere continuum

The Biological and Socioeconomic constraints associated with low productivity of cereals are as follow:

Biological constraints:

- Improper selection of variety as per the maturity duration
- Inadequate, variable and untimely water supply
- Improper management of available water
- Imbalanced /Injudicious application of chemical fertilizers
- Improper placement of seeds and fertilizers
- Poor weed management
- Poor insect and disease management
- Despite soils problems, no measure to ameliorate the problems
- Low/Inadequate use of organic matter and lack of awareness to improve soil health

Socioeconomic constraints:

- Lack of credit facilities
- Traditions and attitudes
- Lack of requisite knowledge
- Lake of timely availability of inputs
- Lake of easy access to knowledge sources
- Unavailability of proper Resource Conservation technologies

On Going Special Projects/ Programs:

The following special projects are ongoing in the State:

- a) Agriculture Technology Management Agency (ATMA) program is implemented since 2009-10 to strengthen the present extension system.
- b) Front line demonstrations in crops other than oilseed and pulses are implemented through ICAR in KrishiVigyan Kendra.
- c) NFSM – National Food Security Mission is ongoing program in the state.
- d) RKVY – (Rashtriya Krishi Vikash Yojana).
- e) Drip irrigation by GGRC.

4.1.1 Rice:

4.1.1.1 Background:

Rice occupies about 10.61 % of the gross cropped area of the State and accounts for around 25.5 % of the total food grain production. It is grown on an average about 7.5 to 8.5 lakh hectares of land comprising nearly 70 to 80% of low land (Transplanted) and 15 to 20 % of Upland (Drilled) rice. In the State, rice is cultivated in major ecologies as given below:

- i) Irrigated Transplanted (60-70 %)
- ii) Rainfed Transplanted (20-25 %)
- iii) Rainfed upland drilled (12-16 %)
- iv) Coastal/Salt affected transplanted rice (2-4 %)

Of these ecologies, irrigated transplanted and rainfed upland drilled are predominant. The area under rain fed transplanted and coastal/ salt affected ecologies are only a few thousand hectares. The distribution pattern of the area under rice and production potentiality of the crop in different agro-ecological situations is apparently governed by the onset and withdrawal of monsoon, the extent and distribution of rainfall and the extent of irrigation facilities available. The area under kharif and summer paddy in different districts is given in Table-4.1.1 and Table – 4.1.2.

Table - 4.1.1 District Wise Area under *Kharif* Paddy during 2012-13 to 2016-17
(Average of five years paddy under irrigated & unirrigated);

(Area in '00 ha)

NO	DISTRICT	'00 ha	% Share
1	Ahmedabad	1786	23.60
2	Anand	1728	22.84
3	Bharuch	106	1.40
4	Dahod	393	5.19
5	Dang	61	0.81
6	Gandhinagar	143	1.89
7	Kheda	1574	20.80
8	Mehsana	97	1.28
9	Narmada	47	0.62
10	Navsari	605	8.00
11	Panchmahal	552	7.29
12	Sabarkantha	52	0.69
13	Surat	563	7.44
14	Tapi	564	7.45
15	Vadodara	434	5.74
16	Valsad	748	9.89
17	Surendranagar	6	0.08
18	Mahisagar	424	5.60
19	Chhotaudepur	110	1.45
GUJARAT STATE		7567	100.00

(Area in '00 ha, Production in '00 M.T., Productivity in kg/ha)

Table - 4.1.2 District Wise Area under Summer Paddy during 2012-13 to 2016-17

(Average of five years paddy);(Area in '00 ha)

NO	DISTRICT	'00 ha	% Share
1	Ahmedabad	74	23.27
2	Anand	6	1.89
3	Bharuch	17	5.35
4	Gandhinagar	0	0.00
5	Kheda	36	11.32
6	Mehsana	0	0.00
7	Narmada	0	0.00
8	Navsari	89	27.99
9	Panchmahal	2	0.63
10	Surat	69	21.70
11	Tapi	14	4.40
12	Valsad	11	3.46
GUJARAT STATE		318	100

The total production of rice in the state is about 16.0 to 17.2 lakh T. with a productivity of 2136 to 2230 kg/ha. The productivity of irrigated rice is nearly 2.4T/ha whereas

that of unirrigated rice is nearly 1.4T/ha. The poor productivity of rainfed upland drilled rice brings down the total productivity of rice in the state (Table-4.1.3)

Table-4.1.3 Area, Production and Yield of Rice during 2012-13 to 2016-17

Year	Rice Irrigated (Kharif)			Rice Unirrigated (Kharif)			Summer Rice (Rabi)			Total Rice		
	Area	Prod.	Yld.	Area	Prod.	Yld.	Area	Prod.	Yld.	Area	Prod.	Yld.
2012-13	4698	10951	2331	2022	3130	1548	291	892	3065	7011	14973	2136
2013-14	5740	13335	2323	2133	3391	1590	331	1055	3188	8204	17781	2167
2014-15	5499	13796	2509	2133	2917	1367	312	1003	3210	7944	17716	2230
2015-16	5978	14163	2369	1433	1681	1173	331	1075	3244	7742	16919	2185
2016-17	5738	13979	2436	1783	2299	1289	322	1039	3228	7843	17317	2208
Average :	5666	13499	2382	1901	2684	1393	317	1013	3196	7884	17196	2181

(Area in '00 ha, Production in '00T., Productivity in kg/ha)

4.1.1.2 Crop Area Issues:

Rice Cultivation:

The productivity fluctuations observed in summer paddy needs to be minimized

- Constrained and costlier irrigation water: especially prior to monsoon at the time of nursery raising and during Summer Rice cultivation.
- Seed supply: Use of inferior quality seeds ,Seed replacement rate very low
- Intensive labour activities in rice need mechanization to increase area under rice.
- Every year the input cost is escalating.
- Due to climate change impact, the late onset of the monsoon, high temperature, mid season withdrawal of rains and untimely shower in harvesting season appears to be a regular feature.
- Sustainability of rice cultivation
- Keeping in view the rice trade, the quality of rice needs to be improved / maintained.
- Rice is being cultivated both in aerobic and anaerobic situation, Integrated Weed Management (IWM) is challenging.
- The Zinc (Zn) and Iron (Fe) deficiency in the rice field during nursery raising and after transplantation in the field urgently needs the Integrated Macro and Micro Nutrient Management (INM).
- Salinity tolerant and thermo resilient genotypes needs to be developed based on C₄

- The rice seed storage facilities require to be improved to prevent losses.
- Village level rice seed storage facilities will help farmers to sell their produce at a proper time to get remunerative prices.
- The procurement of remunerative prices of the rice produce and product needs urgent attention. The prices of rice should be fluctuation free.

4.1.1.3 Priorities for Rice Cultivation:

- Yield stability and bridging / narrowing gap in rice yield between irrigated, unirrigated and summer cultivation in different paddy growing districts through Integrated Crop Management (ICM) and through Integrated Natural Resources Management (INRM).
- Rice being a staple food, the genetic enhancement of nutritional deficiencies like Zn and Fe needs immediate attention.
- Village level Participatory seed production programme to cater the seed demand and help enhancing the SRR (Seed Replacement Ratio).
- Evolving suitable varieties for aerobic cultivation to enhance Water Use Efficiency (WUE) and productivity in upland rice fields.
- Popularizing the SRI (System of Rice Intensification) technique for enhanced productivity and Water Use Efficiency (WUE).
- Popularizing the SIRA (Sawant's Integrated Rice Agro technology) technique for enhanced productivity and Nitrogen Fertilizer Use Efficiency (NUE) in the Eastern Hilly tribal belt.
- Popularizing the use of environment friendly bio-fertilizers to enrich the crop and soil health.
- Popularizing the village level community rice nursery raising for judicious management of water and proper / need based availability of varietal seedlings.
- Evolving suitable upland rice varieties with enhanced yield potential, drought resistance / enhanced Water Use efficiency.
- Development of extra early/mid early fine grained rice varieties with high yield potential to allow a second crop in the ensuing season and procuring remunerative prices.
- Popularization of soil moisture conservation practices for rice farming.
- Enriching the paddy *kyarees* with organics like castor cake/neem cake/FYM/green manuring and using soil reclamation techniques (Gypsum, Bio-reclamation).

4.1.1.4 Rice Production Analysis in the State:

Among the rice growing districts, none of the districts have higher productivity than the **national average** 33 districts have revealed productivity below the national average. Of these 03 districts (below 2500 kg./h.), 07 districts belonged to medium productivity, 07 districts belonged to medium low productivity, 01 districts belonged to low productivity group whereas 02 districts were under very low productivity group. About 71.7 per cent medium low, high productivity 14.5 per cent, medium productivity 8.9 per cent and very low productivity group accounted for 4.9 per cent of total rice production as depicted in the (Table-4.1.4)

Table-4.1.4 Area, Production and Productivity of Rice with Five Productivity

Group of Districts in the Gujarat State (mean of five Years 2012-13 to 2016-17)

Category of District	District	Area (Lakh ha)	Percent of State's Rice Area	Production (Lakh T)	Percent of State's Production	Productivity (Kg/ha)
High Productivity Districts (>2500 kg/ha)	Chhotaudepur Tapi, Navasari	1.279	12.8	3.338	14.5	2582
Medium Productivity Districts (2000-2500 kg/ha)	Kheda, Anand Surat, Bharuch Sabarkantha, Ahmedabad Valsad	6.557	65.6	16.511	71.7	2529
Medium Low Productivity Districts (1500-2000 kg/ha)	Mehsana Gandhinagar Narmada Panchmahal Vadodara Surendranagar Mahisagar	1.151	11.5	2.059	8.9	1685
Low Productivity Districts (1000-1500 kg/ha)	Panchmahal	0.552	5.5	0.754	3.3	1105

Very low Productivity Districts (<1000 kg/ha)	Dahod, Dang	0.454	4.5	0.372	1.6	659
State Total	17	9.993	100.0	23.03	100.0	1712

Source: Report of Directorate of Agriculture, Gujarat State, 2017-18

4.1.1.5 Current Status of Area, Production and Productivity:

District-wise Area, Production and Productivity of irrigated rice, unirrigated rice, *kharif*rice, summer rice and total rice during last five years (Year-2012-13 to 2016-17) are shown in Table – 4.1.5 to Table – 4.1.9.

Table-4.1.5 District-wise Area, Production and Productivity of Irrigated Rice during Last Five Years

(Year-2012-13 to 2016-17).(Area in '00 ha, Production in '00 T Yield in Kg/ha)

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1	Ahmedabad	1071	2115	1974	1128	2640	2341	1162	3047	2622
2	Anand	944	2389	2531	1138	2959	2599	1102	3086	2800
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	52	113	2183	68	128	1890	67	147	2212
5	Dahod	96	152	1573	130	198	1522	41	46	1124
6	Dang	0	0	0	0	0	0	0	0	0
7	Gandhinagar	30	74	2450	100	235	2356	84	192	2277
8	Kheda	794	1909	2404	1082	2522	2332	984	2526	2566
9	Mehsana	14	32	2333	50	100	2007	68	180	2651
10	Narmada	31	72	2333	13	30	2330	6	15	2511
11	Navsari	333	819	2460	489	1188	2432	383	1049	2740
12	Panchmahal	449	998	2223	502	896	1785	244	329	1347
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	29	78	2657	13	34	2618	31.2	84	2676
15	Surat	279	635	2275	346	757	2190	295	764	2591
16	Tapi	219	709	3234	290	871	3003	288	825	2862
17	Vadodara	194	408	2106	207	376	1816	208	391	1882
18	Valsad	163	448	2746	186	401	2157	186	462	2479
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
27	Arvalli	-	-	-	-	-	-	0	0	0
28	Dev. Dwarka	-	-	-	-	-	-	0	0	0
29	Gir Somnath	-	-	-	-	-	-	0	0	0
30	Botad	-	-	-	-	-	-	0	0	0
31	Mahisagar	-	-	-	-	-	-	267	447	1677
32	Chhotaudepur	-	-	-	-	-	-	83	207	2511
33	Morbi	-	-	-	-	-	-	0	0	0
GUJARAT STATE		4698	10951	2331	5740	13335	2323	5499	13796	2509

Source of Est. Data: Director of Agriculture, Gujarat State, Gandhinagar, 2017-18

Table-4.1.5 District-wise Area, Production and Productivity of Irrigated Rice during Last Five Years (Continue...)

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1	Ahmedabad	1079	2804	2598	1121	2925	2610	1112	2706	2429
2	Anand	1085	3002	2768	1093	3044	2784	1072	2896	2696
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	40	83	2084	53	115	2164	56	117	2107
5	Dahod	37	44	1182	39	45	1151	69	97	1310
6	Dang	0	0	0	0	0	0	0	0	0
7	Gandhinagar	108	223	2054	96	207	2152	84	186	2258
8	Kheda	1004	2497	2487	994	2512	2526	972	2393	2463
9	Mehsana	71	171	2403	70	175	2524	55	132	2384
10	Narmada	0	0	0	3	8	2511	11	25	1937
11	Navsari	230	628	2727	307	839	2735	348	905	2619
12	Panchmahal	434	461	1061	339	395	1164	394	616	1516
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	36	114	3141	34	99	2926	29	82	2804
15	Surat	358	856	2390	327	810	2480	321	764	2385
16	Tapi	313	751	2398	301	788	2620	282	789	2823
17	Vadodara	240	425	1770	224	408	1822	215	402	1879
18	Valsad	615	1490	2423	401	976	2436	310	755	2448
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
26	Surendranagar	7	17	2498	3	8	2498	3	8	1665
27	Arvalli	0	0	0	0	0	0	0	0	0
28	Dev. Dwarka	0	0	0	0	0	0	0	0	0
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	264	461	1744	265	454	1710	265	454	1710
32	Chhotaudepur	55	137	2498	69	172	2506	69	172	2505
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		5978	14163	2369	5738	13979	2436	5666	13499	2382

Source of Est. Data: Director of Agriculture, Gujarat State, Gandhinagar, 2017-18

Table-4.1.6 District-wise Area, Production and Productivity of Unirrigated Rice during last Five Years (Year-2012-13 to 2016-17).

(Area in '00 ha, Production in '00Tyield in Kg/ha)

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		Area	Prod	Yield	Area	Prod	Yield	Area	Prod.	Yield
1	Ahmedabad	7	11	1550	0	0	0	1162	3047	2622
2	Anand	0	0	0	0	0	0	1102	3086	2800
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	44	28	631	45	29	643	67	147	2212
5	Dahod	222	206	926	258	148	574	392	180	459
6	Dang	138	218	1577	168	432	2569	0	0	0
7	Gandhinagar	5	7	1550	0	0	0	84	192	2277
8	Kheda	23	36	1550	6	7	1059	984	2526	2566
9	Mehsana	0	0	0	0	0	0	68	180	2651
10	Narmada	85	56	659	86	51	586	6	15	2511
11	Navsari	180	463	2577	186	434	2334	383	1049	2740
12	Panchmahal	224	191	853	308	331	1075	164	111	679
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	8	4	527	4	2	407	31	83	2676
15	Surat	118	206	1750	113	176	1548	295	764	2591
16	Tapi	239	485	2030	267	580	2174	288	825	2862
17	Vadodara	252	224	893	173	131	754	208	391	1882
18	Valsad	475	991	2085	515	1068	2073	186	462	2479
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	2	4	1550	2	4	1584	0	0	0
27	Arvalli	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		Area	Prod	Yield	Area	Prod	Yield	Area	Prod.	Yield
28	Dev. Dwarka	0	0	0	0	0	0	0	0	0
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	0	0	0	0	0	0	267	447	1677
32	Chhotaudepur	0	0	0	0	0	0	83	207	2511
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		2022	3130	1548	2133	3391	1590	2133	2917	1367

Source of Est. Data: Director of Agriculture, Gujarat State, Gandhinagar, 2017-18

Table-4.1.6 District-wise Area, Production and Productivity of unirrigated Rice during last Five Years (Year-2012-13 to 2016-17). (Continue...)

(Area in '00 ha, Production in '00Tyield in Kg/ha)

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	1079	2804	2598	1121	2925	2610	674	1757	1876
2	Anand	1085	3002	2768	1093	3044	2784	656	1826	1670
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	40	83	2084	53	115	2164	50	80	1547
5	Dahod	369	68	185	380	124	326	324	145	494
6	Dang	0	0	0	0	0	0	61	130	829
7	Gandhinagar	108	223	2054	96	207	2152	59	126	1607
8	Kheda	1004	2497	2487	994	2512	2526	602	1516	2038
9	Mehsana	71	170	2402	69	175	2524	42	105	1515
10	Narmada	0	0	0	3	8	2511	36	26	1253
11	Navsari	230	628	2727	307	839	2735	257	683	2623
12	Panchmahal	8	2	203	86	56	656	158	138	693
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	36	114	3141	34	99	2926	23	60	1935
15	Surat	358	856	2390	327	810	2480	242	562	2152
16	Tapi	313	751	2398	301	788	2620	282	686	2417
17	Vadodara	240	425	1770	224	408	1822	219	316	1424
18	Valsad	615	1490	2423	401	976	2436	438	997	2299
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	7	17	2498	3	8	2498	3	7	2033
27	Arvalli	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
28	Dev. Dwarka	0	0	0	0	0	0	0	0	0
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	264	461	1744	265	454	1710	159	272	1710
32	Chhotaudepur	55	137	2498	69	172	2506	41	103	2505
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		1433	1681	1173	1783	2299	1289	1901	2684	1393

Table-4.1.7 District-wise Area, Production and Productivity of total *Kharif* Rice (Irrigated &Unirrigated) during last five Years (2012-13 to 2016-17).

(Area in '00 ha, Prod. In '00T yield in Kg/ha)

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	1078	2126	1762	1128	2640	2340	2324	6094	2622
2	Anand	944	2389	1266	1138	2959	2600	2204	6172	2800
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	96	141	1407	113	157	1389	134	294	2212
5	Dahod	318	358	1250	388	346	892	433	226	792
6	Dang	138	218	789	168	432	2571	0	0	0
7	Gandhinagar	35	81	2000	100	235	2350	168	384	2277
8	Kheda	817	1945	1977	1088	2529	2324	1968	5052	2566
9	Mehsana	14	32	1167	50	100	2000	136	360	2651
10	Narmada	116	128	1496	99	81	818	12	30	2511
11	Navsari	513	1282	2519	675	1622	2403	766	2098	2740
12	Panchmahal	673	1189	1538	810	1227	1515	408	440	1013
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	37	82	1592	17	36	2118	63	167	2676
15	Surat	397	841	2013	459	933	2033	590	1528	2591
16	Tapi	458	1194	2632	557	1451	2605	576	1650	2862
17	Vadodara	446	632	1500	380	507	1334	416	782	1882
18	Valsad	638	1439	2416	701	1469	2096	372	924	2479
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	2	4	775	2	4	2000	0	0	0
27	Arvalli	0	0	0	0	0	0	0	0	0
28	Dev. Dwarka	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	0	0	0	0	0	0	534	894	1677
32	Chhotaudepur	0	0	0	0	0	0	166	414	2511
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		6720	14081	3879	1940	16726	3913	2124	16713	1938

Source of Est. Data: Director of Agriculture, Gujarat State, Gandhinagar, 2017-18

Table-4.1.7 District-wise Area, Production and Productivity of total *Kharif* Rice (Irrigated & Unirrigated) during last five Years (2012-13 to 2016-17) (Continue...)

(Area in '00 ha, Prod. In '00T yield in Kg/ha)

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	2158	5608	2598	2242	5850	2610	1786	4463	2153
2	Anand	2170	6004	2768	2186	6088	2784	1728	4722	2183
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	80	166	2084	106	230	2164	106	197	1827
5	Dahod	406	112	684	419	169	739	393	242	902
6	Dang	0	0	0	0	0	0	61	130	415
7	Gandhinagar	216	446	2054	192	414	2152	143	312	1933
8	Kheda	2008	4994	2487	1988	5024	2526	1574	3909	2251
9	Mehsana	142	341	2403	139	350	2524	97	237	1950
10	Narmada	0	0	0	6	16	2511	47	51	1595
11	Navsari	460	1256	2727	614	1678	2735	605	1588	2621
12	Panchmahal	442	463	632	425	451	910	552	754	1105
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	72	228	3141	68	198	2926	52	142	2370
15	Surat	716	1712	2390	654	1620	2480	563	1326	2269
16	Tapi	626	1502	2398	602	1576	2620	564	1475	2620
17	Vadodara	480	850	1770	448	816	1822	434	718	1652
18	Valsad	1230	2980	2423	802	1952	2436	748	1752	2374
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	14	34	2498	6	16	2498	6	15	1849
27	Arvalli	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
28	Dev. Dwarka	0	0	0	0	0	0	0	0	0
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	528	922	1744	530	908	1710	424	726	1710
32	Chhotaudepur	110	274	2498	138	344	2506	110	275	2505
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		7411	15844	1771	7521	16278	1863	7567	16183	1888

Source of Est. Data: Director of Agriculture, Gujarat State, Gandhinagar, 2017-18

Table-4.1.8 District-wise Area, Production and Productivity of Summer Rice during last five Years (2012-13 to 2016-17).

(Area in '00 ha, Prod. In'00T Yield in Kg/ha)

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	47	131	2773	38	123	3275	85	307	3601
2	Anand	7	22	3063	9	30	3188	5	17	3210
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	21	63	3063	14	46	3188	17	54	3210
5	Dahod	0	0	0	0	0	0	0	0	0
6	Dang	0	0	0	0	0	0	0	0	0
7	Gandhinagar	0	0	0	0	0	3188	0	0	3210
8	Kheda	26	83	3180	45	134	2948	35	92	2620
9	Mehsana	0	0	0	0	0	0	0	1	3210
10	Narmada	1	1	3063	0	1	3188	0	0	0
11	Navsari	83	269	3244	117	370	3166	91	300	3297
12	Panchmahal	2	8	3063	7	21	3188	1	3	3210
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	0	0	0	0	0	0	0	0	0
15	Surat	89	269	3021	76	262	3443	56	164	2918
16	Tapi	9	29	3063	13	43	3188	10	33	3210
17	Vadodara	0	0	0	0	0	0	0	0	0
18	Valsad	6	17	2962	11	27	2359	11	31	2830
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	0	0	0	0	0	0	0	0	0
27	Arvalli	0	0	0	0	0	0	0	0	0
28	Dev. Dwarka	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	0	0	0	0	0	0	0	0	0
32	Chhotaudepur	0	0	0	0	0	0	0	0	0
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		291	892	3065	331	1055	3188	312	1003	3210

Source of Est. Data: Director of Agriculture, Gujarat State, Gandhinagar, 2017-18

Table-4.1.8 District-wise Area, Production and Productivity of Summer Rice during last five Years (2012-13 to 2016-17). (Continue...)

(Area in '00 ha, Prod. In'00T Yield in Kg/ha)

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	104	358	3461	94	333	3524	74	250	3327
2	Anand	4	12	3244	5	15	3224	6	19	3186
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	15	40	2689	16	47	2964	17	50	3023
5	Dahod	0	0	0	0	0	0	0	0	0
6	Dang	0	0	0	0	0	0	0	0	0
7	Gandhinagar	0	0	0	0	0	3210	0	0	1922
8	Kheda	37	128	3508	36	110	3074	36	109	3066
9	Mehsana	0	1	3244	0	1	3231	0	1	1937
10	Narmada	0	0	0	0	0	0	0	0	1250
11	Navsari	71	216	3030	81	258	3179	89	283	3183
12	Panchmahal	0	1	3244	1	2	3215	2	7	3184
13	Patan	0	0	0	0	0	0	0	0	0
14	Sabarkantha	0	0	0	0	0	0	0	0	0
15	Surat	63	195	3110	59	180	3019	69	214	3102
16	Tapi	22	73	3244	16	53	3233	14	46	3188
17	Vadodara	0	0	0	0	0	0	0	0	0
18	Valsad	15	50	3244	13	40	3072	11	33	2893
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	0	0	0	0	0	0	0	0	0
27	Arvalli	0	0	0	0	0	0	0	0	0
28	Dev. Dwarka	0	0	0	0	0	0	0	0	0
29	Gir Somnath	0	0	0	0	0	0	0	0	0

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	0	0	0	0	0	0	0	0	0
32	Chhotaudepur	0	0	0	0	0	0	0	0	0
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		331	1075	3244	322	1039	3228	317	1013	3196

Source of Est. Data: Director of Agriculture, Gujarat State, Gandhinagar, 2017-18

Table-4.1.9 District-wise Area, Production and Productivity of total *Kharif* Rice (Irrigated, Unirrigated & summer) during last five Years (2012 to 2017).
(Area in'00 ha, Prod.n.in'00 T Yield in Kg/ha)

NO	DISTRICT	2012-2013			2013-2014			2014-2015		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	1125	2257	2268	1166	2763	2808	2409	6401	3112
2	Anand	951	2411	2165	1147	2989	2894	2209	6189	3005
3	Banaskantha	0	0	0	0	0		0	0	0
4	Bharuch	117	204	2235	127	203	2289	151	348	2711
5	Dahod	318	358	625	388	346	446	433	226	396
6	Dang	138	218	395	168	432	1286	0	0	
7	Gandhinagar	35	81	1000	100	235	2769	168	384	2744
8	Kheda	843	2028	2579	1133	2663	2636	2003	5144	2593
9	Mehsana	14	32	584	50	100	1000	136	361	2931
10	Narmada	117	129	2280	99	82	2003	12	30	1256
11	Navsari	596	1551	2882	792	1992	2785	857	2398	3019
12	Panchmahal	675	1197	2301	817	1248	2352	409	443	2112
13	Patan									
14	Sabarkantha	37	82	796	17	36	1059	63	167	1338
15	Surat	486	1110	2517	535	1195	2738	646	1692	2755
16	Tapi	467	1223	2848	570	1494	2897	586	1683	3036
17	Vadodara	446	632	750	380	507	667	416	782	941
18	Valsad	644	1456	2689	712	1496	2228	383	955	2655
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	2	4	388	2	4	1000	0	0	0
27	Arvalli	0	0	0	0	0	0	0	0	0
28	Dev.Dwarka	0	0	0	0	0	0	0	0	0
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	0	0	0	0	0	0	534	894	839
32	Chhotaudepur	0	0	0	0	0	0	166	414	1256
33	Morbi	0	0	0	0	0	0	0	0	
GUJARAT STATE		7011	14973	1628	8203	17785	1991	11581	28511	2158

Table-4.1.9 District-wise Area, Production and Productivity of total *Kharif* Rice (Irrigated, Unirrigated & summer) during last five Years (2012 to 2017). (Continue...)

(Area in'00 ha, Prodn.in'00 T Yield in Kg/ha)

NO	DISTRICT	2015-2016			2016-2017			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	2262	5966	3030	2336	6183	3067	1860	4713	2740
2	Anand	2174	6016	3006	2191	6103	3004	1734	4741	2685
3	Banaskantha	0	0	0	0	0	0	0	0	0
4	Bharuch	95	206	2387	122	277	2564	123	247	2425
5	Dahod	406	112	342	419	169	370	393	242	451
6	Dang	0	0	0	0	0	0	61	130	415
7	Gandhinagar	216	446	1027	192	414	2681	143	312	1928
8	Kheda	2045	5122	2998	2024	5134	2800	1610	4018	2659
9	Mehsana	142	342	2824	139	351	2878	97	238	1944
10	Narmada	0	0	0	6	16	1256	47	51	1423
11	Navsari	531	1472	2879	695	1936	2957	694	1871	2902
12	Panchmahal	442	464	1938	426	453	2063	554	761	2145
13	Patan			0			0			0
14	Sabarkantha	72	228	1571	68	198	1463	52	142	1185
15	Surat	779	1907	2750	713	1800	2750	632	1540	2686
16	Tapi	648	1575	2821	618	1629	2927	578	1521	2904
17	Vadodara	480	850	885	448	816	911	434	718	826
18	Valsad	1245	3030	2834	815	1992	2754	759	1785	2634
19	Amreli	0	0	0	0	0	0	0	0	0
20	Bhavnagar	0	0	0	0	0	0	0	0	0
21	Jamnagar	0	0	0	0	0	0	0	0	0
22	Junagadh	0	0	0	0	0	0	0	0	0
23	Kachchh	0	0	0	0	0	0	0	0	0
24	Porbandar	0	0	0	0	0	0	0	0	0
25	Rajkot	0	0	0	0	0	0	0	0	0
26	Surendranagar	14	34	1249	6	16	1249	6	15	925
27	Arvalli	0	0	0	0	0	0	0	0	0
28	Dev.Dwarka	0	0	0	0	0	0	0	0	0
29	Gir Somnath	0	0	0	0	0	0	0	0	0
30	Botad	0	0	0	0	0	0	0	0	0
31	Mahisagar	528	922	872	530	908	855	424	726	855
32	Chhotaudepur	110	274	1249	138	344	1253	110	275	1253
33	Morbi	0	0	0	0	0	0	0	0	0
GUJARAT STATE		12189	28966	1050	11886	28739	1145	1145	24046	1060

4.1.1.6 Major Rice Varieties in the State:

In *kharif* season, rice is a dominant crop in middle and south Gujarat as there is no other alternative crop to grow in the *Kyarees*. The farmers out of compulsion grow rice. In the Gujarat state a number of varieties are available in the basket of choice for the farmers. The details of the Traditional Rice varieties released for cultivation in the state with their characteristic features are shown in Table – 4.1.10.

Table-4.1.10 Characteristics of Traditional Rice Varieties Released for Cultivation in the SAUs of Gujarat State.

Sr No.	Cultivar	Year	Research Station	Duration (days)	Yield (kg/ha.)	1000 Grain wt.g	Remarks
A. Traditional Varieties (Pure Line Selection from Local Germplasm)							
1	Sathi-34-36	1955	Dabhoi	100	1008	31.3	Early, tall and drilled. Quality : White & Coarse
2.	Sukhwel-20	1955	Nawagam	100	3130	20.8	Early, semi-dwarf, drilled and transplanted possesses good tillering, short awns and responsive to fertilizer. Quality : White & Medium
3.	Kamod-118	1955	Nawagam	100	3406	18.0	Tall, late, scented golden yellow husk with purple apiculus, highly susceptible to blast and transplanted, white & medium quality.
4.	Pankhali-203	1955	Nawagam	135	3447	17.3	Tall, late, scented with long extra glumes, pale yellow husk, reddish apiculus, highly susceptible to blast and transplanted. Quality : White, Medium & scented
5.	Jirasal-280	1955	Nawagam	135	3915	16.9	Late, Tall and wide adaptability under transplanted conditions. Quality : White & fine

Sr No.	Cultivar	Year	Research Station	Duration (days)	Yield (kg/ha.)	1000 Grain wt.g	Remarks
6.	Kada-176-12	1955	Bulsar	115	2997	21.9	Early, tall, drilled and transplanted. Quality : White & coarse
7.	Zinnia-31	1964	Introduced from Karjat	125	3000	11.4	Tall, medium duration transplanted possesses wide adaptability in South Gujarat. Quality:White,very fine & lustrous.
8.	Nawagam-19	1969	Nawagam	145	4000	24.6	Tall, late, wide adaptability and transplanted, Quality:White, long
9.	Krishna Kamod		Local variety	120-130	1250	20.4	Moderate resistant to WBPH non shattering, aromatic, fine superior quality.
10.	Bhura Rata	1969	Introduced from Maharashtra	115-120	4300	23.4	Tall, Early, salt tolerant and transplanted coarse grain, kernel red.
11.	Sariu-15-14	1959	Dabhoi	110	896	26.2	Early, dwarf, drilled red & coarse grain.
12.	Early Sutarsal-39	1955	Nawagam	115	3385	20.6	Semi dwarf, mid late, tipped awns, rainfed as well as transplanted.
13.	Nawagam-2-6	1965	Nawagam	117	3000	19.3	A derivative of a cross EST-39 x Jirasar-275, tall, mid late transplanted, quality: White & medium.
14.	Kolhapur Scented	1971	Introduced from Maharashtra	109	1500	23.5	Tall, early, suitable for Saurashtra area under drilled conditions. Quality : White, medium & scented.

Sr No.	Cultivar	Year	Research Station	Duration (days)	Yield (kg/ha.)	1000 Grain wt.g	Remarks
15.	Kolamba-42	1964	Introduced from Karjat	145	3136	12.1	Tall,late,good tillering,wide adaptability transplanted, white & fine quality.
16.	Early Kolam-70	1964	Introduced from Igatpuri	115	2500	14.1	Semi dwarf, early, drilled and transplanted. Quality : White & fine

The details about characteristic features of all the Upland (drilled) and Lowland (transplanted) Rice Varieties Recommended for Release till to date are presented in Table-4.1.11.

Table-4.1.11 Characteristic features of all the Upland (drilled) and Low land (transplanted) Rice Varieties Recommended for Release till to date

Sr. No.	Name of Variety	Percentage	Year of Release	DF F	Plant Height (cm.)	Average Yield (t/ha)	Reaction to Biotic/Abiotic Stresses
Up land (Drilled)							
1	GR-5	Selection (NVS-18)	1990	60-65	100-105	1.8-2.5	Negligible pest & disease observed
2	GR-8	Selection (Vyara-55)	2001	45-50	70-90	1.5-2.0	Negligible pest & disease observed
3	GR-9	Sathi-34-36 x CR-544-1-2	2001	70-75	110-120	2.3-2.5	Negligible pest & disease observed
4	AAUDR-1	Sathi-34-36 x Dadri Kolam	2007	60-70	110-120	2.4 – 2.5	Negligible pest & disease observed
5	Ashoka-200 F	Kalinga III x IR-64	2006	55-60	90-95	1.5-2.0	Negligible pest & disease observed
6	Sahbhagi Dhan (CVRC)	IR-55419-4 x Way Rarem	2000	75-80	85-90	3.8-4.5	Moderate Resistance to Major diseases & insects
Lowland Transplanted (Early): (Maturity duration 110-120 days)							
7	GAUR-1	Zinnia-31 x IR-9-60	1973	85-90	105-110	4.0-4.5	Tolerant to major pest and diseases in field conditions.

Sr. No.	Name of Variety	Percentage	Year of Release	DF F	Plant Height (cm.)	Average Yield (t/ha)	Reaction to Biotic/Abiotic Stresses
8	GAUR-2	IR-8 x Kada-176-12	1976	75-80	75-80	5.0-6.0	Susceptible to prevalent diseases & pests.
9	GR-3	Nawagam-19xIR-9-60	1977	75-80	90-90	5.0-5.5	Moderate susceptible to BLB & LF. Susceptible to Blast.
10	GR-4	Zinnia-31 x IR-8-246	1981	80-85	100-105	4.5-5.0	Moderately susceptible to LF, moderate resistant to SB & rice skipper. Susceptible to BL & BLB.
11	GR-6	GR-3 x Pusa-33	1991	90-95	95-105	4.5-5.0	Moderately resistant to SB & BLB in field conditions.
12	GR-7	GR-3 x Bas.370	2001	85-90	105-115	5.0-6.0	Moderately resistant to prevalent pests and diseases in field conditions.
13	GURJARI	Asha x Kranti	1998	90-95	110-115	6.0-8.0	Moderately resistant to resistant against prevalent pests and diseases.
14	IR-66	IR-13240-108-2-2-3 x IR-129-209-2-2-2-1	1992	80-85	100-105	4.2-5.2	Resistant to prevalent pests & diseases.
15	IR-28	IR-833-6-1-1-1/IR-1561-149-1//IR-1737	1975	75-80	90-95	4.0-4.5	Resistant to prevalent pests & diseases.
16	GR-12	GR-7 x IR-64	2005	90-95	115-120	5.0-6.5	Moderately resistant to resistant against prevalent pests & diseases.
17	GAR-2	Gurjari x IET-14714	2011	90-95	110-125	4.5-5.0	Resistant to prevalent pests & diseases.
18	GAR-3	Gurjari x IET-14714	2013	95-100	125-135	5.0-5.5	Resistant to prevalent pests & diseases.

Sr. No.	Name of Variety	Percentage	Year of Release	DF F	Plant Height (cm.)	Average Yield (t/ha)	Reaction to Biotic/Abiotic Stresses
19	Mahisagar	C.N.-540 x I.R.-50	2015	100-110	115-125	5.0-5.5	Resistant to prevalent pests & diseases.
Mid Late: (Maturity duration 120-130 days)							
1.	GAUR-10	Zinnia-31 x IR-9-60	1973	90-95	99-95	5.0-5.3	Tolerant to major pests in field conditions. Susceptible to blast.
2.	GR-11	Zinnia-31 x IR-8-246	1977	100-105	110-115	5.5-6.0	Susceptible to prevalent diseases & moderately
3.	SLR-51214	Vijaya x PTB-21	1983	100-105	90-95	4.5-5.0	Moderately resistant to prevalent pests & diseases. Tolerant to salt.
4.	CR-138-928	Jaya x TKM-6	1983	95-100	100-105	4.0-4.5	Moderately resistant to prevalent pests & diseases in field conditions.
5.	DANDI	PNL-2 x IET-8320	2001	100-105	115-125	4.5-5.0	Moderately resistant to prevalent pests & diseases in field conditions. Tolerant to soil stresses viz. salinity & alkalinity.
6.	JAYA	T(N)-1 x T-14	1970	100-105	105-110	5.0-5.5	Moderately resistant to prevalent pests & diseases.
7.	IR-22	IR-8 x Taduka	1975	105-110	85-90	5.0-5.5	Moderately resistant to prevalent pests & diseases.
8.	GAR-13	GR-11 x IET-14726	2009	100-105	125-130	5.5-6.5	Multiple Resistant to prevalent pests & diseases.
9.	GAR-1 (Aromatic)	Narmada x IET-14708	2010	95-100	120-125	5.0-6.0	Multiple Resistant
10	GAR-14 (Aromatic)	GR-7 x Mahisugandh /2-1	2018	105-108	105-110	5.0-6.0	Moderately Resistant to BLB, ShR, Stem borer & leaf folder
Late Varieties: (Maturity duration 130-140 days)							

Sr. No.	Name of Variety	Percentage	Year of Release	DF F	Plant Height (cm.)	Average Yield (t/ha)	Reaction to Biotic/Abiotic Stresses
11.	GAUR-100	Zinnia-31 x IR-8-246	1973	95-100	95-100	5.0-5.5	Tolerant to major pests in field conditions. Susceptible to blast & false smut.
12.	GR-101	IR-8 x Pankhali-203	1984	105-110	100-105	4.0-5.0	Moderately resistant to prevalent pests & diseases.
13.	GR-102	IR-8 x Pankhali-203	1987	110-115	110-115	4.0-5.0	Moderately resistant to prevalent pests & diseases.
14.	GR-103	GR-11 x Mahsuri	1991	95-100	75-95	5.5-6.5	Moderately resistant to prevalent pests & resistant to blast in field conditions.
15.	GR-104	GR-101 x Bas. 370	2002	105-110	120-130	4.0-5.0	Moderately resistant to prevalent pests & diseases. In field conditions.
16.	Narmada	T(N)-1 x Bas.370	1991	105-115	110-125	4.0-5.0	Resistant to Moderately to prevalent diseases & pests.
17.	Mahsuri	T-65 x ME-80-2	1968	110-115	110-125	4.5-5.0	Moderately resistant to prevalent pests & diseases in field conditions.
18.	GR-4	Zinnia-31 x IR-8-246	1981	80-85	100-105	4.5-5.0	Moderately susceptible to LF, moderate resistant to SB & rice skipper. Susceptible to BL & BLB.
19.	GR-12	GR- 7 x IR-64	2005	90-95	115-120	5.0-6.5	Moderately resistant to resistant against prevalent pests & diseases.

Table-4.1.12 Varieties Recommended for Release by Navsari Agricultural

University

Sr No	Name of Variety	Cross	Year of Release	DFF	Plant height	Yield Potential kg/ha	Characteristics
1	NAUR 1	GR 4 x IET 1750	2007	90-95	120-125	5500-7000	Suited to all transplanted rice growing area of Gujarat. Long slender grain variety resistant to Neck & Leaf blast, false smut and WBPH
2	GNR 2	GR 103 x Pokkali	2010	95-100	100-110	5000-5200	Medium slender grain variety recommended for salt affected South Gujarat Heavy Rainfall Zone (AES-IV). Resistant to BLB ,false smut, stem borer and BPH
3	GNR 3	IR 28 x GR 4	2012	90-95	120-125	5500-6500	High yielding long bold grain variety suitable for poha making. Resistant to BLB and moderately resistant to sheath rot and grain discoloration
4	GNR 4	NAUR 1 x Lal Kada	2013	105-110	95-100	3500-4500	High iron and dietary fibre with good zinc content high yielding medium slender grain variety
5	Purna	Annada x RR 151-3	2014	62-64	120-125	2500-3000	High yielding good grain quality upland drilled rice variety. Recommended for rainfed upland rice growing region of South Gujarat.
6.	GNR-5	Jaya x GR-6	2016	100-105	120-125	5500-6000	Recommended for Salt affected areas of Gujarat, Long Bold grain, Moderately resistant to diseases and pest.
7.	GNR-6	IR 28 x NAUR 1	2016	72-75	100-110	4000-4500	Suitable for Rainfed transplanted rice growing region of South Gujarat, Long slender grain, early maturing and moderately resistant of disease and pest
8.	GNR-7	NVSR-MS1 x 12SP10 5	2016	80-85	115-120	5500-6000	Shrot slender grain, high yielding, suitable for transplanted rice growing region of Gujarat state,

Sr No	Name of Variety	Cross	Year of Release	DFP	Plant height	Yield Potential kg/ha	Characteristics
							Moderately resistant to BLB, Sheath rot and stem borer.
9.	GR-15	GR-103 x GR-11	2017	100-105	125-130	5500-6000	Long bold grain, high zinc content in grain, suitable for Transplanted rice growing region of Gujarat state
10.	GNRH-2	Bhura rata x NAUR-1	2018	90-95	125-130	5500-6500	Medium slender grain, high yielding, suitable for Transplanted rice growing region of Gujarat state

As per the results / observations made during the Kharif-2017 Production Oriented Survey undertaken in 57 villages of 31 talukas distributed in 10 districts the widely prevalent traditional varieties, high yielding non hybrid and hybrid rice varieties are depicted in Table-4.1.13.

Table-4.1.13 Widely Prevalent Rice Varieties Cultivated in the State
During Kharif - 2017

District	Varieties
Ahmedabad	Gurjari, GAR-13, GR-101, Mahisagar, Sonam, Surya Moti and Nath Pauha
Anand	GAR-13, Sonam, Moti, Gurjari, Daftri Om Sriram 125 and MC-13
Bharuch	Gurjari, GNR-3 and GAR-13
Dang	Jaya, 25 P 25 and US 312
Kheda	Gurjari, GAR-13, GR-11, Mahsuri, Surya moti, Moti-gold and Sonam
Mehsana	Moti gold, GAR-13 and Surya moti
Navsari	US-312, US-807, Gurjari, GNR-3, Masuri, MC-13 and Nath Pauha
Panchmahals	Surya moti, Moti gold and Jaya
Surat	Gurjari, Jaya, Surya Moti and Nath Pauha
Tapi	Excel-708, Dhanya-748, 25 P 25, Jaya and Gurjari
Valsad	PA-6201 and Kaveri
Vadodara	GAR-13, Sonam, Dhan Versa, Surya moti, Pioneer Hybrid and Moti Gold

4.1.1.7 Input Management:

The seed replacement rate is very low as **35%** in rice crop may be attained up to a desired level of **40 %**. The requirement of major inputs like seed, fertilizer and pesticide for

Rice crop is presented below.

4.1.1.7.1 Seed:

The area under rice is about 10 per cent of total cultivable area. At present the seed replacement ratio (SRR) of rice is **33** per cent. Thus, the scope of enhancing the SRR is feasible in future to enhance the productivity of self pollinated crops like Rice in the state especially through **Seed Village** concept or **Producers (farmers) Participatory Seed Production Program**.

Seed Requirement and Planning:

The MRRS, Nawagam produced breeder seed of various promising high yielding varieties as per the State and National indent as given in Table-4.1.14

Table-4.1.14 Breeder Seed production and availability at Main Rice Research Station, Anand Agricultural University, Nawagam (2016-17 to 2019-20)

Sr. No.	Variety/ Parental line	Production (kg)			
		2016-17	2017-18	2018-19	2019-20
1	GR-3	1010	375	500	550
2	GR-4	1100	900	600	800
3	GR-7	1200	900	500	800
4	Gurjari	9400	8000	7000	6000
5	Jaya	3300	4000	2900	2050
6	GR-11	5000	1950	1000	2508
7	Masuri	720	852	575	600
8	IR-28	350	300	250	400
9	GAR-13	13000	11000	8000	5000
10	GAR-1	60	100	130	100
11	GR-12	210	200	150	100
12	Dandi	270	50	30	25
13	NAUR-1	350	550	600	650
14	GNR-2	150	150	200	200
15	GNR-3	1550	2150	2500	3000
16	GNR-4	250	450	500	500
17	Total	37920	31927	25435	23283

The Projected (year wise) Targeted Area (ha.) and Targeted Seed Replacement Rate (SRR) based on Seed Rate (kg/ha) and Projected Seed requirement of Rice Crop (Breeder, Foundation & Certified Seed) during 2017-18 to 2019-20 for Gujarat State is shown in **Table-4.1.15** and **Table-4.1.16 (Breeder Seed)**, **4.1.17(Foundation Seed)**, **4.1.18 (Certified Seed)**, (Generally from one bag (25 kg. packing) of breeder seed 80 bags of foundation seed (each 25 kg packing) can be produced.

Similarly, at the same rate from one bag (25 kg. packing) of foundation seed 80 bags of certified seed (each 25 kg. packing) can be produced).

Table-4.1.15 Projected (year wise) Targeted Area (ha) and Targeted Seed Replacement Rate (SRR) Based on Seed Rate (kg/ha) during 2017-18 to 2019-20 for Gujarat State

Sr. No.	Districts	Year-wise Targeted Area in ha			Seed Rate kg/ha	Targeted Seed Replacement Rate (SRR) (%)		
		1 st year	2 nd year	3 rd year		1 st year	2 nd year	3 rd year
1	Ahmedabad	178600	187530	191281	30	44	46	48
2	Kheda	172840	181482	185112	30	44	46	48
3	Anand	10580	11109	11331	30	44	46	48
4	Surat	39280	41244	42069	30	44	46	48
5	Panchmahal	6120	6426	6555	30	44	46	48
6	Navsari	14220	14931	15230	30	44	46	48
7	Valsad	157380	165249	168554	30	44	46	48
8	Vadodara	9620	10101	10303	30	44	46	48
9	Dahod	4660	4893	4991	30	44	46	48
10	Tapi	60560	63588	64860	30	44	46	48
11	Dang	55160	57918	59076	30	44	46	48
12	Narmada	5124	5380.2	5488	30	44	46	48
13	Bharuch	56320	59136	60319	30	44	46	48
14	Gandhinagar	56380	59199	60383	30	44	46	48
15	Sabarkantha	43400	45570	46481	30	44	46	48
16	Mehsana	74860	78603	80175	30	44	46	48
17	Mahisagar	480	504	514	30	44	46	48
18	Chhotaudepur	31840	33432	34101	30	44	46	48
19	Surendranagar	8280	8694	8868	30	44	46	48
	Gujarat State	585820	615111	627413	30	44	46	48

**Table-4.1.16 Projected Seed Requirement of Breeder Seed of Rice Crop
during 2017-18 to 2019-20 for Gujarat State**

Sr. No.	Districts	Requirement of Breeder Seed, Qtl		
		1 st year	2 nd year	3 rd year
1	Ahmedabad	2.5	3.7	5.5
3	Anand	0.1	0.2	0.3
4	Surat	0.6	0.8	1.2
5	Panchmahal	0.1	0.1	0.2
6	Navsari	0.2	0.3	0.4
7	Valsad	2.2	3.3	4.9
8	Vadodara	0.1	0.2	0.3
9	Dahod	0.1	0.1	0.1
10	Tapi	0.9	1.3	1.9
11	Dang	0.8	1.1	1.7
12	Narmada	0.1	0.1	0.2
13	Bharuch	0.8	1.2	1.7
14	Gandhinagar	0.8	1.2	1.7
15	Sabarkantha	0.6	0.9	1.3
16	Mehsana	1.1	1.5	2.3
17	Mahisagar	0.1	0.1	0.2
18	Chhotaudepur	0.4	0.7	1.0
19	Surendranagar	0.1	0.2	0.3
Gujarat State		14.0	20.5	30.7

**Table-4.1.17 Projected Seed Requirement of Foundation Seed of Rice Crop
during 2017-18 to 2019-20 for Gujarat State**

Sr. No.	Districts	Requirement of Foundation Seed, Qtl		
		1 st year	2 nd year	3 rd year
1	Ahmedabad	200.9	295.4	441.9
2	Kheda	194.4	285.8	427.6
3	Anand	11.9	17.5	26.2
4	Surat	44.2	65.0	97.2
5	Panchmahal	6.9	10.1	15.1
6	Navsari	16.0	23.5	35.2
7	Valsad	177.1	260.3	389.4
8	Vadodara	10.8	15.9	23.8

Sr. No.	Districts	Requirement of Foundation Seed, Qtl		
		1 st year	2 nd year	3 rd year
9	Dahod	5.2	7.7	11.5
10	Tapi	68.1	100.2	149.8
11	Dang	62.1	91.2	136.5
12	Narmada	5.8	8.5	12.7
13	Bharuch	63.4	93.1	139.3
14	Gandhinagar	63.4	93.2	139.5
15	Sabarkantha	48.8	71.8	107.4
16	Mehsana	84.2	123.8	185.2
17	Mahisagar	0.5	0.8	1.2
18	Chhotaudepur	35.8	52.7	78.8
19	Surendranagar	9.3	13.7	20.5
	Gujarat State	1108.9	1630.1	2438.6

Table-4.1.18 Projected Seed Requirement of Certified Seed of Rice Crop during 2017-18 to 2019-20 for Gujarat State.

Sr. No.	Districts	Requirement of Certified Seed, Qtl		
		1 st year	2 nd year	3 rd year
1	Ahmedabad	16074.0	23628.8	35348.7
2	Kheda	15555.6	22866.7	34208.7
3	Anand	952.2	1399.7	2094.0
4	Surat	3535.2	5196.7	7774.4
5	Panchmahal	550.8	809.7	1211.4
6	Navsari	1279.8	1881.3	2814.5
7	Valsad	14164.2	20821.4	31148.8
8	Vadodara	865.8	1272.7	1904.0
9	Dahod	419.4	616.5	922.3
10	Tapi	5450.4	8012.1	11986.1
11	Dang	4964.4	7297.7	10917.2
12	Narmada	461.2	677.9	1014.2
13	Bharuch	5068.8	7451.1	11147.0
14	Gandhinagar	5074.2	7459.1	11158.8
15	Sabarkantha	3906.0	5741.8	8589.7
16	Mehsana	6737.4	9904.0	14816.3
17	Mahisagar	43.2	63.5	95.0
18	Chhotaudepur	2865.6	4212.4	6301.9
19	Surendranagar	745.2	1095.4	1638.8
	Gujarat State	88713.4	130408.6	195091.7

4.1.1.7.2 Fertilizers:

The District-wise urea fertilizer requirement for the rice crop 2017-18 to 2019-20 for Gujarat State is indicated in Table-4.1.19.

Table-4.1.19 Fertilizer Requirement for the Rice Crop

Sr. No	Districts	Area (00'ha)	Urea (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
IRRIGATED KHARIF						
1	Ahmedabad	1071	23348	23348	24590	25332
2	Kheda	794	17309	17309	23588	21451
3	Anand	944	20579	20579	24808	24024
4	Surat	279	6082	6082	7543	6431
5	Panchmahal	449	9788	9788	10944	5319
6	Navsari	333	7259	7259	10660	8349
7	Valsad	163	3553	3553	4055	4055
8	Vadodara	194	4229	4229	4513	4534
9	Dahod	96	2093	2093	2834	894
10	Tapi	219	4774	4774	6322	6278
11	Dang	0	0	0	0	0
12	Narmada	31	676	676	283	131
13	Bharuch	52	1134	1134	1482	1461
14	Gandhinagar	30	654	654	2180	1831
15	Sabarkantha	29	632	632	283	680
16	Mehsana	14	305	305	1090	1482
17	Mahisagar		0	0	0	5821
18	Chhotaudepur		0	0	0	1809
19	Surendranagar	0	0	0	0	0
Gujarat State		4698	101947	101947	102416	125176
Unirrigated Kharif /Upland						
1	Ahmedabad	1078	23500	23500	24590	50663
2	Kheda	817	20579	20579	24808	48047
3	Anand	944	2093	2093	2463	2921
4	Surat	397	6932	6932	8458	9439
5	Panchmahal	673	3008	3008	3662	0
6	Navsari	513	763	763	2180	3662
7	Valsad	638	17811	17811	23718	42902
8	Vadodara	446	305	305	1090	2965
9	Dahod	318	2529	2529	2158	262
10	Tapi	458	11183	11183	14715	16699
11	Dang	138	14671	14671	17658	8894
12	Narmada	116	807	807	371	1356
13	Bharuch	96	8655	8655	10006	12862
14	Gandhinagar	35	9984	9984	12143	12557
15	Sabarkantha	37	9723	9723	8284	9069
16	Mehsana	14	13908	13908	15282	8110
17	Mahisagar	0	44	44	44	0
18	Chhotaudepur	0	0	0	0	11641
19	Surendranagar	2	0	0	0	3619

Sr. No	Districts	Area (00'ha)	Urea (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
Gujarat State		6720	17085	17085	306966	84562
Summer Rice						
1	Ahmedabad	47	1024.6	1024.6	828.4	1853
2	Kheda	26	566.8	566.8	981	763
3	Anand	7	152.6	152.6	196.2	109
4	Surat	89	1940.2	1940.2	1656.8	1220.8
5	Panchmahal	2	43.6	43.6	152.6	21.8
6	Navsari	83	1809.4	1809.4	2550.6	1983.8
7	Valsad	6	130.8	130.8	239.8	239.8
8	Vadodara	0	0	0	0	0
9	Dahod	0	0	0	0	0
10	Tapi	9	196.2	196.2	283.4	218
11	Dang	0	0	0	0	0
12	Narmada	1	21.8	21.8	0	0
13	Bharuch	21	457.8	457.8	0	0
14	Gandhinagar	0	0	0	0	0
15	Sabarkantha	0	0	0	0	0
16	Mehsana	0	0	0	0	0
17	Mahisagar	9	196.2	196.2	283.4	218
18	Chhotaudepur	0	0	0	0	0
19	Surendranagar	0	0	0	0	0
Gujarat State		300	63634	6540	6627	7107
TOTAL ALL GUJARAT STATE		12009	246104	131915	422353	223734

District-wise Di-AmoniumPhosphate (DAP) fertilizer requirement for the rice crop **2017-18 to 2019-20** for Gujarat State is given in Table-4.1.20.

Table-4.1.20 District-wise Di-Amonium Phosphate (DAP) Fertilizer Requirement

Sr. No	Districts	Area (00'ha)	DAP (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
IRRIGATED KHARIF						
1	Ahmedabad	1071	5783	5783	6091	6275
2	Kheda	794	4288	4288	5843	5314
3	Anand	944	5098	5098	6145	5951

Sr. No	Districts	Area (00'ha)	DAP (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
4	Surat	279	1507	1507	1868	1593
5	Panchmahal	449	2425	2425	2711	1318
6	Navsari	333	1798	1798	2641	2068
7	Valsad	163	880	880	1004	1004
8	Vadodara	194	1048	1048	1118	1123
9	Dahod	96	518	518	702	221
10	Tapi	219	1183	1183	1566	1555
11	Dang	0	0	0	0	0
12	Narmada	31	167	167	70	32
13	Bharuch	52	281	281	367	362
14	Gandhinagar	30	162	162	540	454
15	Sabarkantha	29	157	157	70	168
16	Mehsana	14	76	76	270	367
17	Mahisagar		0	0	0	1442
18	Chhotaudepur		0	0	0	448
19	Surendranagar	0	0	0	0	0
Gujarat State		4698	25369	25369	31007	29696
Unirrigated Kharif /Upland						
1	Ahmedabad	1078	6091	6091	12550	11653
2	Kheda	817	6145	6145	11902	11718
3	Anand	944	610	610	724	432
4	Surat	397	2095	2095	2338	2192
5	Panchmahal	673	907	907	0	0
6	Navsari	513	540	540	907	1166
7	Valsad	638	5875	5875	10627	10843
8	Vadodara	446	270	270	734	767
9	Dahod	318	535	535	65	0
10	Tapi	458	3645	3645	4136	2484
11	Dang	138	4374	4374	2203	2387
12	Narmada	116	92	92	336	389
13	Bharuch	96	2479	2479	3186	3866
14	Gandhinagar	35	3008	3008	3110	3380
15	Sabarkantha	37	2052	2052	2246	2592
16	Mehsana	14	3785	3785	2009	6642
17	Mahisagar	0	11	11	0	76
18	Chhotaudepur	0	0	0	2884	2851
19	Surendranagar	2	0	0	896	594
Gujarat State		6720	17085	20947	20947	21130
Summer Rice						
1	Ahmedabad	47	253.8	253.8	253.8	205.2
2	Kheda	26	140.4	140.4	140.4	243

Sr. No	Districts	Area (00'ha)	DAP (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
3	Anand	7	37.8	37.8	37.8	48.6
4	Surat	89	480.6	480.6	480.6	410.4
5	Panchmahal	2	10.8	10.8	10.8	37.8
6	Navsari	83	448.2	448.2	448.2	631.8
7	Valsad	6	32.4	32.4	32.4	59.4
8	Vadodara	0	0	0	0	0
9	Dahod	0	0	0	0	0
10	Tapi	9	48.6	48.6	48.6	70.2
11	Dang	0	0	0	0	0
12	Narmada	1	5.4	5.4	5.4	0
13	Bharuch	21	113.4	113.4	113.4	0
14	Gandhinagar	0	0	0	0	0
15	Sabarkantha	0	0	0	0	0
16	Mehsana	0	0	0	0	0
17	Mahisagar	0	0	0	0	0
Gujarat State		291	4698	291	1571	1571
TOTAL ALL GUJARAT STATE		6720	47152	46607	53525	52397

District-wise single super phosphate fertilizer requirement for the rice crop 2017-18 to 2019-20 for Gujarat State is given in Table-4.1.21.

Table-4.1.21 District-wise Single Super Phosphate Fertilizer Requirement

Sr. No	Districts	Area (00'ha)	SSP (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
IRRIGATED KHARIF						
1	Ahmedabad	1071	16708	16708	17597	18127
2	Kheda	794	12386	12386	16879	15350
3	Anand	944	14726	14726	17753	17191
4	Surat	279	4352	4352	5398	4602
5	Panchmahal	449	7004	7004	7831	3806
6	Navsari	333	5195	5195	7628	5975
7	Valsad	163	2543	2543	2902	2902
8	Vadodara	194	3026	3026	3229	3245
9	Dahod	96	1498	1498	2028	640
10	Tapi	219	3416	3416	4524	4493
11	Dang	0	0	0	0	0

Sr. No	Districts	Area (00'ha)	SSP (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
12	Narmada	31	484	484	203	94
13	Bharuch	52	811	811	1061	1045
14	Gandhinagar	30	468	468	1560	1310
15	Sabarkantha	29	452	452	203	487
16	Mehsana	14	218	218	780	1061
17	Mahisagar		0	0	0	4165
18	Chhotaudepur		0	0	0	1295
19	Surendranagar	0	0	0	0	0
Gujarat State		4698	7328	73289	89575	85788
Unirrigated Kharif /Upland						
1	Ahmedabad	1078	17597	17597	17597	36254
2	Kheda	817	17753	17753	17753	34382
3	Anand	944	1763	1763	1763	2090
4	Surat	397	6053	6053	6053	6755
5	Panchmahal	673	2621	2621	2621	0
6	Navsari	513	1560	1560	1560	2621
7	Valsad	638	16973	16973	16973	30701
8	Vadodara	446	780	780	780	2122
9	Dahod	318	1544	1544	1544	187
10	Tapi	458	10530	10530	10530	11950
11	Dang	138	12636	12636	12636	6365
12	Narmada	116	265	265	265	970
13	Bharuch	96	7160	7160	7160	9204
14	Gandhinagar	35	8689	8689	8689	8986
15	Sabarkantha	37	5928	5928	5928	6490
16	Mehsana	14	10936	10936	10936	5803
17	Mahisagar	0	31	31	31	0
18	Chhotaudepur	0	0	0	0	8330
19	Surendranagar	2	0	0	0	2590
Gujarat State		6720	60512	60512	60512	60512
Summer Rice						
1	Ahmedabad	47	733	733	593	1326
2	Kheda	26	406	406	702	546
3	Anand	7	109	109	140	78
4	Surat	89	1388	1388	1186	874
5	Panchmahal	2	31	31	109	16
6	Navsari	83	1295	1295	1825	1420
7	Valsad	6	94	94	172	172
8	Vadodara	0	0	0	0	0
9	Dahod	0	0	0	0	0
10	Tapi	9	140	140	203	156
11	Dang	0	0	0	0	0
12	Narmada	1	16	16	0	0

Sr. No	Districts	Area (00'ha)	SSP (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
13	Bharuch	21	328	328	0	0
14	Gandhinagar	0	0	0	0	0
15	Sabarkantha	0	0	0	0	0
16	Mehsana	0	0	0	0	0
17	Mahisagar	0	0	0	0	0
18	Chhotaudepur	0	0	0	0	0
19	Surendranagar	0	0	0	0	0
Gujarat State		291	4698	291	4540	4930
TOTAL ALL GUJARAT STATE		6720	138499	134092	154627	151230

District-wise ammonium sulphate fertilizer requirement for the rice crop 2017-18 to 2019-20 for Gujarat State is shown in Table-4.1.22.

Table-4.1.22 District-wise Ammonium Sulphate Fertilizer Requirement

Sr. No.	Districts	Area (00'ha)	AS (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
IRRIGATED KHARIF						
1	Ahmedabad	1071	16708	16708	17597	18127
2	Kheda	794	12386	12386	16879	15350
3	Anand	944	14726	14726	17753	17191
4	Surat	279	4352	4352	5398	4602
5	Panchmahal	449	7004	7004	7831	3806
6	Navsari	333	5195	5195	7628	5975
7	Valsad	163	2543	2543	2902	2902
8	Vadodara	194	3026	3026	3229	3245
9	Dahod	96	1498	1498	2028	640
10	Tapi	219	3416	3416	4524	4493
11	Dang	0	0	0	0	0
12	Narmada	31	484	484	203	94
13	Bharuch	52	811	811	1061	1045
14	Gandhinagar	30	468	468	1560	1310
15	Sabarkantha	29	452	452	203	487
16	Mehsana	14	218	218	780	1061
17	Mahisagar	0	0	0	0	4165
18	Chhotaudepur	0	0	0	0	1295
19	Surendranagar	0	0	0	0	0
Gujarat State		4698	73289	73289	89575	85788
Unirrigated Kharif /Upland						
1	Ahmedabad	1078	54708	17597	54708	112714
2	Kheda	817	55193	17753	55193	106894
3	Anand	944	5481	1763	5481	6499

Sr. No.	Districts	Area (00'ha)	AS (T)	Requirement of Fertilizer,(T)		
				1 st year	2 nd year	3 rd year
4	Surat	397	18818	6053	18818	21001
5	Panchmahal	673	8148	2621	8148	0
6	Navsari	513	4850	1560	4850	8148
7	Valsad	638	52768	16973	52768	95448
8	Vadodara	446	2425	780	2425	6596
9	Dahod	318	4802	1544	4802	582
10	Tapi	458	32738	10530	32738	37151
11	Dang	138	39285	12636	39285	19788
12	Narmada	116	825	265	825	3017
13	Bharuch	96	22262	7160	22262	28615
14	Gandhinagar	35	27015	8689	27015	27936
15	Sabarkantha	37	18430	5928	18430	20176
16	Mehsana	14	33999	10936	33999	18042
17	Mahisagar	0	97	31	97	0
18	Chhotaudepur	0	0	0	0	25899
19	Surendranagar	2	0	0	0	8051
Gujarat State		6720	471416	471416	60512	471416
Summer Rice						
1	Ahmedabad	47	2280	2280	1843	4123
2	Kheda	26	1261	1261	2183	1698
3	Anand	7	340	340	437	243
4	Surat	89	4317	4317	3686	2716
5	Panchmahal	2	97	97	340	49
6	Navsari	83	4026	4026	5675	4414
7	Valsad	6	291	291	534	534
8	Vadodara	0	0	0	0	0
9	Dahod	0	0	0	0	0
10	Tapi	9	437	437	631	485
11	Dang	0	0	0	0	0
12	Narmada	1	49	49	0	0
13	Bharuch	21	1019	1019	0	0
14	Gandhinagar	0	0	0	0	0
15	Sabarkantha	0	0	0	0	0
16	Mehsana	0	0	0	0	0
17	Mahisagar	0	0	0	0	0
18	Chhotaudepur	0	0	0	0	0
19	Surendranagar	0	0	0	0	0
Gujarat State		291	14114	14114	15326	14259
TOTAL ALL GUJARAT STATE		11709	558819	558819	165413	571463

4.1.1.7.3 Pesticides:

District-wise **Fungicides & Pesticides** requirement for the rice crop during 13th Five year plan **2018-2022** for Gujarat State is detailed in Table-4.1.23. For controlling seed borne diseases, the fungicidal treatment of Amisan is ideal for dry seed treatment. Likewise for effective control of Bacterial Leaf Blight (BLB), the wet seed treatment of Streptocyclin is very important. The major menacing insects in Rice crop are WBPH, Stem Borer and Leaf Folder. Carbofuran 3G and Cartep 4G are excellent granular insecticides for their effective control.

Table-4.1.23 District-wise Yearly Requirement of Pesticides/Fungicide of Rice Crop

Sr. No.	Districts	Area (00'ha)	Seed Rate kg/ha	Total Seed Quantity (T)	Fungicides/Pesticides Quantity Required, T			
					Seed Treatment		Pesticides	
					Carben dizime 50% w.p.	Strepto cyclin	Cartep 4G	Carbofuran 3G
IRRIGATED KHARIF								
1	Ahmedabad	1071	30	3213	9639	643	2142	3213
2	Kheda	794	30	2382	7146	476	1588	2382
3	Anand	944	30	2832	8496	566	1888	2832
4	Surat	279	30	837	2511	167	558	837
5	Panchmahal	449	30	1347	4041	269	898	1347
6	Navsari	333	30	999	2997	200	666	999
7	Valsad	163	30	489	1467	98	326	489
8	Vadodara	194	30	582	1746	116	388	582
9	Dahod	96	30	288	864	58	192	288
10	Tapi	219	30	657	1971	131	438	657
11	Dang	0	30	0	0	0	0	0
12	Narmada	31	30	93	279	19	62	93
13	Bharuch	52	30	156	468	31	104	156
14	Gandhinagar	30	30	90	270	18	60	90
15	Sabarkantha	29	30	87	261	17	58	87
16	Mehsana	14	30	42	126	8	28	42
17	Mahisagar	0	30	0	0	0	0	0
18	Chhotaudepur	0	30	0	0	0	0	0
19	Surendranagar	0	30	0	0	0	0	0
Gujarat State		4698	30	14094	42282	2818.8	9396	14094
Unirrigated Kharif /Upland								
1	Ahmedabad	1078	60	6468	19404	1294	4312	6468
2	Kheda	817	60	5664	16992	1133	3776	5664

Sr. No.	Districts	Area (00'ha)	Seed Rate kg/ha	Total Seed Quantity (T)	Fungicides/Pesticides Quantity Required, T			
					Seed Treatment		Pesticides	
					Carben dizime 50% w.p.	Strepto cyclin	Cartep 4G	Carbofuran 3G
3	Anand	944	60	576	1728	115	384	576
4	Surat	397	60	1908	5724	382	1272	1908
5	Panchmahal	673	60	828	2484	166	552	828
6	Navsari	513	60	210	630	42	140	210
7	Valsad	638	60	4902	14706	980	3268	4902
8	Vadodara	446	60	84	252	17	56	84
9	Dahod	318	60	696	2088	139	464	696
10	Tapi	458	60	3078	9234	616	2052	3078
11	Dang	138	60	4038	12114	808	2692	4038
12	Narmada	116	60	222	666	44	148	222
13	Bharuch	96	60	2382	7146	476	1588	2382
14	Gandhinagar	35	60	2748	8244	550	1832	2748
15	Sabarkantha	37	60	2676	8028	535	1784	2676
16	Mehsana	14	60	3828	11484	766	2552	3828
17	Mahisagar	0	60	12	36	2	8	12
18	Chhotaudepur	0	60	0	0	0	0	0
19	Surendranagar	2	60	0	0	0	0	0
Gujarat State		14081	60	40320	120960	8064	26880	40320
Summer Rice								
1	Ahmedabad	47	30	141	423	28	94	141
2	Kheda	26	30	78	234	16	52	78
3	Anand	7	30	21	63	4	14	21
4	Surat	89	30	267	801	53	178	267
5	Panchmahal	2	30	6	18	1	4	6
6	Navsari	83	30	249	747	50	166	249
7	Valsad	6	30	18	54	4	12	18
8	Vadodara	0	30	0	0	0	0	0
9	Dahod	0	30	0	0	0	0	0
10	Tapi	9	30	27	81	5	18	27
11	Dang	0	30	0	0	0	0	0
12	Narmada	1	30	3	9	1	2	3
13	Bharuch	21	30	63	189	13	42	63
14	Gandhinagar	0	30	0	0	0	0	0
15	Sabarkantha	0	30	0	0	0	0	0
16	Mehsana	0	30	0	0	0	0	0
17	Mahisagar	0	30	0	0	0	0	0
18	Chhotaudepur	0	30	0	0	0	0	0
19	Surendranagar	0	30	0	0	0	0	0
Gujarat State		291	30	873	2619	174.6	582	873
TOTAL ALL GUJARAT STATE		19070	120	55287	165861	11057.4	36858	55287

4.1.1.7.4 Farm Mechanization/Farm Equipments:

The rice transplanter machines of Korean design are (1) Walk type (2) Tractor ride type with the help of rice transplanters small sized (2 to 3 leaf stage) young seedlings (15 to 20 days old) can be raised in plastic trays and can be transplanted in the field with the Rice transplanter machines effectively.

4.1.1.8 Constraints Analysis and Recommended Interventions for Yield Gap

Analysis in Rice:

Rice Yield Gap Analysis:

- The productivity of paddy in Gujarat state is poor i.e. **2612 kg/ha** as compared to national average productivity. More than 71 percent of the rice area is concentrated in medium productivity zone followed by nearly 14.5 percent are in high productivity zone.
- Hence, the **Yield gap I** [The difference between the potential yield (experimental station yield) and the potential farm yield (demonstration yield)] is very vast in Gujarat, indicating there are vast environmental differences between experimental station and demonstration plots in farmer's field.
- **Yield gap II** (the difference between potential farm yield and the actual farm yield and is hypothesized to be caused by biological and socio-economic constraint) of **49 per cent for all the major rice producing areas of Gujarat.**

The region wise constraints for low productivity in different agro climatic regions:

Table-4.1.24 Region-wise Constraints for Low Productivity of Irrigated Rice:

Sr. No.	Region	Constraints
1.	Middle Gujarat	<ul style="list-style-type: none">➤ Late sowing and transplanting due to timely unavailability of canal water.➤ Improper plant stand.➤ Poor water management in canal area.➤ Soil salinity / alkalinity due to high water table.

		➤ Imbalanced / Injudicious application of chemical fertilizers.
2.	South Gujarat	<ul style="list-style-type: none"> ➤ Late sowing of Rice nurseries due to non vapsa conditions during Kharif season. ➤ Difficulty in land preparation after heavy rain fall ➤ Improper plant stand. ➤ Soil salinity / alkalinity due to high water table. ➤ Poor weed management.
	Overall Gujarat	<ul style="list-style-type: none"> ➤ Poor seed replacement and lack of adoption of proper varieties. ➤ Imbalanced / injudicious application of chemical fertilizers. ➤ Low/inadequate use of organic matter and lack of awareness to improve soil health.

Table-4.1.25 District-wise Yield Gap in Gujarat State for the Year 2012-13 to 2016-17

Sr. No	District	Average Productivity of the State*	Average Productivity in FLDs (*)	Yield Gap
1	Ahmedabad	2740	4926	2186
		(56%)	(100%)	(44%)
2	Anand	2685	4898	2213
		(55%)	(100%)	(45%)
3	Bharuch	2425	4542	2117
		(53%)	(100%)	(47%)
4	Dahod	451	3946	3495
		(11%)	(100%)	(89%)
5	Dang	800	2000	1200
		(40%)	(100%)	(60%)
6	Gandhinagar	1928	3600	1672
		(54%)	(100%)	(46%)
7	Kheda	2659	4736	2077
		(56%)	(100%)	(44%)
8	Mehsana	1944	4832	2888
		(40%).	(100%)	(60%)
9	Narmada	1423	3800	2377
		(37%)	100%	(63%)

Sr. No	District	Average Productivity of the State*	Average Productivity in FLDs (*)	Yield Gap
10	Navsari	2902	4670	1768
		(62%)	(100%)	(38%)
11	Panchmahal	2145	4629	2484
		(46%)	(100%)	(54%)
12	Sabarkantha	1185	4964	3779
		(24%)	(100%)	(76%)
13	Surat	2686	4320	1634
		(62%)	(100%)	(38%)
14	Tapi	2904	5059	2155
		(57%)	(100%)	(43%)
15	Vadodara	3826	4808	982
		(79.6%)	(100%)	(20.42%)
16	Valsad	2634	3000	366
		(88%)	(100%)	(12%)
17	Surendranagar	925	2200	1275
		(42%)	(100%)	(58%)
18	Mahisagar	1253	2500	1247
		(29%)	(100%)	(72%)
19	Chhotaudepur	2740	4926	2186
		(50%)	(100%)	(50%)

* indicating as per table 4.1.9 i.e. avg. data of all rice pattern during of 2012-13 to 2016-

Table -4.1.26 Sustainability Issues, Gap Analysis and Strategies to Enhance the Productivity of Rice Crop

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
i	Poor Adoption of wet and dry seed treatment	Seed borne diseases and bacterial leaf blight	To increase awareness and to popularize the wet and dry seed treatment practice.	Educating and motivating farmers on its importance and adoption through demonstrations and trainings.	Entire Rice growing area for control of seed born diseases.	Productivity enhancement possible on sustainable basis.
ii	Improper selection of proper variety as per the maturity duration.	Poor awareness about the certified seed of Improved varieties / promising hybrids	Awareness increase campaign through Shibirs / meetings	Educating and motivating farmer sons its importance and adoption through demonstrations and trainings.	Entire Rice growing areas of Middle and South Gujarat.	Improvement in yield on sustainable basis.

iii	Poor plant stand then the recommended 30 to 33 plants / m ² in favorable irrigated ecosystem	Poor awareness of the recommended 30 to 33 plant population / m ² in favorable irrigated ecosystem	Awareness increase campaign through Shibirs / meetings	Educating and motivating farmer son its importance and adoption through demonstrations and trainings.	Entire Rice growing areas of Middle and South Gujarat.	Improvement in production and productivity
iv	Poor fertilizer management	<ol style="list-style-type: none"> 1. Farmers apply excess fertilizers more than the recommended dose in Rice Kyarees and low or no fertilizer in rainfed Rice 2. Basal fertilizer application and fertilizers split dose 	Application of recommended dose of fertilizers in nursery, in field as basal dose as well as split	Educating and motivating farmers on its importance and adoption through demonstrations and trainings.	Entire Rice growing areas of Middle and South Gujarat.	Improvement in productivity and production and sustainability of soil health.
V	Poor weed management	Chemical and Mechanical control of infesting weed at proper time.	Awareness increase campaign through Shibirs / meetings	Educating and motivating farmer son its importance and adoption through demonstrations and trainings.	Entire rice growing areas of Middle and South Gujarat.	Improvement in productivity and production.

vi	Inadequate / low use of organic manure	Results in over all soil health deterioration in a longer run affecting the productivity and production.	Awareness campaign for production of organic manures in own farms	Farmers field schools, campaigns. Demonstrations and trainings.	Entire Rice growing areas of Middle and South Gujarat.	Improvement in productivity with sustainable soil health
vii	Poor insect and diseases management	Injudicious and improper use of pesticides results in eradication of beneficial and friendly insects.	Awareness campaign and identification of harmful target insect pest and beneficial and friendly insects.	Farmers field schools, campaigns demonstrations and trainings.	Entire Rice growing areas of Middle and South Gujarat.	Conservation of beneficial and friendly insects and environment sustainability.

Table-4.1.27 Bridging the Gaps for Realization of the Vision - Rice Crop

Activity Output Matrix				
Activity	Issues	Mode of Action	Collaborator/Target	Suggestions
Integrated Water Management (IWM)	Irregular water supply through canals leads farmers to use more water, out of proportion and the drainage facility does not commensurate.	Supply of water in the canal as per the crop requirement. Drainage facilities to be created.	Irrigation Department and SAUs have to work together to solve this problem.	Co-operative “Piyat Mandlis” to be constituted.
	Salinity stress mitigation at farmers’ fields	<i>Sesbania</i> Greenmanuring and gypsum use. Salinity tolerant varieties to be used.	Subsidy on gypsum (@ 75 per cent) and its availability be ensured.	Demonstration on greenmanuring and gypsum proposed.

	Water logging and secondary salinization	Facilities to drain excess water to be created. Bio-drainage through tree plantation.	Irrigation Department and SAUs have to work together to solve this problem.	
	Water harvesting and village well recharging	Construction of water harvesting structures near catchment area of drain, panchayati / farmers land.	DDA/concerned departments in consultation with SAUs scientist	Project on water harvesting proposed.
Management of Salinity Stress	Discouraging irrigation with brackish water in drought years which leads to secondary salinization. Harvesting and use of good quality rain water.	Cropping pattern studies and proper irrigation management of Rabi crops.	Dept. of Agriculture / KVK Survey and soil sampling will be done by DDA and KVK. Demonstrations will be laid out by DD in collaboration with	Survey proposed. Demonstrations Proposed in plan.

<p>Resource Conservation</p> <p>Technology:</p> <p>Greenmanuring &Bio-fertilizers</p>	<p>To reduce the use of Chemical nitrogenous fertilizers and subsequent improvement in the soil health.</p>	<p>DDA will ensure the timely availability of Sesbania seed at 75 per cent subsidy.</p> <p>50 per cent area will be covered during the plan period of five years.</p>	<p>DDA Ten per cent area will be covered.</p>	<p>Demonstrations proposed.</p> <p>The Govt. has to give 50 per cent subsidy to purchase Sesbania seed for small and marginal farmers</p>
	<p>Bio-fertilizers</p>	<p>Integration of chemical fertilizers with bio-fertilizers to improve the efficiency of fertilization in a sustainable way.</p>	<p>DDA will ensure the availability of location specific quality bio-fertilizers</p>	<p>Demonstrations proposed under INM, free supply of bio fertilizer to the small and marginal farmers.</p>

Quality Seed production	Quality Rice Seed production	<ol style="list-style-type: none"> 1. Selection of improved varieties at farmers field. 2. Motivating farmers to produce the quality seed of promising variety 3. Seed production at farmers' field with farmers participatory approach. 	DDAs in consultation with KVKs. Seed Village.	Project proposed.
	Wet and dry seed treatment of Rice.	<ol style="list-style-type: none"> 1. Motivating farmers for seed treatment 2. Demonstrations will be laid out by DDA in collaboration with KVK scientist 	DDA's Data for all activities will be presented in the officers workshop	Survey proposed

4.1.1.9 Detailed Action Plan with Costs:

A comprehensive package of extension activities those are very vital for farmer's welfare, increasing their farm income, the over all productivity enhancement, employment generation with an environment friendly and sustainable approach in the Gujarat State is recommended here under

The main ingredients of package are:

- Capacity building of agricultural staff, staff of co-operatives and NGOs, staff of *Panchayati Raj* Institution and skill up-gradation of farmers to enlighten them with the modern technologies and broaden their knowledge base.
- Propagating and transfer of technologies viz; Integrated Nutrient Management (INM) Natural Resources Management (NRM), Integrated Pest Management (IPM), Resource Conservation Technologies (RCTs), Water Management (WM), Post Harvest Management, Women Empowerment, Credit and Marketing, Seed Production, Farm Waste Management, Vermi composting, Farm Mechanization, Organic Farming, Renewable Energy and Integrated Weed Management(IWM).
- Popularizing new technologies and farm practices through Front Line Demonstrations of Improved Varieties and Integrated Nutrient Management (INM) especially to educate the farmers for lesser and lesser use of chemical fertilizers and more and more use of organic fertilizers, green manuring, vermicomposting and Farm Yard Manure (FYM).
- Front Line demonstrations of improved varieties and farmer's participatory seed production.

Projected outcome and growth rate during the plan period:

The proposed activities are as under:

Table-4.1.28 State Level Training Proposed for Capacity Building of Agriculture Staff for Rice Crop

Crop	Training for Agricultural Staff (State Level) (Phy - No, Fin - Rs. in Lakh)							
	1 st year		2 nd year		3 rd year		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	10,032	90.29	10,245	92.21	10,491	94.42	30,768	277
Cooperative & NGOs	5,016	45.14	5,123	46.11	5,245	47.21	15,384	138
PRI Staff & Others	3,011	27.10	3,075	27.68	3,152	28.37	9,238	83
Total	18,059	163	18,443	166	18,888	170	55,390	499

Cost Norms: Rs. 900/ Trainee / Day

Table -4.1.29 District-wise Training Proposed for Capacity Building of Agriculture Staff for Rice Crop

Sr No	Districts	Training for Agricultural Staff (Phy - No, Fin - Rs. in Lakh)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		1 st year		2 nd year		3 rd year		1 st year		2 nd year		3 rd year		1 st year		2 nd year		3 rd year	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1,400	12.6	1,428	12.85	1457	13.11	700	6.3	714	6.43	728	6.56	420	3.78	428	3.86	437	3.94
2	Anand	1,100	9.9	1,122	10.1	1144	10.3	550	4.95	561	5.05	572	5.15	330	2.97	337	3.03	344	3.09
3	Bharuch	200	1.8	204	1.84	208	1.88	100	0.9	102	0.92	104	0.94	60	0.54	61	0.55	62	0.56
4	Dahod	500	4.5	510	4.59	520	4.68	250	2.25	255	2.3	260	2.35	150	1.35	153	1.38	156	1.41
5	Dang	200	1.8	204	1.84	208	1.88	100	0.9	102	0.92	104	0.94	60	0.54	61	0.55	62	0.56
6	Gandhinagar	200	1.8	204	1.84	208	1.88	100	0.9	102	0.92	104	0.94	60	0.54	61	0.55	62	0.56
7	Kheda	1,300	11.7	1,326	11.93	1353	12.17	650	5.85	663	5.97	676	6.09	390	3.51	398	3.58	406	3.65
8	Mehsana	100	0.9	102	0.92	104	0.94	50	0.45	51	0.46	52	0.47	30	0.27	31	0.28	32	0.29
9	Narmada	200	1.8	204	1.84	208	1.88	100	0.9	102	0.92	104	0.94	60	0.54	61	0.55	62	0.56
10	Navsari	900	8.1	918	8.26	936	8.43	450	4.05	459	4.13	468	4.21	270	2.43	275	2.48	281	2.53
11	Panchmahal	900	8.1	918	8.26	936	8.43	450	4.05	459	4.13	468	4.21	270	2.43	275	2.48	281	2.53
12	Sabarkantha	100	0.9	102	0.92	104	0.94	50	0.45	51	0.46	52	0.47	30	0.27	31	0.28	32	0.29
13	Surat	1,000	9	1,020	9.18	1040	9.36	500	4.5	510	4.59	520	4.68	300	2.7	306	2.75	312	2.81
14	Tapi	400	3.6	408	3.67	416	3.74	200	1.8	204	1.84	208	1.88	120	1.08	122	1.1	124	1.12
15	Vadodara	700	6.3	714	6.43	728	6.56	350	3.15	357	3.21	364	3.27	210	1.89	214	1.93	218	1.97
16	Valsad	800	7.2	816	7.34	832	7.49	400	3.6	408	3.67	416	3.74	240	2.16	245	2.2	250	2.24
17	Surendranagar	2	0.02	3	0.03	4	0.04	1	0.01	2	0.01	2	0.02	1	0.01	1	0.01	1	0.01
18	Mahisagar	20	0.18	30	0.27	70	0.63	10	0.09	15	0.14	35	0.32	7	0.06	11	0.09	25	0.22
19	Chhotaudepur	10	0.09	12	0.11	15	0.14	5	0.05	6	0.05	8	0.07	4	0.03	4	0.04	5	0.05
Total		10,032	90	10,245	92	10,491	94	5,016	45	5,123	46	5,245	47	3,011	27	3,075	28	3,152	28

Cost Norms: Rs. 900/ Trainee / Day

**Table - 4.1.30 Training Proposed for Capacity Building of Farmers at State Level
on Different Technologies**

Cost Norms: Rs. 600/ Trainee / Day

Name of Technology to be Transferred	Year-wise No. of Farmers to be Trained for Rice Crop (Phy - No, Fin - Rs. in Lakh)							
	1 st year		2 nd year		3 rd year		TOTAL	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
INM	36,999	222	36,999	222	36,999	222	1,10,9	666
NRM	24,082	144	24,082	144	24,082	144	72,246	432
IPM	30,585	184	30,585	184	30,585	184	91,755	551
RCTs	27,242	163	27,242	163	27,242	163	81,726	490
Water management	24,617	148	24,617	148	24,617	148	73,851	443
Post Harvest Management	16,264	98	16,264	98	16,264	98	48,792	294
Women empowerment	7,349	44	7,349	44	7,349	44	22,047	132
Credit & marketing	21,522	129	21,522	129	21,522	129	64,566	387
Seed Production	22,211	133	22,211	133	22,211	133	66,633	400
Farm waste manact.	13,559	81	13,559	81	13,559	81	40,677	244
Vermicomposting	6,612	40	6,612	40	6,612	40	19,836	119
Farm Mechanization	17,941	108	17,941	108	17,941	108	53,823	323
Renewable energy	2955	18	2955	18	2955	18	8,865	54
Organic Farming	6427	39	6427	39	6427	39	19,281	117
IWM	30293	182	30293	182	30293	182	90,879	546
Total	2,88,6	1,73	2,88,6	1,73	2,88,6	1,73	8,65,9	5,19

Table - 4.1.31 District-wise Training Proposed for Capacity Building of Farmers at District Level on Different Technologies for

Rice Crop (Phy - No, Fin - Rs. in Lakh)

Sr No	Districts	IPM								RCT							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4,078	24.47	4,078	24.47	4,078	24.47	12,234	73	3,632	21.79	3,632	21.79	3,632	21.79	10,896	65
2	Anand	3,204	19.22	3,204	19.22	3,204	19.22	9,612	58	2,854	17.12	2,854	17.12	2,854	17.12	8,562	51
3	Bharuch	583	3.5	583	3.5	583	3.5	1,749	11	519	3.11	519	3.11	519	3.11	1,557	9
4	Dahod	1,456	8.74	1,456	8.74	1,456	8.74	4,368	26	1,297	7.78	1,297	7.78	1,297	7.78	3,891	23
5	Dang	583	3.5	583	3.5	583	3.5	1,749	11	519	3.11	519	3.11	519	3.11	1,557	9
6	Gandhinagar	583	3.5	583	3.5	583	3.5	1,749	11	519	3.11	519	3.11	519	3.11	1,557	9
7	Kheda	3,787	22.72	3,787	22.72	3,787	22.72	11,361	68	3,373	20.24	3,373	20.24	3,373	20.24	10,119	61
8	Mehsana	291	1.75	291	1.75	291	1.75	873	5	259	1.55	259	1.55	259	1.55	777	5
9	Narmada	583	3.5	583	3.5	583	3.5	1,749	11	519	3.11	519	3.11	519	3.11	1,557	9
10	Navsari	2,621	15.73	2,621	15.73	2,621	15.73	7,863	47	2,335	14.01	2,335	14.01	2,335	14.01	7,005	42
11	Panchmahal	2,621	15.73	2,621	15.73	2,621	15.73	7,863	47	2,335	14.01	2,335	14.01	2,335	14.01	7,005	42
12	Sabarkantha	291	1.75	291	1.75	291	1.75	873	5	259	1.55	259	1.55	259	1.55	777	5
13	Surat	2,913	17.48	2,913	17.48	2,913	17.48	8,739	52	2,595	15.57	2,595	15.57	2,595	15.57	7,785	47
14	Tapi	1,165	6.99	1,165	6.99	1,165	6.99	3,495	21	1,038	6.23	1,038	6.23	1,038	6.23	3,114	19
15	Vadodara	2,039	12.23	2,039	12.23	2,039	12.23	6,117	37	1,816	10.9	1,816	10.9	1,816	10.9	5,448	33
16	Valsad	2,330	13.98	2,330	13.98	2,330	13.98	6,990	42	2,076	12.46	2,076	12.46	2,076	12.46	6,228	37
17	Surendranagar	583	3.5	583	3.5	583	3.5	1,749	11	519	3.11	519	3.11	519	3.11	1,557	9
18	Mahisagar	583	3.5	583	3.5	583	3.5	1,749	11	519	3.11	519	3.11	519	3.11	1,557	9
19	Chhotaudepur	291	1.75	291	1.75	291	1.75	873	5	259	1.55	259	1.55	259	1.55	777	5
	Total	30,585	184	30,585	184	30,585	184	91,755	551	27,242	163	27,242	163	27,242	163	81,726	490

Table - 4.1.31 District-wise Training Proposed for Capacity Building of Farmers at District Level on Different Technologies for

Rice Crop

(Phy - No, Fin - Rs. in Lakh)

Conti.....

Sr No	Districts	Water Management								INM							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	3,282	19.69	3,282	19.69	3,282	19.69	9,846	59	4,933	29.6	4,933	29.6	4,933	29.6	14,799	89
2	Anand	2,579	15.47	2,579	15.47	2,579	15.47	7,737	46	3,876	23.26	3,876	23.26	3,876	23.26	11,628	70
3	Bharuch	469	2.81	469	2.81	469	2.81	1,407	8	705	4.23	705	4.23	705	4.23	2,115	13
4	Dahod	1,172	7.03	1,172	7.03	1,172	7.03	3,516	21	1,762	10.57	1,762	10.57	1,762	10.57	5,286	32
5	Dang	469	2.81	469	2.81	469	2.81	1,407	8	705	4.23	705	4.23	705	4.23	2,115	13
6	Gandhinagar	469	2.81	469	2.81	469	2.81	1,407	8	705	4.23	705	4.23	705	4.23	2,115	13
7	Kheda	3,048	18.29	3,048	18.29	3,048	18.29	9,144	55	4,581	27.49	4,581	27.49	4,581	27.49	13,743	82
8	Mehsana	234	1.4	234	1.4	234	1.4	702	4	352	2.11	352	2.11	352	2.11	1,056	6
9	Narmada	469	2.81	469	2.81	469	2.81	1,407	8	705	4.23	705	4.23	705	4.23	2,115	13
10	Navsari	2,110	12.66	2,110	12.66	2,110	12.66	6,330	38	3,171	19.03	3,171	19.03	3,171	19.03	9,513	57
11	Panchmahal	2,110	12.66	2,110	12.66	2,110	12.66	6,330	38	3,171	19.03	3,171	19.03	3,171	19.03	9,513	57
12	Sabarkantha	234	1.4	234	1.4	234	1.4	702	4	352	2.11	352	2.11	352	2.11	1,056	6
13	Surat	2,345	14.07	2,345	14.07	2,345	14.07	7,035	42	3,524	21.14	3,524	21.14	3,524	21.14	10,572	63
14	Tapi	938	5.63	938	5.63	938	5.63	2,814	17	1,409	8.45	1,409	8.45	1,409	8.45	4,227	25
15	Vadodara	1,641	9.85	1,641	9.85	1,641	9.85	4,923	30	2,467	14.8	2,467	14.8	2,467	14.8	7,401	44
16	Valsad	1,876	11.26	1,876	11.26	1,876	11.26	5,628	34	2,819	16.91	2,819	16.91	2,819	16.91	8,457	51
17	Surendranagar	469	2.81	469	2.81	469	2.81	1,407	8	705	4.23	705	4.23	705	4.23	2,115	13
18	Mahisagar	469	2.81	469	2.81	469	2.81	1,407	8	705	4.23	705	4.23	705	4.23	2,115	13
19	Chhotaudepur	234	1.4	234	1.4	234	1.4	702	4	352	2.11	352	2.11	352	2.11	1,056	6
	Total	24,617	148	24,617	148	24,617	148	73,851	443	36,999	222	36,999	222	36,999	222	1,10,997	666

Cost Norms: Rs. 600/ Trainee / Day

Table -4.1.31 District-wise Training Proposed for Capacity Building of Farmers at District Level on Different Technologies

...continue

Sr	Name of the Districts	Post Harvest Management								Women Empowerment							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1,793	10.76	1,793	10.76	1,793	10.76	5,379	32	810	4.86	810	4.86	810	4.86	2,430	15
2	Anand	1,409	8.45	1,409	8.45	1,409	8.45	4,227	25	636	3.82	636	3.82	636	3.82	1,908	11
3	Bharuch	256	1.54	256	1.54	256	1.54	768	5	116	0.7	116	0.7	116	0.7	348	2
4	Dahod	640	3.84	640	3.84	640	3.84	1,920	12	289	1.73	289	1.73	289	1.73	867	5
5	Dang	256	1.54	256	1.54	256	1.54	768	5	116	0.7	116	0.7	116	0.7	348	2
6	Gandhinagar	256	1.54	256	1.54	256	1.54	768	5	116	0.7	116	0.7	116	0.7	348	2
7	Kheda	1,665	9.99	1,665	9.99	1,665	9.99	4,995	30	752	4.51	752	4.51	752	4.51	2,256	14
8	Mehsana	128	0.77	128	0.77	128	0.77	384	2	58	0.35	58	0.35	58	0.35	174	1
9	Narmada	256	1.54	256	1.54	256	1.54	768	5	116	0.7	116	0.7	116	0.7	348	2
10	Navsari	1,153	6.92	1,153	6.92	1,153	6.92	3,459	21	521	3.13	521	3.13	521	3.13	1,563	9
11	Panchmahal	1,153	6.92	1,153	6.92	1,153	6.92	3,459	21	521	3.13	521	3.13	521	3.13	1,563	9
12	Sabarkantha	128	0.77	128	0.77	128	0.77	384	2	58	0.35	58	0.35	58	0.35	174	1
13	Surat	1,281	7.69	1,281	7.69	1,281	7.69	3,843	23	579	3.47	579	3.47	579	3.47	1,737	10
14	Tapi	512	3.07	512	3.07	512	3.07	1,536	9	231	1.39	231	1.39	231	1.39	693	4
15	Vadodara	896	5.38	896	5.38	896	5.38	2,688	16	405	2.43	405	2.43	405	2.43	1,215	7
16	Valsad	1,024	6.14	1,024	6.14	1,024	6.14	3,072	18	463	2.78	463	2.78	463	2.78	1,389	8
17	Surendranagar	1,793	10.76	1,793	10.76	1,793	10.76	5,379	32	810	4.86	810	4.86	810	4.86	2,430	15
18	Mahisagar	1,409	8.45	1,409	8.45	1,409	8.45	4,227	25	636	3.82	636	3.82	636	3.82	1,908	11
19	Chhotaudepur	256	1.54	256	1.54	256	1.54	768	5	116	0.7	116	0.7	116	0.7	348	2
	GUJARAT STATE	16,264	98	16,264	98	16,264	98	48,792	294	7,349	44	7,349	44	7,349	44	22,047	132

Cost Norms: Rs. 600/ Trainee / Day

Table-4.1.31 District-wise Training Proposed for Capacity Building of Farmers at District Level on Different Technologies Conti..

Sr No	Districts	Credit & Marketing								NRM							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2,373	14.24	2,373	14.24	2,373	14.24	7,119	43	2,655	15.93	2,655	15.93	2,655	15.93	7,965	48
2	Anand	1,864	11.18	1,864	11.18	1,864	11.18	5,592	34	2,086	12.52	2,086	12.52	2,086	12.52	6,258	38
3	Bharuch	339	2.03	339	2.03	339	2.03	1,017	6	379	2.27	379	2.27	379	2.27	1,137	7
4	Dahod	847	5.08	847	5.08	847	5.08	2,541	15	948	5.69	948	5.69	948	5.69	2,844	17
5	Dang	339	2.03	339	2.03	339	2.03	1,017	6	379	2.27	379	2.27	379	2.27	1,137	7
6	Gandhinagar	339	2.03	339	2.03	339	2.03	1,017	6	379	2.27	379	2.27	379	2.27	1,137	7
7	Kheda	2,203	13.22	2,203	13.22	2,203	13.22	6,609	40	2,465	14.79	2,465	14.79	2,465	14.79	7,395	44
8	Mehsana	169	1.01	169	1.01	169	1.01	507	3	190	1.14	190	1.14	190	1.14	570	3
9	Narmada	339	2.03	339	2.03	339	2.03	1,017	6	379	2.27	379	2.27	379	2.27	1,137	7
10	Navsari	1,525	9.15	1,525	9.15	1,525	9.15	4,575	27	1,707	10.24	1,707	10.24	1,707	10.24	5,121	31
11	Panchmahal	1,525	9.15	1,525	9.15	1,525	9.15	4,575	27	1,707	10.24	1,707	10.24	1,707	10.24	5,121	31
12	Sabarkantha	169	1.01	169	1.01	169	1.01	507	3	190	1.14	190	1.14	190	1.14	570	3
13	Surat	1,695	10.17	1,695	10.17	1,695	10.17	5,085	31	1,896	11.38	1,896	11.38	1,896	11.38	5,688	34
14	Tapi	678	4.07	678	4.07	678	4.07	2,034	12	758	4.55	758	4.55	758	4.55	2,274	14
15	Vadodara	1,186	7.12	1,186	7.12	1,186	7.12	3,558	21	1,327	7.96	1,327	7.96	1,327	7.96	3,981	24
16	Valsad	1,356	8.14	1,356	8.14	1,356	8.14	4,068	24	1,517	9.1	1,517	9.1	1,517	9.1	4,551	27
17	Surendranagar	2,373	14.24	2,373	14.24	2,373	14.24	7,119	43	2,655	15.93	2,655	15.93	2,655	15.93	7,965	48
18	Mahisagar	1,864	11.18	1,864	11.18	1,864	11.18	5,592	34	2,086	12.52	2,086	12.52	2,086	12.52	6,258	38
19	Chhotaudepur	339	2.03	339	2.03	339	2.03	1,017	6	379	2.27	379	2.27	379	2.27	1,137	7
	GUJARAT	21,522	129	21,522	129	21,522	129	64,566	387	24,082	144	24,082	144	24,082	144	72,246	432

Cost Norms: Rs. 600/ Trainee / Day

Table- 4.1.31 District wise Training Proposed for Capacity Building of Farmers District Level on Different Technologiescontinue

Sr No	Districts	Seed Production								Farm Waste Management							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2,906	17.44	2,906	17.44	2,906	17.44	8,718	52	1,774	10.64	1,774	10.64	1,774	10.64	5,322	32
2	Anand	2,283	13.7	2,283	13.7	2,283	13.7	6,849	41	1,394	8.36	1,394	8.36	1,394	8.36	4,182	25
3	Bharuch	415	2.49	415	2.49	415	2.49	1,245	7	253	1.52	253	1.52	253	1.52	759	5
4	Dahod	1,038	6.23	1,038	6.23	1,038	6.23	3,114	19	634	3.8	634	3.8	634	3.8	1,902	11
5	Dang	415	2.49	415	2.49	415	2.49	1,245	7	253	1.52	253	1.52	253	1.52	759	5
6	Gandhinagar	415	2.49	415	2.49	415	2.49	1,245	7	253	1.52	253	1.52	253	1.52	759	5
7	Kheda	2,699	16.19	2,699	16.19	2,699	16.19	8,097	49	1,647	9.88	1,647	9.88	1,647	9.88	4,941	30
8	Mehsana	208	1.25	208	1.25	208	1.25	624	4	127	0.76	127	0.76	127	0.76	381	2
9	Narmada	415	2.49	415	2.49	415	2.49	1,245	7	253	1.52	253	1.52	253	1.52	759	5
10	Navsari	1,868	11.21	1,868	11.21	1,868	11.21	5,604	34	1,141	6.85	1,141	6.85	1,141	6.85	3,423	21
11	Panchmahal	1,868	11.21	1,868	11.21	1,868	11.21	5,604	34	1,141	6.85	1,141	6.85	1,141	6.85	3,423	21
12	Sabarkantha	208	1.25	208	1.25	208	1.25	624	4	127	0.76	127	0.76	127	0.76	381	2
13	Surat	2,076	12.46	2,076	12.46	2,076	12.46	6,228	37	1,267	7.6	1,267	7.6	1,267	7.6	3,801	23
14	Tapi	830	4.98	830	4.98	830	4.98	2,490	15	507	3.04	507	3.04	507	3.04	1,521	9
15	Vadodara	1,453	8.72	1,453	8.72	1,453	8.72	4,359	26	887	5.32	887	5.32	887	5.32	2,661	16
16	Valsad	1,661	9.97	1,661	9.97	1,661	9.97	4,983	30	1,014	6.08	1,014	6.08	1,014	6.08	3,042	18
17	Surendranagar	415	2.49	415	2.49	415	2.49	1,245	7	253	1.52	253	1.52	253	1.52	759	5
18	Mahisagar	830	4.98	830	4.98	830	4.98	2,490	15	507	3.04	507	3.04	507	3.04	1,521	9
19	Chhotaudepur	208	1.25	208	1.25	208	1.25	624	4	127	0.76	127	0.76	127	0.76	381	2
GUJARAT STATE		22,211	133	22,211	133	22,211	133	66,633	400	13,559	81	13,559	81	13,559	81	40,677	244

Table- 4.1.31 District wise Training Proposed for Capacity Building of Farmers District Level on Different Technologiescontinue

Sr No	Districts	Vermicomposting								Farm Mechanization							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	865	5.19	865	5.19	865	5.19	2,595	16	2,348	14.09	2,348	14.09	2,348	14.09	7,044	42
2	Anand	679	4.07	679	4.07	679	4.07	2,037	12	1,844	11.06	1,844	11.06	1,844	11.06	5,532	33
3	Bharuch	124	0.74	124	0.74	124	0.74	372	2	335	2.01	335	2.01	335	2.01	1,005	6
4	Dahod	309	1.85	309	1.85	309	1.85	927	6	838	5.03	838	5.03	838	5.03	2,514	15
5	Dang	124	0.74	124	0.74	124	0.74	372	2	335	2.01	335	2.01	335	2.01	1,005	6
6	Gandhinagar	124	0.74	124	0.74	124	0.74	372	2	335	2.01	335	2.01	335	2.01	1,005	6
7	Kheda	803	4.82	803	4.82	803	4.82	2,409	14	2,180	13.08	2,180	13.08	2,180	13.08	6,540	39
8	Mehsana	62	0.37	62	0.37	62	0.37	186	1	168	1.01	168	1.01	168	1.01	504	3
9	Narmada	124	0.74	124	0.74	124	0.74	372	2	335	2.01	335	2.01	335	2.01	1,005	6
10	Navsari	556	3.34	556	3.34	556	3.34	1,668	10	1,509	9.05	1,509	9.05	1,509	9.05	4,527	27
11	Panchmahal	556	3.34	556	3.34	556	3.34	1,668	10	1,509	9.05	1,509	9.05	1,509	9.05	4,527	27
12	Sabarkantha	62	0.37	62	0.37	62	0.37	186	1	168	1.01	168	1.01	168	1.01	504	3
13	Surat	618	3.71	618	3.71	618	3.71	1,854	11	1,677	10.06	1,677	10.06	1,677	10.06	5,031	30
14	Tapi	247	1.48	247	1.48	247	1.48	741	4	671	4.03	671	4.03	671	4.03	2,013	12
15	Vadodara	432	2.59	432	2.59	432	2.59	1,296	8	1,174	7.04	1,174	7.04	1,174	7.04	3,522	21
16	Valsad	494	2.96	494	2.96	494	2.96	1,482	9	1,341	8.05	1,341	8.05	1,341	8.05	4,023	24
17	Surendranagar	124	0.74	124	0.74	124	0.74	372	2	335	2.01	335	2.01	335	2.01	1,005	6
18	Mahisagar	247	1.48	247	1.48	247	1.48	741	4	671	4.03	671	4.03	671	4.03	2,013	12
19	Chhotaudepur	62	0.37	62	0.37	62	0.37	186	1	168	1.01	168	1.01	168	1.01	504	3
GUJARAT STATE		6,612	40	6,612	40	6,612	40	19,836	119	17,941	108	17,941	108	17,941	108	53,823	323

Cost Norms: Rs. 600/ Trainee / Day

Table- 4.1.31 District wise Training Proposed for Capacity Building of Farmers District Level on Different Technologies .conti..

(Phy - No, Fin - Rs. in Lakh)

Sr No	Districts	Renewable Energy								Organic Farming							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	398	2.39	398	2.39	398	2.39	1,194	7	865	5.19	865	5.19	865	5.19	2,595	16
2	Anand	313	1.88	313	1.88	313	1.88	939	6	679	4.07	679	4.07	679	4.07	2,037	12
3	Bharuch	57	0.34	57	0.34	57	0.34	171	1	124	0.74	124	0.74	124	0.74	372	2
4	Dahod	142	0.85	142	0.85	142	0.85	426	3	309	1.85	309	1.85	309	1.85	927	6
5	Dang	57	0.34	57	0.34	57	0.34	171	1	124	0.74	124	0.74	124	0.74	372	2
6	Gandhinagar	57	0.34	57	0.34	57	0.34	171	1	124	0.74	124	0.74	124	0.74	372	2
7	Kheda	369	2.21	369	2.21	369	2.21	1,107	7	803	4.82	803	4.82	803	4.82	2,409	14
8	Mehsana	28	0.17	28	0.17	28	0.17	84	1	62	0.37	62	0.37	62	0.37	186	1
9	Narmada	57	0.34	57	0.34	57	0.34	171	1	124	0.74	124	0.74	124	0.74	372	2
10	Navsari	256	1.54	256	1.54	256	1.54	768	5	556	3.34	556	3.34	556	3.34	1,668	10
11	Panchmahal	256	1.54	256	1.54	256	1.54	768	5	556	3.34	556	3.34	556	3.34	1,668	10
12	Sabarkantha	28	0.17	28	0.17	28	0.17	84	1	62	0.37	62	0.37	62	0.37	186	1
13	Surat	284	1.7	284	1.7	284	1.7	852	5	618	3.71	618	3.71	618	3.71	1,854	11
14	Tapi	114	0.68	114	0.68	114	0.68	342	2	247	1.48	247	1.48	247	1.48	741	4
15	Vadodara	199	1.19	199	1.19	199	1.19	597	4	432	2.59	432	2.59	432	2.59	1,296	8
16	Valsad	227	1.36	227	1.36	227	1.36	681	4	494	2.96	494	2.96	494	2.96	1,482	9
17	Surendranagar	28	0.17	28	0.17	28	0.17	84	1	62	0.37	62	0.37	62	0.37	186	1
18	Mahisagar	57	0.34	57	0.34	57	0.34	171	1	124	0.74	124	0.74	124	0.74	372	2
19	Chhotaudepur	28	0.17	28	0.17	28	0.17	84	1	62	0.37	62	0.37	62	0.37	186	1
GUJARAT STATE		2955	18	2955	18	2955	18	8,865	54	6427	39	6427	39	6427	39	19,281	117

Cost Norms: Rs. 600/ Trainee / Day

Table- 4.1.31 District wise Training Proposed for Capacity Building of Farmers District Level on Different Technologies

(Phy - No, Fin - Rs. in Lakh)

Continue...

Sr N o	Districts	IWM								Total							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fi	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4,07	24.4	4,07	24.4	4,07	24.4	12,23	73	36,790	221	36,790	221	36,790	221	1,10,37	662
2	Anand	3,20	19.2	3,20	19.2	3,20	19.2	9,612	58	28,904	173	28,904	173	28,904	173	86,712	520
3	Bharuch	583	3.5	583	3.5	583	3.5	1,749	11	5,257	32	5,257	32	5,257	32	15,771	95
4	Dahod	1,45	8.74	1,45	8.74	1,45	8.74	4,368	26	13,137	79	13,137	79	13,137	79	39,411	236
5	Dang	583	3.5	583	3.5	583	3.5	1,749	11	5,257	32	5,257	32	5,257	32	15,771	95
6	Gandhinagar	583	3.5	583	3.5	583	3.5	1,749	11	5,257	32	5,257	32	5,257	32	15,771	95
7	Kheda	3,78	22.7	3,78	22.7	3,78	22.7	11,36	68	34,162	205	34,162	205	34,162	205	1,02,48	615
8	Mehsana	291	1.75	291	1.75	291	1.75	873	5	2,627	16	2,627	16	2,627	16	7,881	47
9	Narmada	583	3.5	583	3.5	583	3.5	1,749	11	5,257	32	5,257	32	5,257	32	15,771	95
10	Navsari	2,62	15.7	2,62	15.7	2,62	15.7	7,863	47	23,650	142	23,650	142	23,650	142	70,950	426
11	Panchmahal	2,62	15.7	2,62	15.7	2,62	15.7	7,863	47	23,650	142	23,650	142	23,650	142	70,950	426
12	Sabarkantha	291	1.75	291	1.75	291	1.75	873	5	2,627	16	2,627	16	2,627	16	7,881	47
13	Surat	2,91	17.4	2,91	17.4	2,91	17.4	8,739	52	26,281	158	26,281	158	26,281	158	78,843	473
14	Tapi	1,16	6.99	1,16	6.99	1,16	6.99	3,495	21	10,510	63	10,510	63	10,510	63	31,530	189
15	Vadodara	2,03	12.2	2,03	12.2	2,03	12.2	6,117	37	18,393	110	18,393	110	18,393	110	55,179	331
16	Valsad	2,33	13.9	2,33	13.9	2,33	13.9	6,990	42	21,022	126	21,022	126	21,022	126	63,066	378
17	Surendranag	291	1.75	291	1.75	291	1.75	873	5	11,415	68	11,415	68	11,415	68	34,245	205
18	Mahisagar	583	3.5	583	3.5	583	3.5	1,749	11	11,290	68	11,290	68	11,290	68	33,870	203
19	Chhotaudep	291	1.75	291	1.75	291	1.75	873	5	3,172	19	3,172	19	3,172	19	9,516	57
	GUJARAT	3029	182	3029	182	3029	182	90,87	54	2,88,65	1,73	2,88,65	1,73	2,88,65	1,73	8,65,97	5,19

Cost Norms: Rs. 600/ Trainee / Day

Table -4.1.32 Rice Seed Planning/Seed Village Program (Seed Production Enhancement)

Sr. No.	District	No. of Taluka	No. of Villages/ Year	Seed Rate Kg/ha	Rice Seed Village Program (Phy - No, Fin - Rs. in Lakh)							
					1 st year		2 nd year		3 rd year		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	50	30	1,000	50	1,000	50	1,000	50	3,000	150
2	Anand	8	40	30	800	40	800	40	800	40	2,400	120
3	Bharuch	8	40	30	800	40	800	40	800	40	2,400	120
4	Dahod	7	35	30	700	35	700	35	700	35	2,100	105
5	Dang	1	5	30	100	5	100	5	100	5	300	15
6	Gandhinagar	4	20	30	400	20	400	20	400	20	1,200	60
7	KHEDA	10	50	30	1,000	50	1,000	50	1,000	50	3,000	150
8	Mehsana	9	45	30	900	45	900	45	900	45	2,700	135
9	Narmada	4	20	30	400	20	400	20	400	20	1,200	60
10	Navsari	5	25	30	500	25	500	25	500	25	1,500	75
11	Panchmahal	11	55	30	1,100	55	1,100	55	1,100	55	3,300	165
12	Sabarkantha	13	65	30	1,300	65	1,300	65	1,300	65	3,900	195
13	Surat	10	50	30	1,000	50	1,000	50	1,000	50	3,000	150
14	Tapi	5	25	30	500	25	500	25	500	25	1,500	75
15	Vadodara	12	60	30	1,200	60	1,200	60	1,200	60	3,600	180
16	Valsad	5	25	30	500	25	500	25	500	25	1,500	75
17	Surendranagar	1	5	30	100	5	100	5	100	5	300	15
18	Mahisagar	5	25	30	500	25	500	25	500	25	1,500	75
19	Chhotaudepur	5	25	30	500	25	500	25	500	25	1,500	75
	Gujarat state	133	665	570	13300	665	13300	665	13300	665	39,900	1,995

Table- 4.1.33 District-wise Varietal Demonstration in Next Three Years in Rice

(Phy - No, Fin - Rs. in Lakh)

Sr No	Districts	Year wise Varietal Demonstration (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	700	35.00	700	35.00	700	35.00	2100	105
2	Anand	550	27.50	550	27.50	550	27.50	1650	82.5
3	Bharuch	100	5.00	100	5.00	100	5.00	300	15
4	Dahod	250	12.50	250	12.50	250	12.50	750	37.5
5	Dang	100	5.00	100	5.00	100	5.00	300	15
6	Gandhinagar	100	5.00	100	5.00	100	5.00	300	15
7	Kheda	650	32.50	650	32.50	650	32.50	1950	97.5
8	Mehsana	50	2.50	50	2.50	50	2.50	150	7.5
9	Narmada	100	5.00	100	5.00	100	5.00	300	15
10	Navsari	450	22.50	450	22.50	450	22.50	1350	67.5
11	Panchmahal	450	22.50	450	22.50	450	22.50	1350	67.5
12	Sabarkantha	50	2.50	50	2.50	50	2.50	150	7.5
13	Surat	500	25.00	500	25.00	500	25.00	1500	75
14	Tapi	200	10.00	200	10.00	200	10.00	600	30
15	Vadodara	350	17.50	350	17.50	350	17.50	1050	52.5
16	Valsad	400	20.00	400	20.00	400	20.00	1200	60
17	Surendranagar	50	2.50	50	2.50	50	2.50	150	7.5
18	Mahisagar	100	5.00	100	5.00	100	5.00	300	15
19	Chhotaudepur	50	2.50	50	2.50	50	2.50	150	7.5
	Gujarat state	5200	260	5200	260	5200	260	15600	780

Cost Norms:Rs 5000/acre/demonstration

Table- 4.1.34 District-wise INM Demonstrations in Next Three Years for Rice Crop

Sr No	Name of the Districts	Year wise INM Demonstration in Rice Crop (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	560	28.00	560	28.00	560	28.00	1680	84
2	Anand	440	22.00	440	22.00	440	22.00	1320	66
3	Bharuch	80	4.00	80	4.00	80	4.00	240	12
4	Dahod	200	10.00	200	10.00	200	10.00	600	30
5	Dang	80	4.00	80	4.00	80	4.00	240	12
6	Gandhinagar	80	4.00	80	4.00	80	4.00	240	12
7	Kheda	520	26.00	520	26.00	520	26.00	1560	78
8	Mehsana	40	2.00	40	2.00	40	2.00	120	6
9	Narmada	80	4.00	80	4.00	80	4.00	240	12
10	Navsari	360	18.00	360	18.00	360	18.00	1080	54
11	Panchmahal	360	18.00	360	18.00	360	18.00	1080	54
12	Sabarkantha	40	2.00	40	2.00	40	2.00	120	6
13	Surat	400	20.00	400	20.00	400	20.00	1200	60
14	Tapi	160	8.00	160	8.00	160	8.00	480	24
15	Vadodara	280	14.00	280	14.00	280	14.00	840	42
16	Valsad	320	16.00	320	16.00	320	16.00	960	48
17	Surendranagar	80	4.00	80	4.00	80	4.00	240	12
18	Mahisagar	160	8.00	160	8.00	160	8.00	480	24
19	Chhotaudepur	40	2.00	40	2.00	40	2.00	120	6
	Gujarat state	4280	214	4280	214	4280	214	12840	642

Cost norms - Rs. 5000/ha/demonstration

Table - 4.1.35 District-wise Demonstrations on Resource Conservation Technologies for Rice Crop

Sr No	Districts	Laser Leveling (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmadabad	448	22.40	448	22.40	448	22.40	1344	67.2
2	Anand	352	17.60	352	17.60	352	17.60	1056	52.8
3	Bharuch	64	3.20	64	3.20	64	3.20	192	9.6
4	Dahod	160	8.00	160	8.00	160	8.00	480	24
5	Dang	64	3.20	64	3.20	64	3.20	192	9.6
6	Gandhinagar	64	3.20	64	3.20	64	3.20	192	9.6
7	Kheda	416	20.80	416	20.80	416	20.80	1248	62.4
8	Mehsana	32	1.60	32	1.60	32	1.60	96	4.8
9	Narmada	64	3.20	64	3.20	64	3.20	192	9.6
10	Navsari	288	14.40	288	14.40	288	14.40	864	43.2
11	Panchmahal	288	14.40	288	14.40	288	14.40	864	43.2

Sr No	Districts	Laser Leveling (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
12	Sabarkantha	32	1.60	32	1.60	32	1.60	96	4.8
13	Surat	320	16.00	320	16.00	320	16.00	960	48
14	Tapi	128	6.40	128	6.40	128	6.40	384	19.2
15	Vadodara	224	11.20	224	11.20	224	11.20	672	33.6
16	Valsad	256	12.80	256	12.80	256	12.80	768	38.4
17	Surendranagar	64	3.20	64	3.20	64	3.20	192	9.6
18	Mahisagar	128	6.40	128	6.40	128	6.40	384	19.2
19	Chhotaudepur	32	1.60	32	1.60	32	1.60	96	4.8
	GUJARAT	3424	171.2	3424	171.2	3424	171.2	10272	513.6

Cost Norms:Rs 5000/ha demonstration area 0.40 ha

Table- 4.1.35 District-wise Demonstrations on Resource Conservation

Technologies for Rice Crop

...continue

Sr No	Districts	Green Manuring (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	336	16.80	336	16.80	336	16.80	1008	50.4
2	Anand	264	13.20	264	13.20	264	13.20	792	39.6
3	Bharuch	48	2.40	48	2.40	48	2.40	144	7.2
4	Dahod	120	6.00	120	6.00	120	6.00	360	18
5	Dang	48	2.40	48	2.40	48	2.40	144	7.2
6	Gandhinagar	48	2.40	48	2.40	48	2.40	144	7.2
7	Kheda	312	15.60	312	15.60	312	15.60	936	46.8
8	Mehsana	24	1.20	24	1.20	24	1.20	72	3.6
9	Narmada	48	2.40	48	2.40	48	2.40	144	7.2
10	Navsari	216	10.80	216	10.80	216	10.80	648	32.4
11	Panchmahal	216	10.80	216	10.80	216	10.80	648	32.4
12	Sabarkantha	24	1.20	24	1.20	24	1.20	72	3.6
13	Surat	240	12.00	240	12.00	240	12.00	720	36
14	Tapi	96	4.80	96	4.80	96	4.80	288	14.4
15	Vadodara	168	8.40	168	8.40	168	8.40	504	25.2
16	Valsad	192	9.60	192	9.60	192	9.60	576	28.8
17	Surendranagar	48	2.40	48	2.40	48	2.40	144	7.2
18	Mahisagar	96	4.80	96	4.80	96	4.80	288	14.4
19	Chhotaudepur	24	1.20	24	1.20	24	1.20	72	3.6
	Gujarat state	2568	128.4	2568	128.4	2568	128.4	7704	385.2

Cost Norms:Rs. 5000/ha demonstration area 0.40 ha

Table-4.1.36 District-wise Seed Treatment Demonstrations for Rice Crop in Next Three Years (State)

Sr No	Districts	Year-wise Seed Treatment Demonstrations							
		(Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	392	3.92	392	3.92	392	3.92	1176	11.76
2	Anand	308	3.08	308	3.08	308	3.08	924	9.24
3	Bharuch	56	0.56	56	0.56	56	0.56	168	1.68
4	Dahod	140	1.40	140	1.40	140	1.40	420	4.2
5	Dang	56	0.56	56	0.56	56	0.56	168	1.68
6	Gandhinagar	56	0.56	56	0.56	56	0.56	168	1.68
7	Kheda	364	3.64	364	3.64	364	3.64	1092	10.92
8	Mehsana	28	0.28	28	0.28	28	0.28	84	0.84
9	Narmada	56	0.56	56	0.56	56	0.56	168	1.68
10	Navsari	252	2.52	252	2.52	252	2.52	756	7.56
11	Panchmahal	252	2.52	252	2.52	252	2.52	756	7.56
12	Sabarkantha	28	0.28	28	0.28	28	0.28	84	0.84
13	Surat	280	2.80	280	2.80	280	2.80	840	8.4
14	Tapi	112	1.12	112	1.12	112	1.12	336	3.36
15	Vadodara	196	1.96	196	1.96	196	1.96	588	5.88
16	Valsad	224	2.24	224	2.24	224	2.24	672	6.72
17	Surendranagar	56	0.56	56	0.56	56	0.56	168	1.68
18	Mahisagar	112	1.12	112	1.12	112	1.12	336	3.36
19	Chhotaudepur	28	0.28	28	0.28	28	0.28	84	0.84
	Gujarat state	2996	29.96	2996	29.96	2996	29.96	8988	89.88

Cost Norms: Rs.1000/- per demonstration area 0.40 ha

Table- 4.1.37 District-wise Organic Farming Demonstration for Rice Crop in Next Three Year

Sr No	Districts	Year-wise Organic Farming Demonstration							
		(Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	420	21.00	420	21.00	420	21.00	1260	63
2	Anand	330	16.50	330	16.50	330	16.50	990	49.5
3	Bharuch	60	3.00	60	3.00	60	3.00	180	9
4	Dahod	150	7.50	150	7.50	150	7.50	450	22.5
5	Dang	60	3.00	60	3.00	60	3.00	180	9
6	Gandhinagar	60	3.00	60	3.00	60	3.00	180	9
7	Kheda	390	19.50	390	19.50	390	19.50	1170	58.5
8	Mehsana	30	1.50	30	1.50	30	1.50	90	4.5
9	Narmada	60	3.00	60	3.00	60	3.00	180	9
10	Navsari	270	13.50	270	13.50	270	13.50	810	40.5
11	Panchmahal	270	13.50	270	13.50	270	13.50	810	40.5
12	Sabarkantha	30	1.50	30	1.50	30	1.50	90	4.5
13	Surat	300	15.00	300	15.00	300	15.00	900	45

14	Tapi	120	6.00	120	6.00	120	6.00	360	18
15	Vadodara	210	10.50	210	10.50	210	10.50	630	31.5
16	Valsad	240	12.00	240	12.00	240	12.00	720	36
17	Surendranagar	60	3.00	60	3.00	60	3.00	180	9
18	Mahisagar	120	6.00	120	6.00	120	6.00	360	18
19	Chhotaudepur	30	1.50	30	1.50	30	1.50	90	4.5
	Gujarat state	3210	160.5	3210	160.5	3210	160.5	9630	481.5

Cost Norms: Rs 5000/acre/demonstration

Table- 4.1.38 District-wise Bio-fertilizer and Bio-compost Demonstration for Rice Crop.

Sr No	Districts	Year wise Bio-fertilizer and Bio-compost Demonstration for Rice Crop (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	364	18.20	364	18.20	364	18.20	1092	54.6
2	Kheda	338	16.90	338	16.90	338	16.90	1014	50.7
3	Anand	286	14.30	286	14.30	286	14.30	858	42.9
4	Surat	260	13.00	260	13.00	260	13.00	780	39
5	Panchmahal	234	11.70	234	11.70	234	11.70	702	35.1
6	Navsari	234	11.70	234	11.70	234	11.70	702	35.1
7	Valsad	208	10.40	208	10.40	208	10.40	624	31.2
8	Vadodara	182	9.10	182	9.10	182	9.10	546	27.3
9	Dahod	130	6.50	130	6.50	130	6.50	390	19.5
10	Tapi	104	5.20	104	5.20	104	5.20	312	15.6
11	Dang	52	2.60	52	2.60	52	2.60	156	7.8
12	Narmada	52	2.60	52	2.60	52	2.60	156	7.8
13	Bharuch	52	2.60	52	2.60	52	2.60	156	7.8
14	Gandhinagar	52	2.60	52	2.60	52	2.60	156	7.8
15	Sabarkantha	26	1.30	26	1.30	26	1.30	78	3.9
16	Mehsana	26	1.30	26	1.30	26	1.30	78	3.9
17	Surendranagar	52	2.60	52	2.60	52	2.60	156	7.8
18	Mahisagar	104	5.20	104	5.20	104	5.20	312	15.6
19	Chhotaudepur	26	1.30	26	1.30	26	1.30	78	3.9
	Gujarat state	2782	139.1	2782	139.1	2782	139.1	8346	417.3

Cost Norms: Rs 5000/acre/demonstration

Table- 4.1.39 District-wise IWM Demonstration for Rice Crop in Next Three Years

Sr No	Districts	Year-wise IWM Demonstration for Rice Crop (Phy - No, Fin - Rs. in Lakh)Rs 5000/acre/demonstration							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	308	15.40	308	15.40	308	15.40	924	46.2
2	Anand	242	12.10	242	12.10	242	12.10	726	36.3
3	Bharuch	44	2.20	44	2.20	44	2.20	132	6.6
4	Dahod	110	5.50	110	5.50	110	5.50	330	16.5
5	Dang	44	2.20	44	2.20	44	2.20	132	6.6

Sr No	Districts	Year-wise IWM Demonstration for Rice Crop (Phy - No, Fin - Rs. in Lakh)Rs 5000/acre/demonstration							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
6	Gandhinagar	44	2.20	44	2.20	44	2.20	132	6.6
7	Kheda	286	14.30	286	14.30	286	14.30	858	42.9
8	Mehsana	22	1.10	22	1.10	22	1.10	66	3.3
9	Narmada	44	2.20	44	2.20	44	2.20	132	6.6
10	Navsari	198	9.90	198	9.90	198	9.90	594	29.7
11	Panchmahal	198	9.90	198	9.90	198	9.90	594	29.7
12	Sabarkantha	22	1.10	22	1.10	22	1.10	66	3.3
13	Surat	220	11.00	220	11.00	220	11.00	660	33
14	Tapi	88	4.40	88	4.40	88	4.40	264	13.2
15	Vadodara	154	7.70	154	7.70	154	7.70	462	23.1
16	Valsad	176	8.80	176	8.80	176	8.80	528	26.4
17	Surendranagar	44	2.20	44	2.20	44	2.20	132	6.6
18	Mahisagar	88	4.40	88	4.40	88	4.40	264	13.2
19	Chhotaudepur	22	1.10	22	1.10	22	1.10	66	3.3
	GUJARAT	2354	117.7	2354	117.7	2354	117.7	7062	353.1

Table- 4.1.40 District-wise Farmer Field Schools Covering Identified Critical Technologies for Rice Crop in Next Three Years

Sr No	Districts	Year-wise Farmers Field School for Rice Crop (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	84	16.80	84	16.80	84	16.80	252	50.4
2	Anand	66	13.20	66	13.20	66	13.20	198	39.6
3	Bharuch	12	2.40	12	2.40	12	2.40	36	7.2
4	Dahod	30	6.00	30	6.00	30	6.00	90	18
5	Dang	12	2.40	12	2.40	12	2.40	36	7.2
6	Gandhinagar	12	2.40	12	2.40	12	2.40	36	7.2
7	Kheda	78	15.60	78	15.60	78	15.60	234	46.8
8	Mehsana	6	1.20	6	1.20	6	1.20	18	3.6
9	Narmada	12	2.40	12	2.40	12	2.40	36	7.2
10	Navsari	54	10.80	54	10.80	54	10.80	162	32.4
11	Panchmahal	54	10.80	54	10.80	54	10.80	162	32.4
12	Sabarkantha	6	1.20	6	1.20	6	1.20	18	3.6
13	Surat	60	12.00	60	12.00	60	12.00	180	36
14	Tapi	24	4.80	24	4.80	24	4.80	72	14.4
15	Vadodara	42	8.40	42	8.40	42	8.40	126	25.2
16	Valsad	48	9.60	48	9.60	48	9.60	144	28.8
17	Surendranagar	12	2.40	12	2.40	12	2.40	36	7.2
18	Mahisagar	24	4.80	24	4.80	24	4.80	72	14.4
19	Chhotaudepur	48	9.60	48	9.60	48	9.60	144	28.8
	GUJARAT	684	136.8	684	136.8	684	136.8	2052	410.4

Cost Norms: Rs. 20,000/- per School

Table- 4.1.41 Group Formation /Commodity Interest Groups Formation for Specific Activities for Rice Crop

Interest Group	Year-wise No. of Group Formation for Rice Crop							
	(Phy - No, Fin - Rs. in Lakh)							
	1 st year		2 nd year		3 rd year		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Seed Production	480	96	480	96	480	96	1440	288
Organic Farming	270	54	270	54	270	54	810	162
Value Addition	205	41	205	41	205	41	615	123
Specific Crop Group	140	28	140	28	140	28	420	84
Total	1095	219	1095	219	1095	219	3285	657

Cost Norms: Rs.0.20 lacs/group (for capacity building, input assistance, marketing and for group specific activities)

Table- 4.1.42 District-wise Group Formation / Commodity Interest Groups Formation for Specific Activities for Rice Crop

(Phy - No, Fin - Rs. in Lakh)

Sr. No.	Districts	Seed Production								Organic Farming								Value Addition							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	75	15	75	15	75	15	225	45	35	7	35	7	35	7	105	21	20	4	20	4	20	4	60	12
2	Anand	75	15	75	15	75	15	225	45	28	5.6	28	5.6	28	5.6	84	16.8	20	4	20	4	20	4	60	12
3	Bharuch	10	2	10	2	10	2	30	6	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
4	Dahod	5	1	5	1	5	1	15	3	18	3.6	18	3.6	18	3.6	54	10.8	5	1	5	1	5	1	15	3
5	Dang	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
6	Gandhinagar	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3	0	0	0	0	0	0	0	0
7	Kheda	75	15	75	15	75	15	225	45	30	6	30	6	30	6	90	18	25	5	25	5	25	5	75	15
8	Mehsana	0	0	0	0	0	0	0	0	2	0.4	2	0.4	2	0.4	6	1.2	0	0	0	0	0	0	0	0
9	Narmada	10	2	10	2	10	2	30	6	5	1	5	1	5	1	15	3	0	0	0	0	0	0	0	0
10	Navsari	50	10	50	10	50	10	150	30	22	4.4	22	4.4	22	4.4	66	13.2	20	4	20	4	20	4	60	12
11	Panchmahal	15	3	15	3	15	3	45	9	23	4.6	23	4.6	23	4.6	69	13.8	15	3	15	3	15	3	45	9
12	Sabarkantha	0	0	0	0	0	0	0	0	2	0.4	2	0.4	2	0.4	6	1.2	0	0	0	0	0	0	0	0
13	Surat	50	10	50	10	50	10	150	30	25	5	25	5	25	5	75	15	20	4	20	4	20	4	60	12
14	Tapi	20	4	20	4	20	4	60	12	10	2	10	2	10	2	30	6	15	3	15	3	15	3	45	9
15	Vadodara	5	1	5	1	5	1	15	3	15	3	15	3	15	3	45	9	10	2	10	2	10	2	30	6
16	Valsad	50	10	50	10	50	10	150	30	20	4	20	4	20	4	60	12	20	4	20	4	20	4	60	12
17	Surendranagar	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
18	Mahisagar	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
19	Chhotaudepur	20	4	20	4	20	4	60	12	10	2	10	2	10	2	30	6	15	3	15	3	15	3	45	9
	Gujarat state	480	96	480	96	480	96	1440	288	270	54	270	54	270	54	810	162	205	41	205	41	205	41	615	123

Cost Norms: Rs.0.20 lacs/group (for capacity building, input assistance, marketing and for group specific activities)

Table- 4.1.42 District-wise Group Formation / Commodity Interest Groups Formation for Specific Activities for Rice Crop

(Phy - No, Fin - Rs. in Lakh) **Continue...**

Sr. No.	Districts	Specific Crop Group								Total							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	15	3	15	3	15	3	45	9	145	29	145	29	145	29	435	87
2	Anand	10	2	10	2	10	2	30	6	133	26.6	133	26.6	133	26.6	399	79.8
3	Bharuch	0	0	0	0	0	0	0	0	20	4	20	4	20	4	60	12
4	Dahod	10	2	10	2	10	2	30	6	38	7.6	38	7.6	38	7.6	114	22.8
5	Dang	5	1	5	1	5	1	15	3	20	4	20	4	20	4	60	12
6	Gandhinagar	0	0	0	0	0	0	0	0	10	2	10	2	10	2	30	6
7	Kheda	15	3	15	3	15	3	45	9	145	29	145	29	145	29	435	87
8	Mehsana	0	0	0	0	0	0	0	0	2	0.4	2	0.4	2	0.4	6	1.2
9	Narmada	5	1	5	1	5	1	15	3	20	4	20	4	20	4	60	12
10	Navsari	10	2	10	2	10	2	30	6	102	20.4	102	20.4	102	20.4	306	61.2
11	Panchmahal	10	2	10	2	10	2	30	6	63	12.6	63	12.6	63	12.6	189	37.8
12	Sabarkantha	0	0	0	0	0	0	0	0	2	0.4	2	0.4	2	0.4	6	1.2
13	Surat	10	2	10	2	10	2	30	6	105	21	105	21	105	21	315	63
14	Tapi	10	2	10	2	10	2	30	6	55	11	55	11	55	11	165	33
15	Vadodara	10	2	10	2	10	2	30	6	40	8	40	8	40	8	120	24
16	Valsad	10	2	10	2	10	2	30	6	100	20	100	20	100	20	300	60
17	Surendranagar	5	1	5	1	5	1	15	3	20	4	20	4	20	4	60	12
18	Mahisagar	5	1	5	1	5	1	15	3	20	4	20	4	20	4	60	12
19	Chhotaudepur	10	2	10	2	10	2	30	6	55	11	55	11	55	11	165	33
	Gujarat state	140	28	140	28	140	28	420	84	1095	219	1095	219	1095	219	3285	657

Cost Norms: Rs.0.20 lacs/group (for capacity building, input assistance, marketing and for group specific activities)

4.1.2 Wheat:

4.1.2.1 Background:

Though the shift in the land use of agriculture sector to non- agriculture sector has been increased in the state, yet agriculture is still the main occupation of large number of the farmers in the state. Gujarat grows cereals on one third of its cultivated land. On an average it grows wheat on 0.9 – 1.6 m ha that comprise 23 per cent of the cereals. The average wheat production in Gujarat was 38.12 lakh MT (2011-12 to 2015-16). The average productivity of Gujarat is 29.43 q/ha. Within the state, wheat cultivation area in Saurashtra, North Gujarat, Middle Gujarat and South Gujarat are 37,31,30 and 2 per cent, respectively. The productivity is higher in Saurashtra followed by North Gujarat, Middle Gujarat and South Gujarat. Gujarat grows three types of wheat, bread wheat (*Triticum aestivum* L.) - 77 %, durum or macaroni wheat (*Triticum durum* Desf.) – 23 % and dicoccum (*Triticum dicoccum*) in scattered pockets. The state has nearly 45.90 per cent of the area under irrigation. Through, the irrigated wheat comprises 94 % of the total area, yet water stress at either end of the crop is a regular feature. The main thrust of the state is to increase the profitability of the farmers by way of sustainable agriculture and the judicious use of natural resources like water. The state has wide range of cropping systems viz. Cotton-Wheat-*Bajra*, Mung-Wheat-*Bajra*, Cotton-Wheat-Mung, Cotton-Wheat, Groundnut- Wheat, Paddy-Wheat-*Bajra*, Paddy-Wheat etc.

4.1.2.2 Crop/Area Issues:

- Lack of adequate supply of irrigation water and high pumping cost
- Seed supply : Use of inferior quality seeds, seed replacement rate is low
- Acute paucity of labour during peak seasons in major area of state
- Escalating cost of input resources and poor resource use efficiency
- Climate change impact
- Sustainability and reduction in cost of wheat cultivation
- Weed management
- Macro/ micro nutrient management
- Development of saline resistant, draught resistant and thermoresilient genotype
- Standardizing the design of storage structures and improving the storage conditions
- Fluctuating market prices

4.1.2.3 Priority for Comprehensive Wheat Cultivation:

- Enhanced use of ICTs for smart use of natural base in consonance to better Productivity and quality of wheat in relation to cropping pattern of the area
- With precise tolerance to high temperature at grain filling and maturity stage to adapt to short temperature window
- Genetic enhancement of nutritional densities of Zn and Fe in grains

- Awareness for product specific wheat varieties and quality of products with feasibility diversify fortified products

4.1.2.4 Current Status of Area, Production and Productivity

The district wise and year wise area, production and productivity under irrigated and rainfed wheat is given in Tables 4.1.43 to 4.1.46 and average values are presented in Table 4.1.47.

Table- 4.1.43 District-wise Area, Production and Yield in Gujarat state based on Final Forecast reports for the year 2014-15 and

2015-16

(Area: 00" hact. Prod: 00 MT" Yield : kg/ha)

IRRIGATED WHEAT

S. N.	DISTRICT	2014-15			2015-16			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	1365.15	3233.36	2368.50	1052.30	2686.10	2552.60	1208.73	2959.73	2448.64
2	Amreli	43.20	144.58	3346.80	73.11	227.34	3109.50	58.16	185.96	3197.64
3	Anand	651.05	1849.70	2841.10	595.74	1811.88	3041.40	623.40	1830.79	2936.81
4	Arvalli	662.00	1476.79	2230.80	642.00	1427.55	2223.60	652.00	1452.17	2227.26
5	Banaskantha	880.25	2728.42	3099.60	814.80	2407.90	2955.20	847.53	2568.16	3030.19
6	Bharuch	213.00	434.92	2041.90	180.25	377.64	2095.10	196.63	406.28	2066.28
7	Bhavnagar	54.94	157.86	2873.30	71.55	226.13	3160.40	63.25	191.99	3035.70
8	Botad	37.45	93.09	2485.70	61.15	176.82	2891.50	49.30	134.95	2737.37
9	Chhotaudepur	6.61	21.02	3180.70	6.55	23.35	3565.40	6.58	22.19	3372.17
10	Dahod	539.02	1025.59	1902.70	363.33	547.68	1507.40	451.18	786.64	1743.53
11	Dang	25.56	39.95	1563.00	25.07	37.13	1481.00	25.32	38.54	1522.40
12	Dev_Dwarka	23.68	97.36	4111.60	3.20	8.54	2668.30	13.44	52.95	3939.78
13	Gandhinagar	309.24	1080.95	3495.50	309.98	1019.52	3289.00	309.61	1050.24	3392.13
14	Gir Somnath	916.00	3591.18	3920.50	96.85	375.68	3879.00	506.43	1983.43	3916.53
15	Jamnagar	15.97	48.45	3033.60	7.95	22.64	2847.60	11.96	35.54	2971.78
16	Junagadh	746.60	3105.18	4159.10	91.15	338.54	3714.10	418.88	1721.86	4110.68
17	Kachchh	184.63	555.81	3010.40	300.38	857.95	2856.20	242.51	706.88	2914.90
18	Kheda	646.77	1663.36	2571.80	500.21	1321.90	2642.70	573.49	1492.63	2602.72
19	Mahesana	710.53	2094.15	2947.30	676.45	2003.78	2962.20	693.49	2048.96	2954.57
20	Mahisagar	261.86	701.92	2680.50	172.83	351.76	2035.30	217.35	526.84	2423.97
21	Morbi	209.93	879.21	4188.10	180.58	639.20	3539.70	195.26	759.20	3888.27
22	Narmada	19.41	35.02	1804.30	15.02	26.30	1750.70	17.22	30.66	1780.92
23	Navsari	3.13	8.72	2786.10	1.54	4.19	2718.30	2.34	6.45	2763.74

S. N.	DISTRICT	2014-15			2015-16			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
24	Panchmahal	220.53	410.27	1860.40	126.14	213.40	1691.80	173.34	311.84	1799.05
25	Patan	369.05	1068.14	2894.30	374.15	995.88	2661.70	371.60	1032.01	2777.20
26	Porbandar	174.50	593.49	3401.10	25.75	73.34	2848.10	100.13	333.42	3329.99
27	Rajkot	132.65	532.68	4015.70	151.10	562.05	3719.70	141.88	547.36	3858.08
28	Sabarkantha	863.60	2745.82	3179.50	848.10	2494.26	2941.00	855.85	2620.04	3061.33
29	Surat	135.45	301.90	2228.90	48.37	123.48	2552.90	91.91	212.69	2314.16
30	Surendranagar	317.90	965.46	3037.00	298.15	930.94	3122.40	308.03	948.20	3078.33
31	Tapi	47.50	124.16	2613.80	27.92	35.49	1271.20	37.71	79.82	2116.78
32	Vadodara	243.70	583.61	2394.80	267.90	706.48	2637.10	255.80	645.05	2521.68
33	Valsad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
GUJARAT		11030.86	32392.14	2936.50	8409.57	23054.84	2741.50	9720.21	27723.49	2852.15

Source: Directorate of Agriculture, Gandhinagar

Table - 4.1.44 District-wise Area, Production and Yield in Gujarat state based on Final Forecast reports for the year 2014-15 and

2015-16

(Area: 00" hact. Prod: 00 MT" Yield : kg/ha)

UNIRRIGATED WHEAT

S. N.	DISTRICT	2014-15			2015-16			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	511.22	425.18	831.70	89.48	59.39	663.70	300.35	242.28	806.67
2	Amreli	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
3	Anand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
4	Arvalli	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
5	Banaskantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
6	Bharuch	80.00	38.21	477.60	48.00	26.36	549.10	64.00	32.28	504.41
7	Bhavnagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
8	Botad	34.10	25.17	738.10	16.00	8.48	530.20	25.05	16.83	671.70

9	Chhotaudepur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
10	Dahod	1.59	1.11	700.70	0.88	0.48	544.40	1.24	0.80	645.01
11	Dang	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
12	Dev_Dwarka	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
13	Gandhinagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
14	Gir Somnath	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
15	Jamnagar	0.40	0.32	788.70	0.07	0.04	619.90	0.24	0.18	763.56
16	Junagadh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
17	Kachchh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
18	Kheda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
19	Mahesana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
20	Mahisagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
21	Morbi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
22	Narmada	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
23	Navsari	0.00	0.00	0.00	0.19	0.12	619.90	0.10	0.06	619.90
24	Panchmahal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
25	Patan	2.10	1.66	788.70	7.12	4.41	619.90	4.61	3.03	658.35
26	Porbandar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
27	Rajkot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
28	Sabarkantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
29	Surendranagar	53.00	50.13	945.90	5.65	4.38	775.00	29.33	27.26	929.44
30	Surat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
31	Tapi	1.22	0.96	788.70	0.00	0.00	0.00	0.61	0.48	788.70
32	Vadodara	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
33	Valsad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
GUJARAT STATE		683.63	542.74	793.91	167.39	103.66	619.28	425.51	323.20	759.56

Source: Directorate of Agriculture, Gandhinagar

Table- 4.1.45 Statement showing district-wise Area, Production and Yield in Gujarat state based on Final Forecast reports for the year 2014-15 and 2015-16 (Area: 00" hact. Prod: 00 MT" Yield : kg/ha)

TOTAL WHEAT

S. N.	DISTRICT	2014-15			2015-16			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	1876.37	3658.54	1949.80	1141.78	2745.49	2404.57	1509.08	3202.01	2121.84
2	Amreli	43.20	144.58	3346.80	73.11	227.34	3109.50	58.16	185.96	3197.64
3	Anand	651.05	1849.70	2841.10	595.74	1811.88	3041.40	623.40	1830.79	2936.81
4	Arvalli	662.00	1476.79	2230.80	642.00	1427.55	2223.60	652.00	1452.17	2227.26
5	Banaskantha	880.25	2728.42	3099.60	814.80	2407.90	2955.20	847.53	2568.16	3030.19
6	Bharuch	293.00	473.13	1614.79	228.25	404.00	1769.98	260.63	438.57	1682.75
7	Bhavnagar	54.94	157.86	2873.30	71.55	226.13	3160.40	63.25	191.99	3035.70
8	Botad	71.55	118.26	1652.81	77.15	185.30	2401.79	74.35	151.78	2041.41
9	Chhotaudepur	6.61	21.02	3180.70	6.55	23.35	3565.40	6.58	22.19	3372.17
10	Dahod	540.61	1026.71	1899.16	364.21	548.16	1505.07	452.41	787.44	1740.53
11	Dang	25.56	39.95	1563.00	25.07	37.13	1481.00	25.32	38.54	1522.40
12	Dev_Dwarka	23.68	97.36	4111.60	3.20	8.54	2668.30	13.44	52.95	3939.78
13	Gandhinagar	309.24	1080.95	3495.50	309.98	1019.52	3289.00	309.61	1050.24	3392.13
14	Gir Somnath	916.00	3591.18	3920.50	96.85	375.68	3879.00	506.43	1983.43	3916.53
15	Jamnagar	16.37	48.76	2978.75	8.02	22.68	2828.16	12.20	35.72	2929.23
16	Junagadh	746.60	3105.18	4159.10	91.15	338.54	3714.10	418.88	1721.86	4110.68
17	Kachchh	184.63	555.81	3010.40	300.38	857.95	2856.20	242.51	706.88	2914.90
18	Kheda	646.77	1663.36	2571.80	500.21	1321.90	2642.70	573.49	1492.63	2602.72
19	Mehesana	710.53	2094.15	2947.30	676.45	2003.78	2962.20	693.49	2048.96	2954.57
20	Mahisagar	261.86	701.92	2680.50	172.83	351.76	2035.30	217.35	526.84	2423.97
21	Morbi	209.93	879.21	4188.10	180.58	639.20	3539.70	195.26	759.20	3888.27
22	Narmada	19.41	35.02	1804.30	15.02	26.30	1750.70	17.22	30.66	1780.92
23	Navsari	3.13	8.72	2786.10	1.73	4.30	2487.84	2.43	6.51	2679.93
24	Panchmahal	220.53	410.27	1860.40	126.14	213.40	1691.80	173.34	311.84	1799.05

S. N.	DISTRICT	2014-15			2015-16			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
25	Patan	371.15	1069.80	2882.39	381.27	1000.29	2623.57	376.21	1035.04	2751.24
26	Porbandar	174.50	593.49	3401.10	25.75	73.34	2848.10	100.13	333.42	3329.99
27	Rajkot	132.65	532.68	4015.70	151.10	562.05	3719.70	141.88	547.36	3858.08
28	Sabarkantha	863.60	2745.82	3179.50	848.10	2494.26	2941.00	855.85	2620.04	3061.33
29	Surat	135.45	301.90	2228.90	48.37	123.48	2552.90	91.91	212.69	2314.16
30	Surendranagar	370.90	1015.60	2738.19	303.80	935.32	3078.74	337.35	975.46	2891.53
31	Tapi	48.72	125.12	2568.10	27.92	35.49	1271.20	38.32	80.30	2095.64
32	Vadodara	243.70	583.61	2394.80	267.90	706.48	2637.10	255.80	645.05	2521.68
33	Valsad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
STATE		11714.5	32934.9	2811.5	8577.0	23158.5	2700.1	10145.7	28046.7	2764.4

Table 4.1.46 District-wise Area, Production and Productivity of Wheat during 2016-17

A-Area in '00ha; P – Production in '00 T; Y - Productivity in q/ha)

S.N.	Districts	Area (ha)		Total Area (ha)	Production (Mt T)		Total Prod. (ha)	Productivity (kg/ha)		Average (Q/ha)
		Irri.	Unirri.		Irri.	Unirri.		Irri.	Unirri.	
1	Ahmedabad	104754	46880	151634	30786	13928	279180	29.39	29.71	29.55
2	Amreli	8568	0	8568	2518	0	30888	29.39	0	29.39
3	Anand	60578	0	60578	17716	0	177768	29.24	0	29.24
4	Aravalli	66606	0	66606	19574	0	120204	29.39	0	29.39
5	Banaskantha	75480	0	75480	22182	0	616680	29.39	0	29.39
6	Bharuch	16626	2314	18940	4886	687	89316	29.39	29.71	29.55
7	Bhavanagar	14586	125	14711	4287	30	67608	29.39	24.19	26.79
8	Botad	7956	0	7956	2338	0	16956	29.39	0	29.39
9	Chota Udepura	510	0	510	150	0	21492	29.34	0	29.34

S.N.	Districts	Area (ha)		Total Area (ha)	Production (Mt T)		Total Prod. (ha)	Productivity (kg/ha)		Average (Q/ha)
		Irri.	Unirri.		Irri.	Unirri.		Irri.	Unirri.	
10	Dahod	43962	232	44194	12920	59	127224	29.39	25.63	27.51
11	Dang	2346	0	2346	690	0	27216	29.39	0	29.39
12	Dev_Dwarka	3162	0	3162	929	0	46980	29.38	0	29.38
13	Gandhinagar	29274	0	29274	8604	0	77112	29.39	0	29.39
14	Gir Somnath	49776	0	49776	14628	0	114696	29.39	0	29.39
15	Jamnagar	7140	0	7140	2099	0	32832	29.40	0	29.40
16	Junagadh	44290	0	44290	12890	0	150660	29.10	0	29.10
17	Kachchh	21726	0	21726	6384	0	116532	29.39	0	29.39
18	Kheda	81600	0	81600	23981	0	157896	29.39	0	29.39
19	Mahesana	74911	0	74911	21822	0	195048	29.13	0	29.13
20	Mahisagar	22440	0	22440	6595	0	51516	29.39	0	29.39
21	Morbi	13464	0	13464	3957	0	51084	29.39	0	29.39
22	Narmada	1326	0	1326	389	0	15552	29.35	0	29.35
23	Navasari	204	0	204	60	0	27972	29.24	0	29.24
24	Panchmahal	12750	0	12750	3747	0	51840	29.39	0	29.39
25	Patan	35598	2460	38058	10462	718	219456	29.39	29.17	29.28
26	Porbandar	8262	0	8262	2428	0	102816	29.39	0	29.39
27	Rajkot	61200	0	61200	17986	0	135432	29.39	0	29.39
28	Sabarkantha	90780	0	90780	26679	0	141156	29.39	0	29.39
29	Surat	4590	0	4590	1349	0	125712	29.38	0	29.38
30	Surendranagar	37026	850	37876	10881	210	190404	29.39	24.67	27.03
31	Tapi	3570	0	3570	1049	0	46224	29.40	0	29.40
32	Vadodara	20462	0	20462	6026	0	67500	29.45	0	29.45
33	Valsad	937	0	937	281	0	25596	29.99	0	29.99
Total		1026460	52860	1079320	300961	15601	34433	29.32	29.89	29.60

Table 4.1.47 District-wise Area, Production and Productivity of Wheat during 2017-18

(Area in '00ha; P - Production in '00 T; Y - Productivity in q/ha)

S. N.	District	Area (ha)		Area (ha)	Production (Mt T)		Total Area(ha)	Av.Prodvty (Q/ha)
		Irri.	Unirri.	Total	Irri.	Unirri.	Total	Average
1	Ahmedabad	102700	46600	149300	30451	13817	258500	29.65
2	Amreli	8400	0	8400	2491	0	28600	29.65
3	Anand	59100	0	59100	17523	0	164600	29.65
4	Aravalli	65300	0	65300	19361	0	111300	29.65
5	Banaskantha	74000	0	74000	21941	0	571000	29.65
6	Bharuch	16300	2300	18600	4833	682	82700	29.65
7	Bhavanagar	14300	100	14400	4240	30	62600	29.83
8	Botad	7800	0	7800	2313	0	15700	29.65
9	Chota Udepura	500	0	500	148	0	19900	29.60
10	Dahod	43100	200	43300	12779	59	117800	29.65
11	Dang	2300	0	2300	682	0	25200	29.65
12	Dev_Dwarka	3100	0	3100	919	0	43500	29.65
13	Gandhinagar	28700	0	28700	8510	0	71400	29.65
14	Gir Somnath	48800	0	48800	14469	0	106200	29.65
15	Jamnagar	7000	0	7000	2076	0	30400	29.66
16	Junagadh	43000	0	43000	12750	0	139500	29.65
17	Kutch	21300	0	21300	6315	0	1,07,900	29.65
18	Kheda	80000	0	80000	23720	0	1,46,200	29.65
19	Mahesana	72800	0	72800	21585	0	1,80,600	29.65
20	Mahisagar	22000	0	22000	6523	0	47700	29.65
21	Morbi	13200	0	13200	3914	0	47300	29.65
22	Narmada	1300	0	1300	385	0	14400	29.62
23	Navasari	200	0	200	59	0	25900	29.50
24	Panchmahal	12500	0	12500	3706	0	48000	29.65

25	Patan	34900	2400	37300	10348	712	203200	29.65
26	Porbandar	8100	0	8100	2402	0	95200	29.65
27	Rajkot	60000	0	60000	17790	0	125400	29.65
28	Sabarkantha	89000	0	89000	26389	0	130700	29.65
29	Surat	4500	0	4500	1334	0	116400	29.64
30	Surendranagar	36300	700	37000	10763	208	176300	29.65
31	Tapi	3500	0	3500	1038	0	42800	29.66
32	Vadodara	20100	0	20100	5960	0	62500	29.65
33	Valsad	100	0	100	0	100	23700	0.00
	State	1004000	52200	1056200	297686	15477	34433	29.65

Source: Directorate of Agriculture, Gandhinagar

Table - 4.1.48 Statement of breeder Seed Indent (M Tonnes) and production of major crops 2017-18								Projected	Projected
Crop	2018-19 Targets	2018-19 Targets	2015-16	2016-17	2017-18			2018-19	2019-20
				1 st Advance Estimates	4 th Advance Estimates	Targets	1 st Advance Estimates	Targets	Targets
Wheat	97.50	97.50	92.29	--	98.38	97.50	119.37	99.94	102.44
Cereals	128.25	128.25	119.56	126.33	129.10	128.25	125.96	131.46	134.74
	123.40	123.40	115.66	--	123.63	123.40	--	126.49	129.65
	251.65	251.65	235.22	126.33	252.73	251.65	125.96	257.94	264.39
Total Foodgrains	137.00	137.00	125.09	135.03	138.52	137.00	134.67	140.43	143.94
	137.55	137.55	126.47	--	137.16	137.55	--	140.99	144.51
	274.55	274.55	251.57	135.03	275.68	274.55	134.67	281.41	288.45

4.1.2.5 Major Wheat Varieties:

In *rabi* season, wheat is dominant crops having near about 70% area. The varieties developed/endorsed by SAUs and grown in the state are given in Table4.1.49.

NARP ZONE	District covered	Name of the Prevalent varieties	Production condition	Area under the variety (ha)	Duration (Early, medium, late)	Disease reaction (Susceptible/ resistant)	Abiotic stress reaction (Susceptible/ resistant)	Potential Av.Yield (tones/ha)	Special Features
GJ-1 South Guj. Heavy Rainfall Zone	Dang Valsad, valod, Vyara, Songadh & Mahuva taluka of Surat	GW 451 GW 496 GW 173*	Timely Sown *Late Sown	GW 496, GW 451, GW 322, GW 366,	Medium *Early	+ Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.5 3.8 3.6	GW 451 having :
					Medium *Early	+ Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.5 3.8 4.0 3.6 -	
					Medium *Early	+ Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.5 3.8 4.0 4.2	
GJ-2 South Guj. Zone	Surat&Amod, Ankleshwar, Broach, Dediapada, Honsot,Jhagadia, Nanded, Sagbara & Valia taluka of Broach	GW 451 GW 496 GW 322 GW 173*	Timely Sown *Late Sown	GW 173 and GW 273 are the most popular varieties in that order.	Medium *Early	+ Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.5 3.8 4.0 3.6 -	
GJ-3 Middle Guj. Zone	Panchmahal, Baroda & Anand, Balasinor, Borsad, Kapadvanj, Kheda,Matar, Ahmedabad, Nadiad, Petlad & Thasara taluka of	GW 451 GW 496 GW 322 GW 273 GW 366 GW 173*	Timely Sown *Late Sown		Medium *Early	+ Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.5 3.8 4.0 4.2	

	Kheda							4.0	
								3.8	
GJ-4 North Guj. Zone	Sabarkantha Gandhinagar Dehgam Daskoi Sanand taluka of A'bad, Deesa, Dhanera, Palanpur, Danta, Wadgam taluka of B.K. & Chansma, Kadi, kalol, Kheralu, Mahesana, Patan, Sidhpur, Visnagar, Vijapur taluka of Mahesana	GW 451 GW 496 GW 322 GW 273 GW 366 GW 173* GW 1@ GW 1255 (D)	Timely Sown *Late Sown @ Rainfed		Medium *Early	* Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.4 3.8 4.0 4.2 4.0 3.8 0.9 3.2	
GJ-5 North- West Zone	Kutch, Rajkot, Malia, Halvad, Dhanghra, Dasada taluka of Surendranagar, Sami, Harij taluka of Mahesana, Santalpur, Radhanpur, Kankrej, Deodar, Vav, Tharad taluka of B.K. & Viramgam taluka of A'bad	Lok.1+ GW 496 GW 322 GW 273 GW 366 GW 173* GW 1@ GW 1255 (D)	Timely Sown *Late Sown @ Rainfed		Medium *Early	* Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.2 3.6 3.8 4.0 4.0 3.6 0.8 3.2	
GJ-6	Jamnagar, Rajkot, Chotila, Limbdi,	GW 451 GW 496	Timely Sown		Medium	* Susceptible	Heat tolerance:	3.2	

North Saurashtra Zone	Lakhtar, Muli, Sayla, Wadhwan taluka of Surendranagar & Gadhda, Umralla, Botad, kandla, Dihor Gariadhar, Palitana taluka of Bhavnagar and Amreli, Babra, Lathi, lilia, kunkavav, Khamba, Dhari taluka of Amreli	GW 322 GW 273 GW 366 GW 173* GW 1255 (D)	*Late Sown		*Early	Resistant	GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.6 3.8 4.0 4.0 3.6 3.2	
GJ-7 South Saurashtra Zone	Junagadh, Ghodha, Talaja, Mauuva taluka of Bhavnagar, Kodinar, Rajula & Jafrabad taluka of Amreli and Dhoraji, Jetpur, Upleta talukas of Rajkot	GW 366 GW 496 GW 322 GW 273 GW 366 GW 173* GW 1139 (D)	Timely Sown *Late Sown		Medium *Early	+ Susceptible Resistant	Heat tolerance: GW 322, GW 273, GW 173 and GW 11 (yet to be popularized)	3.4 4.0 4.3 4.5 4.5 3.8 3.6	
GJ-8 Bhal & Coastal Zone	Bhavnagar(Vallabhipur, Bhavnagar taluka) Ahmedabad(Dholka, Dhandhuka taluka) and Vagra, Jambusar taluka of Bharuch	GW 451 GW496 GW 173* A 206@, GW1@ GW 1139	Timely sown *Late sown @ Rainfed		Medium *Early	+ Susceptible Resistant	GW 1, A 206 are triple abiotic stress tolerant (Heat, water & salinity)	2.2 2.5 2.3 0.5 0.8 2.1	

4.1.2.6 Input Management:

The seed replacement rate is very low as in wheat crop may be attained up to a desired level of 40 %. The requirement of major inputs like seed, fertilizer, chemicals and pesticides for wheat crop is presented below.

4.1.2.6.1 Seed:

The area under wheat is 10 per cent of totalcultivable area. At present the seed replacement ratio (SRR) of wheat is 20 per cent. Thus, the scope of SRR is ambient in future to enhance the productivity of self pollinated crops like wheat in the state especially through seed village concept. The projected seed requirement was calculated based on year 2014-15.

S. N.	District	Area ('000 ha)	Seed rate kg/ha	Total Seed quantity 2014-15 (T)	Req.Total Seed quantity (T)	SRR	2017-18	2018-19	2019-20
1	Ahmedabad	151	120	18120	37972	20.96	10384	12378	15210
2	Amreli	58	120	6960	7659	11.00	2148	2513	2998
3	Anand	62	120	7440	12728	17.11	3452	4141	5135
4	aravali	65	120	7800	580	0.74	141	184	255
5	Banaskantha	85	120	10200	23496	23.04	6670	7731	9095
6	Bharuch	26	120	3120	4723	15.14	1305	1544	1874
7	Bhavnagar	6	120	720	2154	29.92	604	707	843
8	Botad	8	120	960	1254	13.06	362	415	477
9	ChottaUdaipur	7	120	840	580	6.90	141	184	255
10	Dahod	45	120	5400	7211	13.35	1965	2348	2898
11	Dang	3	120	360	1254	34.83	362	415	477
12	Dev_Dwarka	2	120	240	1254	52.25	362	415	477
13	Gandhinagar	31	120	3720	6995	18.80	1913	2280	2802
14	Gir Somnath	51	120	6120	580	0.95	141	184	255
15	Jamnagar	12	120	1440	7218	50.13	1958	2348	2912
16	Junagadh	42	120	5040	36379	72.18	10206	11934	14239
17	Kutch	24	120	2880	4360	15.14	1114	1398	1848
18	Kheda	57	120	6840	9187	13.43	2255	2920	4012
19	Mahesana	70	120	8400	10266	12.22	2622	3292	4352
20	Mahisagar	22	120	2640	2113	8.00	600	695	818
21	Morbi	20	120	2400	580	2.42	141	184	255
22	Narmada	17	120	2040	12535	61.45	3623	4143	4769

23	Navsari	2	120	240	580	24.17	141	184	255
24	Panchmahal	17	120	2040	5699	27.94	1546	1854	2299
25	Patan	38	120	4560	12051	26.43	3435	3969	4647
26	Porbandar	10	120	1200	4132	34.43	1093	1336	1703
27	Rajkot	142	120	17040	27284	16.01	7654	8951	10679
28	Sabarkantha	149	120	17880	39337	22.00	11167	12943	15227
29	Surat	9	120	1080	2113	19.56	600	695	818
30	Surendranagar	34	120	4080	16034	39.30	4498	5260	6276
31	Tapi	4	120	480	580	12.08	141	184	255
32	Vadodara	26	120	3120	10090	32.34	2789	3298	4003
33	Valsad	0	0	0	0	0.00	0	0	0
	Total	1295	3840	4972800	308978	22.64	85533	101027	122418

Table - 4.1.50 B Seed Requirement for Wheat (based on 2017-18)

S. N.	District	Area ('000 ha)	Seed rate kg/ha	Total Req.Seed (T)	ReqTotal Seed quantity (T)	SRR	2017-18	2018-19	2019-20
1	Ahmedabad	190	120	22800	37972	27	10384	12378	15210
2	Amreli	32	120	3840	7659	35	2148	2513	2998
3	Anand	67	120	8040	12728	25	3452	4141	5135
4	aravali	5	120	600	580	10	141	184	255
5	Banaskantha	89	120	10680	23496	40	6670	7731	9095
6	Bharuch	22	120	2640	4723	30	1305	1544	1874
7	Bhavnagar	9	120	1080	2154	35	604	707	843
8	Botad	4	120	480	1254	50	362	415	477
9	ChottaUdaipur	5	120	600	580	10	141	184	255
10	Dahod	37	120	4440	7211	26	1965	2348	2898
11	Dang	4	120	480	1254	50	362	415	477
12	Dev Dwarka	4	120	480	1254	50	362	415	477
13	Gandhinagar	35	120	4200	6995	27	1913	2280	2802
14	Gir Somnath	5	120	600	580	10	141	184	255
15	Jamnagar	38	120	4560	7218	25	1958	2348	2912
16	Junagadh	152	120	18240	36379	35	10206	11934	14239
17	Kutch	31	120	3720	4360	15	1114	1398	1848
18	Kheda	76	120	9120	9187	11	2255	2920	4012
19	Mahesana	73	120	8760	10266	15	2622	3292	4352
20	Mahisagar	8	120	960	2113	40	600	695	818
21	Morbi	5	120	600	580	10	141	184	255
22	Narmada	40	120	4800	12535	50	3623	4143	4769
23	Navsari	5	120	600	580	10	141	184	255

24	Panchmahal	30	120	3600	5699	25	1546	1854	2299
25	Patan	44	120	5280	12051	42	3435	3969	4647
26	Porbandar	25	120	3000	4132	20	1093	1336	1703
27	Rajkot	114	120	13680	27284	35	7654	8951	10679
28	Sabarkantha	149	120	17880	39337	40	11167	12943	15227
29	Surat	8	120	960	2113	40	600	695	818
30	Surendranagar	67	120	8040	16034	35	4498	5260	6276
31	Tapi	5	120	600	580	10	141	184	255
32	Vadodara	47	120	5640	10090	30	2789	3298	4003
33	Valsad	0	0	0	0	0	0	0	0
	Total	1425	3840	171000	308978	913	85533	101027	122418

4.1.2.6.2 Fertilizer:

District-wise consumption of fertilizers, NPK consumption and ratio in *Rabi* crop are given in Tables 4.1.51 and 4.1.52. The projected fertilizer requirement was calculated based on year 2017-18 and is given in Table 4.1.53.

Table 4.1.51 District-wise NPK(MT) requirement and Ratio in *Rabi* Crop in 2015-16.

S. N.	District	Area ('000 ha)	Nutrient Requirement (MT/ha)			Total NPK	N:P:K Ratio
			N	P	K		
1	Ahmedabad	190	31008	12400	1420	43828	21.84:4.85:1.00
2	Amreli	32	5222	1920	322	7464	16.24:3.46:1.00
3	Anand	67	10934	4020	3745	18700	6.79:1.39:1.00
4	aravali	4	653	240	31	924	20.92:5.23:1.00
5	Banaskantha	89	14525	5340	1507	21372	9.64:2.24:1.00
6	Bharuch	22	3590	1320	617	5527	5.82:1.21:1.00
7	Bhavnagar	9	1469	540	190	2198	7.75:1.99:1.00
8	Botad	4	653	240	31	924	20.92:5.23:1.00
9	ChottaUdaipur	4	653	240	31	924	20.92:5.23:1.00
10	Dahod	37	6038	2220	368	8627	16.39:3.90:1.00
11	Dang	4	653	240	31	924	20.92:5.23:1.00
12	Dev_Dwarka	8	1306	480	168	1954	7.77:1.69:1.00
13	Gandhinagar	35	5712	2100	647	8459	8.83:3.74:1.00

14	Gir Somnath	19	3100.75	1140	106.25	4347	5.20:2.21:1.00
15	Jamnagar	38	6202	2280	1043	9524	5.95:1.32:1.00
16	Junagadh	152	24806	9120	2959	36886	8.38:1.91:1.00
17	Kutch	31	5059	1860	628	7547	8.06:1.61:1.00
18	Kheda	76	12403	4560	425	17388	29.20:6.21:1.00
19	Mahesana	73	11914	4380	1583	17876	7.53:1.79:1.00
20	Mahisagar	19	3100.75	1140	106.25	4347	5.20:2.21:1.00
21	Morbi	9	1469	540	190	2198	7.75:1.99:1.00
22	Narmada	40	6528	2400	990	9918	6.59:1.37:1.00
23	Navsari	0	600	100	20	720	6.59:1.37:1.00
24	Panchmahal	30	4896	1800	541	7237	9.05:1.92:1.00
25	Patan	44	7181	2640	244	10064	29.48:6.55:1.00
26	Porbandar	25	4080	1500	342	5922	11.93:2.91:1.00
27	Rajkot	114	18605	6840	2150	27595	8.65:2.11:1.00
28	Sabarkantha	149	24317	8940	2960	36217	8.21:1.79:1.00
29	Surat	8	1306	480	168	1954	7.77:1.69:1.00
30	Surendranagar	67	10934	4020	1298	16253	8.42:1.96:1.00
31	Tapi	5	816	300	130	1246	6.30:1.34:1.00
32	Vadodara	47	7670	2820	712	11202	10.78:2.20:1.00
33	Valsad	0	570	265	48	883	10.85:2.22:1.00
	Total	1295	237973.5	88425	25751.5	351149	8.84:2.83:1.00

Table - 4.1.52 A Districtwise Fertilizers Requirement in Rabi 2018-19 (Estimated)

S.N.	District	Urea	DAP	MOP	NPK	SSP	Total	ZnSO ₄	FeSO ₄
1	Ahmedabad	51600	10000	1600	4600	3500	71300	1870	3420
2	Amreli	32100	16100	1300	7500	2600	59600	315	576
3	Anand	65600	4200	4100	6100	2700	82700	659	1206
4	Arvalli	31600	5000	3400	8100	1600	49700	660	1207
5	Banaskantha	77700	15600	7600	23400	3400	127700	876	1602
6	Bharuch	25200	3700	3600	8400	4400	45300	216	396
7	Bhavnagar	34000	12200	1800	9400	4800	62200	62	113
8	Botad	19600	5300	900	4100	2000	31900	36	65
9	Chhotaudepur	29900	2600	2400	3400	1800	40100	157	288
10	Dahod	14700	2600	800	2400	900	21400	258	473
11	Dang	800	600	500	600	600	3100	39	72
12	Dev Dwarka	13200	6400	900	5100	1700	27300	123	226
13	Gandhinagar	25600	3900	2100	5900	1800	39300	344	630
14	Gir Somnath	19200	6800	1000	5400	1700	34100	598	1094
15	Jamnagar	18900	9500	900	7600	2400	39300	239	438
16	Junagadh	33000	12700	1800	9800	2600	59900	1047	1915
17	Kheda	48900	4600	2600	3700	2800	62600	223	407
18	Kutch	41700	11500	800	4700	1400	60100	748	1368
19	Mahesana	51200	7900	2050	7200	1600	69950	718	1314
20	Mahisagar	26300	2400	900	3200	1300	34100	116	212
21	Morbi	25100	8700	1200	9100	2400	46500	303	555
22	Narmada	13100	1700	2600	2100	1100	20600	394	720
23	Navsari	14300	4900	4700	7200	4000	35100	0	0
24	Panchmahal	24800	2300	800	3500	600	32000	295	540
25	Patan	33500	5900	900	4500	1000	45800	433	792
26	Porbandar	9400	4100	700	3200	800	18200	246	450
27	Rajkot	48100	17100	2150	19800	5200	92350	1122	2052
28	Sabarkantha	36700	5800	4400	9800	2100	58800	953	1743
29	Surat	30800	14000	12800	26800	10400	94800	79	144
30	Surendranagar	48000	13900	1000	10900	1900	75700	507	929
31	Tapi	6900	2200	1400	4400	1700	16600	49	90
32	Vadodara	43000	3500	3150	4600	2200	56450	462	846
33	Valsad	5500	2300	3150	3500	1000	15450	0	0
	Total	1000000	230000	80000	240000	80000	1630000	14149	25883

Table 4.1.52 B Districtwise Projected fertilizer requirement Rabi 2019-20 (In terms of Material) and NPK ratio (In Metric Tonnes* Estimated)

S.N.	District	UREA	DAP	MOP	SSP	AS	20:20:0	15:15:15	12:32:16	10:26:26	24.24:0	N	P	K	Ratio N:P:K		
1	Ahmedabad	57473	12783	1393	2625	1620	3771	35	1425	100	55	30026	7555	1095	27.42	6.90	1.00
2	Amreli	48555	14913	1071	1750	1800	2571	35	4275	100	193	26479	9100	1358	19.50	6.70	1.00
3	Anand	53509	4261	2679	2450	7380	4029	175	665	100	55	27836	3436	1766	15.76	1.95	1.00
4	Arvalli	32700	3728	2679	2013	2160	3857	123	3325	800	165	17466	4138	2366	7.38	1.75	1.00
5	Banas kantha	81255	18109	4714	3063	5400	8143	70	6175	6000	275	44795	14061	5387	8.32	2.61	1.00
6	Bharuch	27745	3302	3000	4025	2700	3857	18	1900	1200	220	15088	3910	2419	6.24	1.62	1.00
7	Bhavnagar	40627	10652	1929	3938	4050	5743	70	5700	200	330	23383	8644	2132	10.97	4.06	1.00
8	Botad	21800	5326	964	1750	1440	2143	35	1425	200	110	11935	3698	864	13.82	4.28	1.00
9	Chhota Udepur	32700	2876	2464	1313	1620	2229	35	950	100	110	16495	2340	1662	9.93	1.41	1.00
10	Dahod	13873	2130	643	438	270	1714	18	285	100	28	7217	1519	460	15.69	3.30	1.00
11	Dev_Dwarka	13873	5859	1071	1313	720	1886	35	3800	100	28	8439	4536	1282	6.58	3.54	1.00
12	Gandhinagar	18827	3835	964	1313	1800	3000	35	1900	1300	110	10711	3552	1226	8.74	2.90	1.00
13	Gir Somnath	19818	8522	964	1313	720	2143	35	3325	100	110	11668	5680	1142	10.22	4.97	1.00
14	Jamnagar	25764	9587	964	1750	1080	2829	35	5225	100	138	15040	6992	1446	10.40	4.84	1.00
15	Junagadh	41618	18109	1607	2625	2700	3771	70	6650	100	248	24592	11728	2065	11.91	5.68	1.00
16	Kheda	55491	4261	2143	2625	2880	3000	35	570	100	55	27583	3207	1408	19.59	2.28	1.00
17	Kutch	43600	11717	643	1313	1170	2400	210	570	300	55	23029	6385	586	39.27	10.89	1.00
18	Mahesana	34682	9054	1286	1313	3150	3771	140	1900	500	165	19325	5928	1226	15.76	4.83	1.00
19	Mahisagar	28736	2663	964	875	1710	2143	35	380	100	55	14553	1960	671	21.70	2.92	1.00
20	Morbi	28736	9054	1071	1750	1260	3000	70	6460	100	110	16530	7175	1713	9.65	4.19	1.00

21	Narmada	15855	1065	2250	1050	900	943	18	475	200	55	7952	1066	1481	5.37	0.72	1.00
22	Navsari	14864	3728	5357	4375	2880	2743	665	1710	300	220	9038	3741	3666	2.47	1.02	1.00
23	Panch Mahal	27745	2557	643	438	1260	2400	35	760	100	55	14082	2014	539	26.15	3.74	1.00
24	Patan	35673	7457	750	438	1260	3857	35	760	200	55	18912	4585	629	30.07	7.29	1.00
25	Porbandar	8918	3728	536	438	450	1714	35	1520	150	55	5425	2672	609	8.91	4.39	1.00
26	Rajkot	55491	20239	3857	5688	3150	11143	175	14250	500	275	33899	17231	4751	7.14	3.63	1.00
27	Sabar Kantha	41618	7457	4179	1750	2520	4800	140	5700	800	220	22803	6776	3648	6.25	1.86	1.00
28	Surat	45582	13848	12857	9188	7200	7286	560	7125	4500	990	28027	13069	10108	2.77	1.29	1.00
29	Surendranagar	55491	15978	1393	1750	1170	11143	140	2850	300	165	31304	10909	1391	22.51	7.84	1.00
30	Tapi	12882	2024	1607	1750	1980	2229	105	950	900	110	7390	2237	1366	5.41	1.64	1.00
31	Dangs	991	320	321	263	90	171	18	95	50	28	592	276	224	2.65	1.23	1.00
32	Vadodara	47564	4261	4286	1750	2340	3857	53	1425	100	110	24115	3528	2833	8.51	1.25	1.00
33	Valsad	5945	1598	3750	1575	1170	1714	210	475	200	550	3847	1697	2410	1.60	0.70	1.00
	TOTAL	1090000	245000	75000	70000	72000	120000	3500	95000	20000	5500	599577	185345	65925	9.09	2.81	1.00

Table 4.1.53 Districtwise NPK Consumption Ratio in Rabi crop in 2017-18 (Quantity in Y)

S.N.	District	Area ('000 ha)	Nutrient Consumption (MT/ha)			Total NPK	N:P:K Ratio
			N	P	K		
1	Ahmedabad	190	31008	12400	1420	43828	21.84:4.85:1.00
2	Amreli	32	5222	1920	322	7464	16.24:3.46:1.00
3	Anand	67	10934	4020	3745	18700	6.79:1.39:1.00
4	aravali	4	653	240	31	924	20.92:5.23:1.00
5	Banaskantha	89	14525	5340	1507	21372	9.64:2.24:1.00
6	Bharuch	22	3590	1320	617	5527	5.82:1.21:1.00
7	Bhavnagar	9	1469	540	190	2198	7.75:1.99:1.00
8	Botad	4	653	240	31	924	20.92:5.23:1.00
9	ChottaUdaipur	4	653	240	31	924	20.92:5.23:1.00

10	Dahod	37	6038	2220	368	8627	16.39:3.90:1.00
11	Dang	4	653	240	31	924	20.92:5.23:1.00
12	Dev_Dwarka	8	1306	480	168	1954	7.77:1.69:1.00
13	Gandhinagar	35	5712	2100	647	8459	8.83:3.74:1.00
14	Gir Somnath	19	3100.75	1140	106.25	4347	5.20:2.21:1.00
15	Jamnagar	38	6202	2280	1043	9524	5.95:1.32:1.00
16	Junagadh	152	24806	9120	2959	36886	8.38:1.91:1.00
17	Kutch	31	5059	1860	628	7547	8.06:1.61:1.00
18	Kheda	76	12403	4560	425	17388	29.20:6.21:1.00
19	Mahesana	73	11914	4380	1583	17876	7.53:1.79:1.00
20	Mahisagar	19	3100.75	1140	106.25	4347	5.20:2.21:1.00
21	Morbi	9	1469	540	190	2198	7.75:1.99:1.00
22	Narmada	40	6528	2400	990	9918	6.59:1.37:1.00
23	Navsari	0	600	100	20	720	6.59:1.37:1.00
24	Panchmahal	30	4896	1800	541	7237	9.05:1.92:1.00
25	Patan	44	7181	2640	244	10064	29.48:6.55:1.00
26	Porbandar	25	4080	1500	342	5922	11.93:2.91:1.00
27	Rajkot	114	18605	6840	2150	27595	8.65:2.11:1.00
28	Sabarkantha	149	24317	8940	2960	36217	8.21:1.79:1.00
29	Surat	8	1306	480	168	1954	7.77:1.69:1.00
30	Surendranagar	67	10934	4020	1298	16253	8.42:1.96:1.00
31	Tapi	5	816	300	130	1246	6.30:1.34:1.00
32	Vadodara	47	7670	2820	712	11202	10.78:2.20:1.00
33	Valsad	0	570	265	48	883	10.85:2.22:1.00
	Total	1451	237973.5	88425	25751.5	351149	8.84:2.83:1.00

4.1.2.6.3 Pesticides: Districtwise requirement of pesticides for termite and weed management is given in table 4.1.54 and 4.1.55

Table- 4.1.54 A Present Scenario of Chemical Pesticides in Gujarat: in Gujarat Status and Projected Use of Pesticides (2017-18 to 2019-20) (Kg)

S. No.	District	Present	Projected Use		
		2016-17	2017-18	2018-19	2019-20
1	Ahmedabad	79633	84411	85207	92024
2	Amreli	113103	119889	121020	130702
3	Anand	193542	205155	207090	223657
4	Aravalli	5810	6159	6217	6714
5	Banaskantha	23069	24452	24683	26658
6	Bharuch	32563	34517	34842	37630
7	Bhavnagar	46084	48849	49309	53255
8	Botad	23042	24424	24655	26627
9	Chota Udepur	14771	15657	15805	17069
10	Dahod	7385	7828	7902	8534
11	Dang	12625	13383	13509	14589
12	Dev Dwarka	6265	6641	6704	7240
13	Gandhinagar	35209	37322	37674	40688
14	Gir Somnath	6125	6493	6554	7078
15	Jamnagar	8575	9090	9175	9909
16	Junagadh	12250	12985	13108	14156
17	Kuchchh	147648	156507	157983	170622
18	Kheda	60954	64611	65221	70438
19	Mahesana	118000	125080	126260	136361
20	Mahasagar	2585	2740	2766	2987
21	Morbi	4386	4649	4692	5068
22	Narmada	209400	24452	24683	26658
23	Navsari	104700	12226	12342	13329
24	Panchmahal	32955	34932	35262	38083
25	Patan	12530	13282	13407	14480
26	Porbandar	16600	17596	17762	19183

27	Rajkot	12250	12985	13108	14156
28	Sabarkantha	5170	5480	5532	5974
29	Surat	125025	132527	133777	144479
30	Surendranagar	87518	92769	93644	101135
31	Tapi	35168	37278	37630	40640
32	Vadodara	14771	15657	15805	17069
33	Valsad	11928	12644	12763	13784
	Total	1621637	1422669	1436089	1550976

Table- 4.1.54 B District-wise Requirement of Pesticides for Wheat (2017-18 to 2019-20)

S. N.	Districts	Area (‘00 ha)	Seed Rate kg/ha	Total Seed Quantity(T)	Pesticides Quantity Required, T			
					Seed Treatment		Broad Casting	For Weed Pendimethaline
					Bifenthrin	Fipronil	Fipronil	
1	Ahmedabad	1900	120	22800	32	96	213	439
2	Amreli	320	120	3840	6	16	36	74
3	Anand	670	120	8040	11	34	75	155
4	Arvali	671	54	3623.4	11	34	75	155
5	Banaskantha	890	120	10680	15	45	99	206
6	Bharuch	220	120	2640	4	11	25	51
7	Bhavnagar	50	66	330	1	2	6	12
8	Botad	111	36	399.6	2	6	13	26
9	ChhotaUdaipur	248	80	1984	4	13	28	57
10	Dahod	370	120	4440	6	19	41	85
11	Dang	40	120	480	1	2	4	9
12	Dev	160	50	800	3	8	18	37
13	Gandhinagar	350	120	4200	6	18	39	81
14	GirSomanath	109	34	370.6	2	6	12	25
15	Jamnagar	247	78	1926.6	4	13	28	57
16	Junagadh	1064	84	8937.6	18	53	119	246
17	Kachchh	310	120	3720	5	15	35	71

18	Kheda	502	79	3965.8	8	25	57	116
19	Mahisagar	357	56	1999.2	6	18	40	83
20	Mahesana	730	120	8760	13	37	82	169
21	Morbi	214	38	813.2	4	11	24	50
22	Narmada	400	120	4800	7	20	45	92
23	Navsari	60	90	540	1	4	7	14
24	Panchmahal	300	120	3600	5	15	34	69
25	Patan	440	120	5280	8	22	49	102
26	Porbandar	250	120	3000	4	13	28	58
27	Rajkot	1140	120	13680	19	57	127	263
28	Sabarkantha	894	72	6436.8	15	45	100	207
29	Surat	80	120	960	1	4	9	18
30	Surendranagar	670	120	8040	11	34	75	155
31	Tapi	50	120	600	1	3	6	12
32	Vadodara	470	120	5640	8	24	53	109
33	Valsad	0	0	0	0	0	0	0
	Total	14285	3099	4426922	239	721	1598	3301

Table - 4.1.55 A District-wise Agricultural equipments , Seed, Fertilisers and Motor pump for farmers for rabi season 2017-18

S.	District	Rotavator		Seed/FertilizerDri		Thresher		Total		El.MotorPumpse		Submersibl		Oil engine		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	16	10.08	16	10.08	16	10.08	48	30.24	50	6.45	20	5.00	35	4.79	105	16.24
2	Amreli	4	2.52	4	2.52	4	2.52	12	7.56	11	1.42	4	1.00	11	1.51	26	3.92
3	Anand	2	1.26	2	1.26	2	1.26	6	3.78	20	2.58	10	2.50	20	2.74	50	7.82
4	Aravali	4	2.52	4	2.52	4	2.52	12	7.56	20	2.58	10	2.50	20	2.74	50	7.82
5	Banaskantha	4	2.52	4	2.52	4	2.52	12	7.56	15	1.94	7	1.75	17	2.33	39	6.01
6	Bhavnagar	10	6.30	10	6.30	10	6.30	30	18.90	5	0.65	0	0.00	5	0.68	10	1.33
7	Bharuch	2	1.26	2	1.26	2	1.26	6	3.78	30	3.87	10	2.50	20	2.74	60	9.11
8	Botad	6	3.78	6	3.78	6	3.78	18	11.34	5	0.65	0	0.00	5	0.68	10	1.33
9	ChhotaUdaipur	4	2.52	4	2.52	4	2.52	12	7.56	10	1.29	4	1.00	10	1.37	24	3.66
10	Dahod	4	2.52	4	2.52	4	2.52	12	7.56	5	0.65	0	0.00	5	0.68	10	1.33
11	Dang	2	1.26	2	1.26	2	1.26	6	3.78	25	3.23	10	2.50	25	3.42	60	9.15
12	Dev_Dwarkka	3	1.89	3	1.89	3	1.89	9	5.67	0	0.00	0	0.00	0	0.00	0	0.00
13	Gandhinagar	3	1.89	3	1.89	3	1.89	9	5.67	20	2.58	8	2.00	20	2.74	48	7.32
14	Gir Somanath	5	3.15	5	3.15	5	3.15	15	9.45	30	3.87	10	2.50	30	4.10	70	10.47
15	Jamnagar	4	2.52	4	2.52	4	2.52	12	7.56	30	3.87	14	3.50	25	3.42	69	10.79
16	Junagadh	6	3.78	6	3.78	6	3.78	18	11.34	0	0.00	0	0.00	0	0.00	0	0.00
17	Kheda	2	1.26	2	1.26	2	1.26	6	3.78	45	5.81	20	5.00	45	6.16	110	16.96
18	Kutchh	13	8.19	13	8.19	13	8.19	39	24.57	0	0.00	0	0.00	0	0.00	0	0.00
19	Mahesana	5	3.15	5	3.15	5	3.15	15	9.45	7	0.90	0	0.00	7	0.96	14	1.86
20	Mahisagar	4	2.52	4	2.52	4	2.52	12	7.56	25	3.23	10	2.50	25	3.42	60	9.15
21	Morbii	4	2.52	4	2.52	4	2.52	12	7.56	10	1.29	4	1.00	10	1.37	24	3.66
22	Narmada	2	1.26	2	1.26	2	1.26	6	3.78	0	0.00	0	0.00	0	0.00	0	0.00
23	Navsari	2	1.26	2	1.26	2	1.26	6	3.78	20	2.58	10	2.50	20	2.74	50	7.82
24	Patan	4	2.52	4	2.52	4	2.52	12	7.56	0	0.00	0	0.00	0	0.00	0	0.00
25	Panchmahal	4	2.52	4	2.52	4	2.52	12	7.56	30	3.87	12	3.00	30	4.10	72	10.97
26	Porbandar	2	1.26	2	1.26	2	1.26	6	3.78	15	1.94	7	1.75	15	2.05	37	5.74
27	Rajkot	8	5.04	8	5.04	8	5.04	24	15.12	50	6.45	18	4.50	40	5.47	108	16.42
28	Sabarkantha	4	2.52	4	2.52	4	2.52	12	7.56	0	0.00	0	0.00	0	0.00	0	0.00

29	Surat	6	3.78	6	3.78	6	3.78	18	11.34	40	5.16	12	3.00	35	4.79	87	12.95
30	Surendranagar	5	3.15	5	3.15	5	3.15	15	9.45	0	0.00	0	0.00	0	0.00	0	0.00
31	Tapi	3	1.89	3	1.89	3	1.89	9	5.67	10	1.29	4	1.00	10	1.37	24	3.66
32	Vadodara	8	5.04	8	5.04	8	5.04	24	15.12	15	1.94	6	1.50	20	2.74	41	6.17
33	Valsad	5	3.15	5	3.15	5	3.15	15	9.45	0	0.00	0	0.00	0	0.00	0	0.00
	Total	160	100.80	160	100.80	160	100.80	480	302.40	543	70.05	210	52.50	505	69.09	1258	191.63

Table - 4.1.55 B District-wise requirement of Agricultural equipments, Seed, Fertilisers and Motor pump for *rabi* season 2017-18 to 2019-20

S.	District	Rotavator		Seed/		Thresher		Total		Electric		Submersible		Oil engine up		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	48	30.2	48	30.2	48	30.2	144	90.7	150	19.4	60	15.0	105	14.4	315	48.7
2	Amreli	12	7.6	12	7.6	12	7.6	36	22.7	33	4.3	12	3.0	33	4.5	78	11.8
3	Anand	6	3.8	6	3.8	6	3.8	18	11.3	60	7.7	30	7.5	60	8.2	150	23.5
4	Aravali	12	7.6	12	7.6	12	7.6	36	22.7	60	7.7	30	7.5	60	8.2	150	23.5
5	Banaskantha	12	7.6	12	7.6	12	7.6	36	22.7	45	5.8	21	5.3	51	7.0	117	18.0
6	Bhavnagar	30	18.9	30	18.9	30	18.9	90	56.7	15	2.0	0	0.0	15	2.0	30	4.0
7	Bharuch	6	3.8	6	3.8	6	3.8	18	11.3	90	11.6	30	7.5	60	8.2	180	27.3
8	Botad	18	11.3	18	11.3	18	11.3	54	34.0	15	2.0	0	0.0	15	2.0	30	4.0
9	ChhotaUdaipur	12	7.6	12	7.6	12	7.6	36	22.7	30	3.9	12	3.0	30	4.1	72	11.0
10	Dahod	12	7.6	12	7.6	12	7.6	36	22.7	15	2.0	0	0.0	15	2.0	30	4.0
11	Dang	6	3.8	6	3.8	6	3.8	18	11.3	75	9.7	30	7.5	75	10.3	180	27.5
12	DevBhumiDwarka	9	5.7	9	5.7	9	5.7	27	17.0	0	0.0	0	0.0	0	0.0	0	0.0
13	Gandhinagar	9	5.7	9	5.7	9	5.7	27	17.0	60	7.7	24	6.0	60	8.2	144	22.0
14	Gir Somanath	15	9.5	15	9.5	15	9.5	45	28.4	90	11.6	30	7.5	90	12.3	210	31.4
15	Jamnagar	12	7.6	12	7.6	12	7.6	36	22.7	90	11.6	42	10.5	75	10.3	207	32.4
16	Junagadh	18	11.3	18	11.3	18	11.3	54	34.0	0	0.0	0	0.0	0	0.0	0	0.0
17	Kheda	6	3.8	6	3.8	6	3.8	18	11.3	135	17.4	60	15.0	135	18.5	330	50.9
18	Kutchh	39	24.6	39	24.6	39	24.6	117	73.7	0	0.0	0	0.0	0	0.0	0	0.0
19	Mahesana	15	9.5	15	9.5	15	9.5	45	28.4	21	2.7	0	0.0	21	2.9	42	5.6
20	Mahisagar	12	7.6	12	7.6	12	7.6	36	22.7	75	9.7	30	7.5	75	10.3	180	27.5
21	Morbii	12	7.6	12	7.6	12	7.6	36	22.7	30	3.9	12	3.0	30	4.1	72	11.0

22	Narmada	6	3.8	6	3.8	6	3.8	18	11.3	0	0.0	0	0.0	0	0.0	0	0.0
23	Navsari	6	3.8	6	3.8	6	3.8	18	11.3	60	7.7	30	7.5	60	8.2	150	23.5
24	Patan	12	7.6	12	7.6	12	7.6	36	22.7	0	0.0	0	0.0	0	0.0	0	0.0
25	Panchmahal	12	7.6	12	7.6	12	7.6	36	22.7	90	11.6	36	9.0	90	12.3	216	32.9
26	Porbandar	6	3.8	6	3.8	6	3.8	18	11.3	45	5.8	21	5.3	45	6.2	111	17.2
27	Rajkot	24	15.1	24	15.1	24	15.1	72	45.4	150	19.4	54	13.5	120	16.4	324	49.3
28	Sabarkantha	12	7.6	12	7.6	12	7.6	36	22.7	0	0.0	0	0.0	0	0.0	0	0.0
29	Surat	18	11.3	18	11.3	18	11.3	54	34.0	120	15.5	36	9.0	105	14.4	261	38.9
30	Surendranagar	15	9.5	15	9.5	15	9.5	45	28.4	0	0.0	0	0.0	0	0.0	0	0.0
31	Tapi	9	5.7	9	5.7	9	5.7	27	17.0	30	3.9	12	3.0	30	4.1	72	11.0
32	Vadodara	24	15.1	24	15.1	24	15.1	72	45.4	45	5.8	18	4.5	60	8.2	123	18.5
33	Valsad	15	9.5	15	9.5	15	9.5	45	28.4	0	0.0	0	0.0	0	0.0	0	0.0
	Total	480	302.4	480	302.4	480	302.4	1440	907.2	1629	210.3	630	157.5	1515	207.3	3774	575.0

4.1.2.7 Constraints Analysis and Recommended Interventions for Yield Gaps

Analysis of Wheat

Constraints associated with low productivity include:

- Short and mild winter
- Improper selection of variety as per seeding time
- Variable water supply in quantum and space
- Imbalanced fertilizers application
- Improper placement of seeds and fertilizers
- Poor weed management
- Poor insect and disease management
- Low use of organic matter due to poor awareness regarding soil health
- Poor resource conservation technology

Suggestions for enhancing wheat farmers' income

Table- 4.1.56 Suggestions for enhancing wheat farmers' income

S. N.	Particulars	Farmers' practice	Scientific practice	Income enhancement	Reduction in cost
1	Variety selection for timely sown condition	GW 496	GW 451	7650	--
2	Variety selection for late sown condition	GW 496	GW 173/GW 11	9000	--
3	Appropriate Seed rate	200 kg/ha	120 kg/ha	--	2400
4	Termite management	Broadcasting	Seed treatment	--	1380
5	Fertilizer application	200 kg DAP & 400 kg Urea /ha	130 kg DAP & 210 kg Urea/ha	--	2800
6	Proper nutrient management	Only chemical fertilizers	Bio-fertilizers + Chemical fertilizers	--	1000
7	Irrigation management	7-9 irrigations in long plots	7 irrigations at critical growth stages	--	2900
	Total			16650	10480
				27130	

1) Land development: Land Reclamation, Bunding Soil Conservation, Amelioration of Water Logged and Saline Soils, Land:

Leveling:

Land development including the land lesser leveling, reclamation, bunding, soil conservation and increase soil productivity were considered for Jamnagar, Kachchh, Mahisagar, Morbi and Surendranagar districts as per CDAPs. Amelioration of water logged and saline soils, land levelling were taken for Aravali, Banaskantha and Sabarkantha districts of north Gujarat. Reclamation of degraded lands @ Rs.0.2 lakh/ha were considered for Bharuch districts of south Gujarat as per CDAP.

Region wise bottle necks for low productivity in different agroclimatic regions are described in Table 4.1.55.

Table- 4.1.57 Regionwise Constraints for Low Productivity of Irrigated Wheat		
S.N.	Region	Constraints
1.	North Gujarat	<ul style="list-style-type: none"> ➤ Increase in late sown area due to introduction of Bt. Cotton ➤ Early sowing (Sabarkantha) to take benefit of water from wells ➤ High cost of irrigation ➤ High weed population. ➤ Improper plant stand due to broad casting of seed ➤ Imbalance fertilizer ➤ Termite damage in light soils
2.	Middle Gujarat	<ul style="list-style-type: none"> ➤ Late / very late sowing of wheat after paddy ➤ Improper plant stand ➤ Lack of proper sowing device particularly in rainfed area ➤ Poor water management in canal area ➤ Traditional preferable cash crop ➤ Soil salinity / alkalinity
3.	South Gujarat	<ul style="list-style-type: none"> ➤ Late sowing of wheat after paddy ➤ Difficulty in land preparation ➤ Relatively high temperature ➤ Improper plant stand
4.	Saurashtra	<ul style="list-style-type: none"> ➤ Short winter ➤ Early sowing to make use of tube wells water ➤ Low rainfall there by irregular irrigation ➤ Increase in late sowing after introduction of Bt.cotton
Overall Gujarat		<ul style="list-style-type: none"> ➤ Poor seed replacement ➤ Lack of adoption of proper varieties and sowing method ➤ imbalance fertilizer is the common factors affecting ➤ productivity of wheat besides above factors

The yield gap analysis of wheat was completed by SAUs resource team, identifying different farming situations under which a crop is being grown under each AES in the State. Critical gaps were identified by comparing the existing practices followed by the farmers with

the recommended practices. Sustainability and gap analysis issues were sorted out in a log frame summary indicating proposed mode of action, collaborations/targets along with the costs involved in addressing the issues critical for increasing productivity with sustainability. Data in Table – 4.1.56 and 4.1.57 reveal that wheat productivity in some districts of state is lower than state average due to imbalance of NPK ratio. The ideal ratio of NPK is 4:2:1. The actual and expected yield gap analysis of wheat crop of the State ranged from 1.65 % (Kachchh) to 12.83 % (Mahesana). The expected yield of wheat can be increased in next three years: (a) by adopting scientific technologies of crop (b) required dose of NPK and micronutrients recommended by SAUs (c) judicious use of input resources.

Data in Table – 4.1.56 and 4.1.57 reveal that wheat productivity in some districts of state is lower than state average due to imbalance of NPK ratio. The ideal ratio of NPK is 4:2:1. The actual and expected yield gap analysis of wheat crop of the State ranged from 4.31 % (Dang) to 52.58% (Panchmahal). The expected yield of wheat can be increased in next five years: (a) by adopting scientific technologies of crop (b) required dose of NPK and micronutrients recommended by SAUs (c) judicious use of input resources.

Table- 4.1.58 Comparative Yield of Wheat Crop of State along with Expected Yield and Gaps in the Actual Yield (Q/ha)			
S. N.	Districts	Actual and Expected Yield	Yield (Q/ha) (Avg of years: 2015-16 to 2017-2018)
1	Ahmedabad	Actual	29.42
		Expected	35.00
		Gap %	4.69
2	Amreli	Actual	29.69
		Expected	38.00
		Gap %	6.49
3	Anand	Actual	28.76
		Expected	40.00
		Gap %	8.08
4	Arvali	Actual	29.34
		Expected	34.00
		Gap %	4.02
5	Banaskantha	Actual	29.80

		Expected	38.00
		Gap %	6.43
6	Bharuch	Actual	27.12
		Expected	31.00
		Gap %	3.39
7	Bhavnagar	Actual	29.17
		Expected	36.00
		Gap %	5.53
8	Botad	Actual	26.67
		Expected	35.00
		Gap %	6.35
9	ChhotaUdaipur	Actual	29.20
		Expected	40.00
		Gap %	7.88
10	<u>Dahod</u>	Actual	31.30
		Expected	37.00
		Gap %	4.82
11	<u>Dang</u>	Actual	32.45
		Expected	39.00
		Gap %	5.45
12	Dev-Dwarka	Actual	29.35
		Expected	37.00
		Gap %	6.07
13	Gandhinagar	Actual	32.73
		Expected	36.00
		Gap %	2.97
14	GirSomanath	Actual	30.69
		Expected	39.00
		Gap %	6.54
15	Jamnagar	Actual	33.30
		Expected	39.00
		Gap %	4.87
16	Junagadh	Actual	32.46
		Expected	40.00

		Gap %	6.12
17	Kutchh	Actual	30.25
		Expected	32.00
		Gap %	1.65
18	Kheda	Actual	29.71
		Expected	34.00
		Gap %	3.75
19	Mahisagar	Actual	26.40
		Expected	36.00
		Gap %	7.04
20	Mahesana	Actual	29.21
		Expected	40.00
		Gap %	12.83
21	Morbi	Actual	28.27
		Expected	35.00
		Gap %	5.44
22	Narmada	Actual	25.56
		Expected	37.00
		Gap %	7.86
23	Navsari	Actual	27.57
		Expected	34.00
		Gap %	5.21
24	Panchmahal	Actual	25.40
		Expected	36.00
		Gap %	7.48
25	Patan	Actual	27.93
		Expected	35.00
		Gap %	8.09
26	Porbandar	Actual	30.83
		Expected	36.00
		Gap %	4.43
27	Rajkot	Actual	25.53
		Expected	32.00
		Gap %	5.16

28	Sabarkantha	Actual	25.20
		Expected	34.00
		Gap %	6.52
29	Surat	Actual	27.30
		Expected	33.00
		Gap %	4.72
30	Surendranagar	Actual	23.09
		Expected	31.00
		Gap %	5.89
31	Tapi	Actual	28.53
		Expected	33.00
		Gap %	3.86
32	Vadodara	Actual	26.98
		Expected	35.00
		Gap %	6.18
33	Valsad	Actual	19.63
		Expected	30.00
		Gap %	6.79
	Total	Actual	31.26
		Expected	35.67
		Gap %	3.86

Table- 4.1.59 District-wise Yield Gap Analysis of Wheat (Av. of 2015-16, 2016-17 and 2017-18)

S. N.	Districts	Average Yield in q/ha			Yield Gap (%)	Reasons for Gap
		District	State	FLDs		
1	Ahmedabad	29.42	28.95	9.55	4.69	Technology & input management
2	Amreli	29.69	28.95	15.05	6.49	
3	Anand	28.76	28.95	13.65	8.08	
4	Arvali	29.34	28.95	17.66	4.02	
5	Banaskantha	29.8	28.95	5.14	6.43	
6	Bharuch	27.12	28.95	10.88	3.39	
7	Bhavnagar	29.17	28.95	2.97	5.53	
8	Botad	26.67	28.95	7.03	6.35	

9	ChhotaUdaipur	29.2	28.95	18.35	7.88
10	Dahod	31.3	28.95	13.05	4.82
11	Dang	32.45	28.95	13.29	5.45
12	Dev-Dwarka	29.35	28.95	11.55	6.07
13	Gandhinagar	32.73	28.95	13.65	2.97
14	GirSomanath	30.69	28.95	13.20	6.54
15	Jamnagar	33.3	28.95	2.95	4.87
16	Junagadh	32.46	28.95	7.03	6.12
17	Kachchh	30.25	28.95	8.50	1.65
18	Kheda	29.71	28.95	14.30	3.75
19	Mahisagar	26.4	28.95	8.95	7.04
20	Mahesana	29.21	28.95	11.29	12.83
21	Morbi	28.27	28.95	3.56	5.44
22	Narmada	25.56	28.95	11.47	7.86
23	Navsari	27.57	28.95	7.21	5.21
24	Panchmahal	25.4	28.95	3.55	7.48
25	Patan	27.93	28.95	8.30	8.09
26	Porbandar	30.83	28.95	2.05	4.43
27	Rajkot	25.53	28.95	3.65	5.16
28	Sabarkantha	25.2	28.95	3.75	6.52
29	Surat	27.3	28.95	2.25	4.72
30	Surendranagar	23.09	28.95	3.05	5.89
31	Tapi	28.53	28.95	2.05	3.86
32	Vadodara	26.98	28.95	5.05	6.18
33	Valsad	19.63	28.95	1.05	6.79
	Total	28.95	31.26	31.26	3.86

Table- 4.1.60 Average Yield (Q and %) Gap of wheat on State and FLDs yield basis

S. N.	Districts	Average Yield in q/ha			Yield Gap (%)
		District	State	FLDs	
1	Ahmedabad	29.42	28.95	35.00	38.50
2	Amreli	29.69	28.95	38.00	44.00
3	Anand	28.76	28.95	40.00	42.60
4	Arvali	29.34	28.95	34.00	46.61

5	Banaskantha	29.8	28.95	38.00	23.81
6	Bharuch	27.12	28.95	31.00	39.83
7	Bhavnagar	29.17	28.95	36.00	31.92
8	Botad	26.67	28.95	35.00	21.92
9	ChhotaUdaipur	29.2	28.95	40.00	47.30
10	Dahod	31.3	28.95	37.00	42.00
11	Dang	32.45	28.95	39.00	42.24
12	Dev-Dwarka	29.35	28.95	37.00	40.50
13	Gandhinagar	32.73	28.95	36.00	42.60
14	GirSomanath	30.69	28.95	39.00	42.15
15	Jamnagar	33.3	28.95	39.00	31.90
16	Junagadh	32.46	28.95	40.00	21.92
17	Kachchh	30.25	28.95	32.00	37.45
18	Kheda	29.71	28.95	34.00	43.25
19	Mahisagar	26.4	28.95	36.00	37.90
20	Mahesana	29.21	28.95	40.00	40.24
21	Morbi	28.27	28.95	35.00	32.51
22	Narmada	25.56	28.95	37.00	40.42
23	Navsari	27.57	28.95	34.00	36.16
24	Panchmahal	25.4	28.95	36.00	32.50
25	Patan	27.93	28.95	35.00	37.25
26	Porbandar	30.83	28.95	36.00	31.00
27	Rajkot	25.53	28.95	32.00	32.60
28	Sabarkantha	25.2	28.95	34.00	38.40
29	Surat	27.3	28.95	33.00	31.20
30	Surendranagar	23.09	28.95	31.00	32.00
31	Tapi	28.53	28.95	33.00	31.00
32	Vadodara	26.98	28.95	35.00	34.00
33	Valsad	19.63	28.95	30.00	30.00
	Total	28.95	31.26	35.67	36.29

Table- 4.1.61 District-wise Grain Yield (Average of Last Three Years) of wheat and Gap

S. N.	District	Area ('00 ha)	Production ('00 T)	Yield (Kg/ha)	Potential Yield (Kg/ha)	Gap (Kg/ha)
1	Ahmedabad	151634	446107	29.42	3567	625
2	Amreli	8568	25438	29.69	3567	598
3	Anand	60578	174222	28.76	3567	691
4	Arvali	66606	195422	29.34	3567	633
5	Banaskantha	75480	224930	29.80	3567	587
6	Bharuch	18940	51365	27.12	3567	855
7	Bhavnagar	14711	42912	29.17	3567	650
8	Botad	7956	21219	26.67	3567	900
9	ChhotaUdaipur	510	1489	29.20	3567	647
10	Dahod	44194	138327	31.30	3567	437
11	Dang	2346	7613	32.45	3567	322
12	Dev_Dwarka	3162	9280	29.35	3567	632
13	Gandhinagar	29274	95814	32.73	3567	294
14	GirSomanath	49776	152763	30.69	3567	498
15	Jamnagar	7140	23776	33.30	3567	237
16	Junagadh	44290	143765	32.46	3567	321
17	Kachchh	21726	65721	30.25	3567	542
18	Kheda	81600	242434	29.71	3567	596
19	Mahisagar	74911	197765	26.40	3567	927
20	Mahesana	22440	65547	29.21	3567	646
21	Morbi	13464	38063	28.27	3567	740
22	Narmada	1326	3389	25.56	3567	1011
23	Navsari	204	562	27.57	3567	810
24	Panchmahal	12750	32385	25.40	3567	1027
25	Patan	38058	106296	27.93	3567	774
26	Porbandar	8262	25472	30.83	3567	484
27	Rajkot	61200	156244	25.53	3567	1014
28	Sabarkantha	90780	228766	25.20	3567	1047
29	Surat	4590	12531	27.30	3567	837

30	Surendranagar	37876	87456	23.09	3567	1258
31	Tapi	3570	10185	28.53	3567	714
32	Vadodara	20462	55206	26.98	3567	869
33	Valsad	937	1839	19.63	3567	1604
	Total	1079321	3124634	28.95	3567	672

Source: Gujarat Agricultural Statistics (2011-12)

Constraints, strategies and technological interventions to alleviate the yield gap for sustaining wheat productivity are given in Table 4.1.62 and Table 4.1.63 respectively.

Table- 4.1.62 Sustainability Issues and Gap Analysis of Productivity of Wheat Crop and Resources

S. N.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
i	•Lesser Adoption of seed treatment	•Termites, fungal diseases	•Topopularize practiceof seedtreatmentfor maintainingcrop health.	•Educating •and motivatingfarmersonits importanceand adoption throughdemonstrations and trainings.	•Entire wheat growing area withno exceptionin seed born diseases and termite affectedareas.	•Productivitygrowthon sustainable basis.
ii	•Sowing of traditional seed	•Low awareness about certified seed	•Awareness campaign for use of certified seed.	•Farmers field schools, campaigns.	•Entire wheat growing areas.	•Improvementinyield on sustainable basis.
iii	•Broadcastin g of the seed	•Farmers apply excess seed in irrigated Wheat with broadcasting of seed after harvest of previous crop.	•Application of recommended seed in line sowing	•Farmers participatory approach and demonstration	•In cotton-wheat & paddy-wheat cropping system	•Improvement in productivity
iv	•Poor fertilizer managemen t	•Farmers apply excess fertilizer in irrigated Wheat and low or no fertilizer in •rainfed Wheat particularly in Bhal area	•Application of recommended dose of fertilizers. Use of organic manure and use ofsite specific micro-nutrient	•Farmers participatory approach and demonstration	•Entire Wheat growing area	•Improvement in productivity with sustainable soil health

v	<ul style="list-style-type: none"> •High incidence of weeds 	<ul style="list-style-type: none"> •Chinopodium albam and Amaranthus spp. seriously affect wheat yields in different cropping systems 	<ul style="list-style-type: none"> •Improve the efficiency of existing herbicides. •Capacity building for spraying techniques. 	<ul style="list-style-type: none"> •State level strategic plan for the management of Chinopodium albam and Amaranthus spp. Capacity building of extension agencies and farmers for appropriate spraying techniques. On farm demonstrations of 	<ul style="list-style-type: none"> •Entire Wheat growing area 	<ul style="list-style-type: none"> •Economic benefits are increased profitability and increased food security.
vi	<ul style="list-style-type: none"> •No or low use of Organic manure 	<ul style="list-style-type: none"> •Low production and higher price of well decomposed organic manures 	<ul style="list-style-type: none"> •Awareness campaign for production of organic manures in own farms 	<ul style="list-style-type: none"> •Farmers fieldschools, campaigns 	<ul style="list-style-type: none"> •Entire Wheat growing area 	<ul style="list-style-type: none"> •Improvement in productivity with sustainable soil health
vii	<ul style="list-style-type: none"> •Excess irrigation in irrigated wheat 	<ul style="list-style-type: none"> •Due to lower rates of irrigation water in canal irrigation system, farmers pond their fields throughout the crop season 	<ul style="list-style-type: none"> •Judicious use of water. 	<ul style="list-style-type: none"> •Training and demonstrations •On proper water management. 	<ul style="list-style-type: none"> •4 % growth in area under proper water management 	<ul style="list-style-type: none"> •Increase in water use efficiency and sustain soil health
viii	<ul style="list-style-type: none"> •Growing of companion crop Lucerne in standing wheat crop 	<ul style="list-style-type: none"> •Improvement in soil fertility and gain more income •Harvesting becomes difficult 	<ul style="list-style-type: none"> •Evolve best practice to generate more income. 	<ul style="list-style-type: none"> •Experiment should be carried out 	<ul style="list-style-type: none"> •Entire Wheat growing area 	<ul style="list-style-type: none"> •Salinity is reduced due to deeper root system of Lucerne and addition of organic matter in the soil. •Increase the palatibity of the

Table - 4.1.63 Bridging the Gaps for Realizing the Wheat Crop Vision

Activity Output Matrix				
Activity/Crop/ Commodity	Issues	ModeofAction	Collaborator/Target	Cost
1.Watermanagement	•Irregular water supply in canal water so farmers use more water. Lack of drainage facility.	•Supply of water in the canal as per the crop requirement. Drainage facility is created	•Irrigation Department and SAUs have to jointly work for solving this problem.	•Demonstration proposed
	•Salinity stress mitigation at farmers' fields	•Green manuring of sunhemp and gypsum use. Tolerant varieties.	•Subsidy on gypsum(@ 75per cent) and its availability be ensured.	•Demonstration on green manuring and gypsum proposed.
	• Water logging and secondary salinization	•Bio-drainage through tree plantation.	•DDA will ensure the characterization of waterlogged areas and plantation of treespecies.	
	• Water harvesting and recharging	•Construction of water harvesting structures near catchmentarea of drain, panchayati / farmers land.	•DDA/ concerned departments in consultation with SAUs scientist	•Projecton water harvesting proposed.
	• Watershed development inrainfed areas	•Sprinkler/ drip irrigation after creating facility of community ponds/ water harvesting structure.	•DDA/ concerned departments in consultation with GGRC	•Project proposed.
	• Ground water testing for fluoride contamination	•Survey of marked sites for nitrate contamination and characterization of nitrate contaminated areas.	•DDA will conduct surveyand identify theare as of high	•Survey forstudy of ground water quality proposed.

2.Managementofsalinity	<ul style="list-style-type: none"> •Avoid irrigation with brackish water in drought years because it leads to secondary salinity; wherever available make conjunctive use of good quality water. Tolerance of current and improved varieties to salinity needs further investigations. 	<ul style="list-style-type: none"> •Cropping pattern will best utilised. The yield of Rabi crops will be recorded for farmers where farmers have given variable number of irrigation with brackish water in <i>Kharif</i> season. 	<ul style="list-style-type: none"> •Dept. of Agriculture / KVK •Survey and soil sampling will be done by DDA and KVK. Demonstrations will be laid out by DDA in collaboration with KVK scientist 	<ul style="list-style-type: none"> •Survey proposed. Demonstrations •Proposed in plan.
	<ul style="list-style-type: none"> •Work is also needed to adapt agronomic practices, especially the time and method of sowing and amount of fertilizer and irrigation in order to increase ecological sustainability, profitability and yield 	<ul style="list-style-type: none"> •The reclamation of saline soil and water through gypsum will be done. 	<ul style="list-style-type: none"> •Demonstrations will be laid out by DDA in collaboration with SAUs scientist and supply of gypsum maybe ensured by DDA 	<ul style="list-style-type: none"> •Demonstrations proposed in plan.

<p>3.RCTS i) Zero Tillage</p>	<ul style="list-style-type: none"> •Environmental (Carbon sequestration, soil fertility gains etc.) and economic benefits (saving in labour, diesel, machinery wear and tear etc) will be catalogued and calculated. Zero till technology will be extended to wheat and other cropping system •Improve agronomic efficiency of nutrients. It also improves nitrogen and water efficiency. Improve biological activity in the soil. Reduce energy budget for Cotton-wheat & rice-wheat cropping system 	<ul style="list-style-type: none"> •Some farmers have adopted zero-tillage in wheat crop and they found beneficial effect on soil fertility and yield. 	<ul style="list-style-type: none"> •The efforts are required to popularize the zero tillage system in whole cotton-wheat & paddy-wheat growing area. 	<ul style="list-style-type: none"> •The Govt. has to give 60% subsidy to purchase seed drill for small and marginal farmers.
<p>(ii) Laser-Leveling</p>	<ul style="list-style-type: none"> •Laser land leveling for water saving, land saving and improve yields of wheat and other crops. 	<ul style="list-style-type: none"> •DDA will organize and monitor the distribution of laser leveler especially on custom hire services. 	<ul style="list-style-type: none"> •DDA in consultation with KVK. 	<p>Demonstrations proposed. The Govt. has to give 60 per cent subsidy to purchase Laserlandleveler for small and marginal farmers.</p>

(iv) Green Manuring	<ul style="list-style-type: none"> The improvement in the productivity of crops and also improvement in the soil health. 	<ul style="list-style-type: none"> DDA will ensure the timely availability of dhaincha seed at 75 per cent subsidy. 50 per cent area will be covered during the plan period of five years. 	<ul style="list-style-type: none"> DDA Ten per cent area will be covered. 	<p>Demonstrations will propose.</p> <p>The Govt. has to give 50 per cent subsidy to purchase dhaincha seed for small and marginal farmers</p>
4. Seed Production	1. Seed planning	<ol style="list-style-type: none"> Selection of improved variety At farmers field. Motivating farmers to produce the seed of best variety 	<ul style="list-style-type: none"> DDAs in consultation with KVKs. 	Project proposed.
	2. Best quality seed	<ul style="list-style-type: none"> Seed production at farmers' field with farmers participatory approach. 	<ul style="list-style-type: none"> DDA and KVK. 	Project proposed.
	3. Seed treatment	<ol style="list-style-type: none"> Motivating farmers for seed treatment Demonstrations will be laid out by DDA in collaboration with KVK scientist 	<ul style="list-style-type: none"> DDA's Data for all activities will be presented in the officers workshop 	Survey proposed.
5. Site specific nutrient management	<ul style="list-style-type: none"> Number of split application and timing of topdressing with reference to irrigation 	<ul style="list-style-type: none"> The project will identify, test and promote intervention for the sustainable cotton-wheat & paddy-wheat cropping system through site specific nutrient management. Fertilizer 	<ul style="list-style-type: none"> DDA and KVK will conduct survey. 	Survey of doses of fertilizer application in cotton, paddy and wheat crops.
	<ul style="list-style-type: none"> Legume in cropping rotation 	<ul style="list-style-type: none"> Integrated soil and crop management for rehabilitation of legume production in cotton-wheat & paddy-wheat cropping 	<ul style="list-style-type: none"> DDA will ensure quality seed of important legumes green gram for summer season 	Demonstration will be laid out on green gram.

	<ul style="list-style-type: none"> •Crop residue 	<ul style="list-style-type: none"> •Surface residue management for improving soil health. •Improving the efficiency of nutrient utilization. 	<ul style="list-style-type: none"> •Machineries for uniform distribution of residue will be ensured by DDA •Residue retention machinery, second generation machinery, 	Demonstrations proposed
	<ul style="list-style-type: none"> •Bio-fertilizers 	<ul style="list-style-type: none"> •Integrate chemical fertilizers with •bio-fertilizers improve the efficiency of chemical fertilizers 	<ul style="list-style-type: none"> •DDA will ensure the availability of location specific quality bio-fertilizers 	Demonstrations proposed under INM, free supply of bio fertilizer to the small and marginal farmers.
6. IWM	<ul style="list-style-type: none"> •Spraying techniques for improving efficiency of herbicides. 	<ul style="list-style-type: none"> •Demonstration of varieties at farmer's field. 	<ul style="list-style-type: none"> • DDA / SAUs / KVK 	Survey proposed.
8. Wheat Timely seeding of wheat	<ul style="list-style-type: none"> •Delayed harvesting of cotton/paddy, availability of irrigation, excess/ untimely rains, zero tillage short duration varieties of cotton/paddy 	<ul style="list-style-type: none"> •Extension and development agencies should approach in a farmers' participatory approach for each of possible solution. •Evaluating and refining the technology for arange of stubbles, developing guidelines for achieving good establishment with residue retention •Efficient use of N fertilizer. •The technology need to be further developed for other cropping systems and other crops. 	<ul style="list-style-type: none"> •DDAs / KVK •DDA 	<p>Demonstrations proposed.</p> <p>Campaigns, hoarding/posters, field days, district level training camps</p>

4.1.2.8 Detailed Action Plan with Costs

A comprehensive package of extension activities, site specific input management along with infrastructural support (by means of special project) that are vital for increasing farm income, productivity and employment and setting the ground for evolution of a 'second Green Revolution' in the state is recommended herewith. The main ingredients of package are:

- Capacity building and skill up gradation of farmers to broaden their knowledge base
- Propagating resource conservation technologies
- Popularizing new technologies and farm practices through demonstrating
- ✓ Area specific improved varieties
- ✓ Demonstrations on INM with a shift in focus from fertilizer nutrients usage to judicious application
- Organize trained and link farmers to domestic and international markets in PPP frame work

For the field extension workers and the farmers, the whole set of activities boil down to extension activities viz. trainings, demonstrations on quality seeds, INM, RCTs, IPM, Water Management, Post Harvest Management ,Wheat Seed Production, Farm Waste Management, Vermicomposting , Farm Mechanization Organic Farming, IWM etc.,.

Soil and water management, credit and market management etc. It is essential to make better use of given research in asustainable manner for increased production, productivity and employment generation.

The proposed activities are as under

Projected Outcome and Growth Rate during the Plan Period:

The proposed activities are as under:

Table- 4.1.64 Year-wise Training Proposed for Capacity Building of Farmers at District Level for Wheat Crop (Phy - No, Fin - Rs. Lakh)

S. N	Districts	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	5000	30	5000	30	5000	30	25000	150
2	Amreli	5500	33	5500	33	5500	33	27500	165
3	Anand	4000	24	4000	24	4000	24	20000	120
4	Arvali	1500	9	1500	9	1500	9	7500	45
5	Banaskantha	6000	36	6000	36	6000	36	30000	180
6	Bharuch	4000	24	4000	24	4000	24	20000	120
7	Bhavnagar	5500	33	5500	33	5500	33	27500	165
8	Botad	2500	15	2500	15	2500	15	12500	75
9	Chhotaudaipur	2500	15	2500	15	2500	15	12500	75
10	Dahod	3500	21	3500	21	3500	21	17500	105
11	Dang	500	3	500	3	500	3	2500	15
12	Dev_Dwarka	500	3	500	3	500	3	2500	15
13	Gandhinagar	2000	12	2000	12	2000	12	10000	60
14	GirSomnath	2000	12	2000	12	2000	12	10000	60
15	Jamnagar	5000	30	5000	30	5000	30	25000	150
16	Junagadh	7000	42	7000	42	7000	42	35000	210
17	Kachchh	5000	30	5000	30	5000	30	25000	150
18	Kheda	5000	30	5000	30	5000	30	25000	150
19	Mahesana	4500	27	4500	27	4500	27	22500	135
20	Mahisagar	1500	9	1500	9	1500	9	7500	45
21	Morbi	500	3	500	3	500	3	2500	15
22	Narmada	2000	12	2000	12	2000	12	10000	60
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	5500	33	5500	33	5500	33	27500	165
25	Patan	4000	24	4000	24	4000	24	20000	120
26	Porbandar	1500	9	1500	9	1500	9	7500	45
27	Rajkot	7000	42	7000	42	7000	42	35000	210

28	Sabarkantha	6500	39	6500	39	6500	39	32500	195
29	Surat	5000	30	5000	30	5000	30	25000	150
30	Surendranagar	5000	30	5000	30	5000	30	25000	150
31	Tapi	2500	15	2500	15	2500	15	12500	75
32	Vadodara	6000	36	6000	36	6000	36	30000	180
33	Valsad	0	0	0	0	0	0	0	0
	Total	118500	711	118500	711	118500	711	592500	3555

Table 4.1.65 Training Proposed for Capacity Building of Farmers at state level on Different Technology given on wheat crop

Name of Technology to be Transferred	Year wise No. of Farmers to be Trained (Phy - No, Fin - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
INM	40390	242.34	40390	242.34	40390	242.34	121170	727.02
NRM	22710	136.26	22710	136.26	22710	136.26	68130	408.78
IPM	35060	210.36	35060	210.36	35060	210.36	105180	631.08
RCTs	32110	192.66	32110	192.66	32110	192.66	96330	577.98
Water Management	28230	169.38	28230	169.38	28230	169.38	84690	508.14
Post Harvest Management	15270	91.62	15270	91.62	15270	91.62	45810	274.86
Women Empowerment	7560	45.4	7560	45.4	7560	45.4	22680	136.2
Credit &Marketing	20740	124.4	20740	124.4	20740	124.4	62220	373.2
Seed Production	24750	148.5	24750	148.5	24750	148.5	74250	445.5
Farm Waste Management	14610	87.7	14610	87.7	14610	87.7	43830	263.1
Vermicomposting	6850	41.1	6850	41.1	6850	41.1	20550	123.3
Farm Mechanization	20100	120.6	20100	120.6	20100	120.6	60300	361.8
Renewable Energy	3340	20	3340	20	3340	20	10020	60
Organic Farming	6900	41.4	6900	41.4	6900	41.4	20700	124.2
IWM	35060	210.4	35060	210.4	35060	210.4	105180	631.2
Total	313680	1882.12	313680	1882.12	313680	1882.12	941040	5646.36

Table 4.1.66 District-wise Training Proposed for Capacity Building of Farmers at District Level on Different Technologies for Wheat

S. N.	Districts	INM				NRM				IPM			
		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2100	12.6	6300	37.8	2100	12.6	6300	37.8	2100	12.6	6300	37.8
2	Amreli	3300	19.8	9900	59.4	1650	9.9	4950	29.7	1650	9.9	4950	29.7
3	Anand	960	5.76	2880	17.28	640	3.84	1920	11.52	960	5.76	2880	17.28
4	Arvali	550	3.3	1650	9.9	500	3	1500	9	550	3.3	1650	9.9
5	Banaskantha	1440	8.64	4320	25.92	960	5.76	2880	17.28	1440	8.64	4320	25.92
6	Bharuch	1260	7.56	3780	22.68	1260	7.56	3780	22.68	1260	7.56	3780	22.68
7	Bhavnagar	3300	19.8	9900	59.4	1650	9.9	4950	29.7	1650	9.9	4950	29.7
8	Botad	250	1.5	750	4.5	250	1.5	750	4.5	250	1.5	750	4.5
9	Chhotaudaipur	250	1.5	750	4.5	250	1.5	750	4.5	250	1.5	750	4.5
10	Dahod	1050	6.3	3150	18.9	700	4.2	2100	12.6	1050	6.3	3150	18.9
11	Dang	550	3.3	1650	9.9	500	3	1500	9	550	3.3	1650	9.9
12	Dev_Dwarkka	250	1.5	750	4.5	250	1.5	750	4.5	250	1.5	750	4.5
13	Gandhinagar	480	2.88	1440	8.64	350	2.1	1050	6.3	550	3.3	1650	9.9
14	GirSomnath	500	3	1500	9	500	3	1500	9	1500	9	4500	27
15	Jamnagar	3000	18	9000	54	0	0	0	0	1500	9	4500	27
16	Junagadh	4000	24	12000	72	700	4.2	2100	12.6	2000	12	6000	36
17	Kachchh	800	4.8	2400	14.4	600	3.6	1800	10.8	800	4.8	2400	14.4
18	Kheda	1020	6.12	3060	18.36	540	3.24	1620	9.72	1020	6.12	3060	18.36
19	Mahesana	1080	6.48	3240	19.44	720	4.32	2160	12.96	1080	6.48	3240	19.44
20	Mahisagar	1000	6	3000	18	500	3	1500	9	100	0.6	300	1.8
21	Morbi	500	3	1500	9	500	3	1500	9	1500	9	4500	27
22	Narmada	1000	6	3000	18	500	3	1500	9	100	0.6	300	1.8
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	1500	9	4500	27	0	0	0	0	1500	9	4500	27
25	Patan	1500	9	4500	27	1000	6	3000	18	1200	7.2	3600	21.6
26	Porbandar	250	1.5	750	4.5	250	1.5	750	4.5	250	1.5	750	4.5

27	Rajkot	2500	15	7500	45	1500	9	4500	27	3000	18	9000	54
28	Sabarkantha	1300	7.8	3900	23.4	1040	6.24	3120	18.72	1300	7.8	3900	23.4
29	Surat	1050	6.3	3150	18.9	700	4.2	2100	12.6	1050	6.3	3150	18.9
30	Surendranagar	500	3	1500	9	500	3	1500	9	1500	9	4500	27
31	Tapi	1050	6.3	3150	18.9	700	4.2	2100	12.6	1050	6.3	3150	18.9
32	Vadodara	2100	12.6	6300	37.8	1400	8.4	4200	25.2	2100	12.6	6300	37.8
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0
	Total	40390	242.34	121170	727.02	22710	136.26	68130	408.78	35060	210.36	105180	631.08

Cost Norms: Rs. 600/ Trainee / Day

Table- 4.1.66 District-wise Training Proposed for Capacity Building of Farmers at District Level (Continue...)

S. N.	Districts	RCT				Water Management				Post Harvest Management			
		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20	
		Phy	Fin	Phy	Phy	Fin	Phy	Phy	Fin	Phy	Phy	Fin	Phy
1	Ahmedabad	2100	12.60	6300	37.8	1750	10.50	5250	31.5	1750	10.50	5250	31.5
2	Amreli	1100	6.60	3300	19.8	1650	9.90	4950	29.7	1650	9.90	4950	29.7
3	Anand	960	5.76	2880	17.28	640	3.84	1920	11.52	320	1.92	960	5.76
4	Arvali	700	4.20	2100	12.6	600	3.60	1800	10.8	300	1.80	900	5.4
5	Banaskantha	1440	8.64	4320	25.92	960	5.76	2880	17.28	480	2.88	1440	8.64
6	Bharuch	1260	7.56	3780	22.68	1050	6.30	3150	18.9	640	3.84	1920	11.52
7	Bhavnagar	1100	6.60	3300	19.8	1650	9.90	4950	29.7	1650	9.90	4950	29.7
8	Botad	550	3.30	1650	9.9	350	2.10	1050	6.3	180	1.08	540	3.24
9	Chhotaudaipur	550	3.30	1650	9.9	350	2.10	1050	6.3	180	1.08	540	3.24
10	Dahod	1050	6.30	3150	18.9	700	4.20	2100	12.6	350	2.10	1050	6.3
11	Dang	550	3.30	1650	9.9	500	3.00	1500	9	350	2.10	1050	6.3
12	Dev_Dwarka	550	3.30	1650	9.9	350	2.10	1050	6.3	180	1.08	540	3.24
13	Gandhinagar	550	3.30	1650	9.9	350	2.10	1050	6.3	180	1.08	540	3.24
14	GirSomnath	700	4.20	2100	12.6	600	3.60	1800	10.8	300	1.80	900	5.4
15	Jamnagar	0	0.00	0	0	1500	9.00	4500	27	0	0.00	0	0
16	Junagadh	0	0.00	0	0	1500	9.00	4500	27	500	3.00	1500	9
17	Kachchh	700	4.20	2100	12.6	600	3.60	1800	10.8	300	1.80	900	5.4
18	Kheda	1020	6.12	3060	18.36	540	3.24	1620	9.72	280	1.68	840	5.04
19	Mahesana	1080	6.48	3240	19.44	720	4.32	2160	12.96	360	2.16	1080	6.48
20	Mahisagar	1050	6.30	3150	18.9	700	4.20	2100	12.6	350	2.10	1050	6.3
21	Morbi	700	4.20	2100	12.6	600	3.60	1800	10.8	300	1.80	900	5.4
22	Narmada	1000	6.00	3000	18	500	3.00	1500	9	250	1.50	750	4.5
23	Navsari	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0
24	Panchmahal	0	0.00	0	0	1000	6.00	3000	18	500	3.00	1500	9
25	Patan	1400	8.40	4200	25.2	980	5.88	2940	17.64	500	3.00	1500	9
26	Porbandar	500	3.00	1500	9	250	1.50	750	4.5	250	1.50	750	4.5
27	Rajkot	3000	18.00	9000	54	1500	9.00	4500	27	750	4.50	2250	13.5

28	Sabarkantha	1300	7.80	3900	23.4	1040	6.24	3120	18.72	520	3.12	1560	9.36
29	Surat	1050	6.30	3150	18.9	700	4.20	2100	12.6	350	2.10	1050	6.3
30	Surendranagar	3000	18.00	9000	54	2500	15.00	7500	45	500	3.00	1500	9
31	Tapi	1050	6.30	3150	18.9	700	4.20	2100	12.6	350	2.10	1050	6.3
32	Vadodara	2100	12.60	6300	37.8	1400	8.40	4200	25.2	700	4.20	2100	12.6
33	Valsad	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0
	Total	32110	192.66	96330	577.98	28230	169.38	84690	508.14	15270	91.62	45810	274.86

Table- 4.1.66 District-wise Training Proposed for Capacity Building of Farmers District Level on Different Technologies (Continue...)

S. N.	Districts	Women Empowerment				Credit &Marketing				Seed Production				Farm Waste Management			
		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	700	4.2	2100	12.6	1400	8.4	4200	25.2	1400	8.4	4200	25.2	1750	10.5	5250	31.5
2	Amreli	0	0	0	0	1650	9.9	4950	29.7	1650	9.9	4950	29.7	1100	6.6	3300	19.8
3	Anand	320	1.9	960	5.7	640	3.8	1920	11.4	640	3.8	1920	11.4	320	1.9	960	5.7
4	Arvali	180	1.1	540	3.3	350	2.1	1050	6.3	350	2.1	1050	6.3	130	0.8	390	2.4
5	Banaskantha	480	2.9	1440	8.7	960	5.8	2880	17.4	960	5.8	2880	17.4	480	2.9	1440	8.7
6	Bharuch	0	0	0	0	640	3.8	1920	11.4	640	3.8	1920	11.4	250	1.5	750	4.5
7	Bhavnagar	0	0	0	0	1650	9.9	4950	29.7	1650	9.9	4950	29.7	1100	6.6	3300	19.8
8	Botad	180	1.1	540	3.3	350	2.1	1050	6.3	350	2.1	1050	6.3	130	0.8	390	2.4
9	Chhotaudaipur	250	1.5	750	4.5	500	3	1500	9	500	3	1500	9	250	1.5	750	4.5
10	Dahod	350	2.1	1050	6.3	700	4.2	2100	12.6	700	4.2	2100	12.6	250	1.5	750	4.5
11	Dang	250	1.5	750	4.5	500	3	1500	9	500	3	1500	9	250	1.5	750	4.5
12	Dev_Dwarkka	180	1.1	540	3.3	350	2.1	1050	6.3	350	2.1	1050	6.3	130	0.8	390	2.4
13	Gandhinagar	180	1.1	540	3.3	350	2.1	1050	6.3	350	2.1	1050	6.3	130	0.8	390	2.4
14	GirSomnath	250	1.5	750	4.5	500	3	1500	9	500	3	1500	9	250	1.5	750	4.5
15	Jamnagar	0	0	0	0	250	1.5	750	4.5	1000	6	3000	18	0	0	0	0
16	Junagadh	0	0	0	0	250	1.5	750	4.5	1400	8.4	4200	25.2	1400	8.4	4200	25.2
17	Kachchh	300	1.8	900	5.4	600	3.6	1800	10.8	600	3.6	1800	10.8	300	1.8	900	5.4

18	Kheda	280	1.7	840	5.1	540	3.2	1620	9.6	540	3.2	1620	9.6	280	1.7	840	5.1
19	Mahesana	360	2.2	1080	6.6	720	4.3	2160	12.9	720	4.3	2160	12.9	360	2.2	1080	6.6
20	Mahisagar	250	1.5	750	4.5	500	3	1500	9	500	3	1500	9	250	1.5	750	4.5
21	Morbi	180	1.1	540	3.3	350	2.1	1050	6.3	350	2.1	1050	6.3	130	0.8	390	2.4
22	Narmada	0	0	0	0	250	1.5	750	4.5	500	3	1500	9	500	3	1500	9
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	500	3	1500	9	1000	6	3000	18	1000	6	3000	18	200	1.2	600	3.6
25	Patan	450	2.7	1350	8.1	900	5.4	2700	16.2	1000	6	3000	18	400	2.4	1200	7.2
26	Porbandar	0	0	0	0	0	0	0	0	250	1.5	750	4.5	250	1.5	750	4.5
27	Rajkot	0	0	0	0	750	4.5	2250	13.5	1250	7.5	3750	22.5	1500	9	4500	27
28	Sabarkantha	520	3.1	1560	9.3	1040	6.2	3120	18.6	1300	7.8	3900	23.4	520	3.1	1560	9.3
29	Surat	350	2.1	1050	6.3	700	4.2	2100	12.6	700	4.2	2100	12.6	250	1.5	750	4.5
30	Surendranagar	0	0	0	0	250	1.5	750	4.5	1000	6	3000	18	1000	6	3000	18
31	Tapi	350	2.1	1050	6.3	700	4.2	2100	12.6	700	4.2	2100	12.6	250	1.5	750	4.5
32	Vadodara	700	4.2	2100	12.6	1400	8.4	4200	25.2	1400	8.4	4200	25.2	500	3	1500	9
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	7560	45.4	22680	136.2	20740	124.4	62220	373.2	24750	148.5	74250	445.5	14610	87.7	43830	263.1

Cost Norms: Rs. 600/ Trainee / Day

S. N.	Districts	Vermi Composting				Farm Mechanization				Renewable Energy			
		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	350	2.1	1050	6.3	350	2.1	1050	6.3	350	2.1	1050	6.3
2	Amreli	1100	6.6	3300	19.8	1650	9.9	4950	29.7	0	0	0	0
3	Anand	160	1	480	3	640	3.8	1920	11.4	160	1	480	3
4	Arvali	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
5	Banaskantha	240	1.4	720	4.2	960	5.8	2880	17.4	240	1.4	720	4.2
6	Bharuch	250	1.5	750	4.5	700	4.2	2100	12.6	100	0.6	300	1.8
7	Bhavnagar	1100	6.6	3300	19.8	1650	9.9	4950	29.7	0	0	0	0

8	Botad	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
9	ChhotaUdaipur	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
10	Dahod	100	0.6	300	1.8	700	4.2	2100	12.6	100	0.6	300	1.8
11	Dang	100	0.6	300	1.8	500	3	1500	9	100	0.6	300	1.8
12	Devv-Dwarka	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
13	Gandhinagar	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
14	GirSomnath	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
15	Jamnagar	0	0	0	0	0	0	0	0	0	0	0	0
16	Junagadh	700	4.2	2100	12.6	1000	6	3000	18	0	0	0	0
17	Kachchh	200	1.2	600	3.6	550	3.3	1650	9.9	150	0.9	450	2.7
18	Kheda	140	0.8	420	2.4	540	3.2	1620	9.6	140	0.8	420	2.4
19	Mahesana	180	1.1	540	3.3	720	4.3	2160	12.9	180	1.1	540	3.3
20	Mahisagar	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
21	Morbi	50	0.3	150	0.9	350	2.1	1050	6.3	50	0.3	150	0.9
22	Narmada	500	3	1500	9	250	1.5	750	4.5	0	0	0	0
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	0	0	0	0	1000	6	3000	18	0	0	0	0
25	Patan	210	1.3	630	3.9	1200	7.2	3600	21.6	560	3.4	1680	10.2
26	Porbandar	0	0	0	0	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	750	4.5	2250	13.5	0	0	0	0
28	Sabarkantha	520	3.1	1560	9.3	1040	6.2	3120	18.6	260	1.6	780	4.8
29	Surat	100	0.6	300	1.8	700	4.2	2100	12.6	100	0.6	300	1.8
30	Surendranagar	0	0	0	0	300	1.8	900	5.4	0	0	0	0
31	Tapi	100	0.6	300	1.8	700	4.2	2100	12.6	100	0.6	300	1.8
32	Vadodara	400	2.4	1200	7.2	1400	8.4	4200	25.2	400	2.4	1200	7.2
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0
	Tota	6850	41.1	20550	123.3	20100	120.6	60300	361.8	3340	20	10020	60

Table- 4.1.66 District-wise Training Proposed for Capacity Building of Farmers District Level on Different Technologies (Continue...)

S. N.	Districts	Organic Farming				IWM				Total			
		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	350	2.1	1050	6.3	2100	12.6	6300	37.8	20650	123.9	61950	371.7
2	Amreli	1100	6.6	3300	19.8	1650	9.9	4950	29.7	20900	125.4	62700	376.2
3	Anand	160	1	480	3	960	5.8	2880	17.4	8480	50.88	25440	152.64
4	Arvali	50	0.3	150	0.9	550	3.3	1650	9.9	5260	31.6	15780	94.8
5	Banaskantha	240	1.4	720	4.2	1440	8.6	4320	25.8	12720	76.32	38160	228.96
6	Bharuch	250	1.5	750	4.5	1260	7.6	3780	22.8	10820	64.88	32460	194.64
7	Bhavnagar	1100	6.6	3300	19.8	1650	9.9	4950	29.7	20900	125.4	62700	376.2
8	Botad	50	0.3	150	0.9	550	3.3	1650	9.9	3890	23.38	11670	70.14
9	ChhotaUdaipur	50	0.3	150	0.9	550	3.3	1650	9.9	4380	26.28	13140	78.84
10	Dahod	100	0.6	300	1.8	1050	6.3	3150	18.9	8950	53.7	26850	161.1
11	Dang	100	0.6	300	1.8	550	3.3	1650	9.9	5850	35.1	17550	105.3
12	Devv-Dwarka	50	0.3	150	0.9	550	3.3	1650	9.9	3890	23.38	11670	70.14
13	Gandhinagar	50	0.3	150	0.9	550	3.3	1650	9.9	4520	27.16	13560	81.48
14	GirSomnath	50	0.3	150	0.9	550	3.3	1650	9.9	6650	39.9	19950	119.7
15	Jamnagar	0	0	0	0	1500	9	4500	27	8750	52.5	26250	157.5
16	Junagadh	700	4.2	2100	12.6	2000	12	6000	36	16150	96.9	48450	290.7
17	Kachchh	200	1.2	600	3.6	800	4.8	2400	14.4	7500	45	22500	135
18	Kheda	140	0.8	420	2.4	1020	6.1	3060	18.3	8040	48.02	24120	144.06
19	Mahesana	180	1.1	540	3.3	1080	6.5	3240	19.5	9540	57.34	28620	172.02
20	Mahisagar	50	0.3	150	0.9	550	3.3	1650	9.9	6250	37.5	18750	112.5
21	Morbi	50	0.3	150	0.9	550	3.3	1650	9.9	6160	37	18480	111
22	Narmada	500	3	1500	9	100	0.6	300	1.8	5950	35.7	17850	107.1
23	Navsari	50	0.3	150	0.9	550	3.3	1650	9.9	600	3.6	1800	10.8
24	Panchmahal	0	0	0	0	1500	9	4500	27	9700	58.2	29100	174.6
25	Patan	210	1.3	630	3.9	1200	7.2	3600	21.6	12710	76.38	38130	229.14
26	Porbandar	0	0	0	0	250	1.5	750	4.5	2500	15	7500	45

27	Rajkot	0	0	0	0	3000	18	9000	54	19500	117	58500	351
28	Sabarkantha	520	3.1	1560	9.3	1300	7.8	3900	23.4	13520	81	40560	243
29	Surat	100	0.6	300	1.8	1050	6.3	3150	18.9	8950	53.7	26850	161.1
30	Surendranagar	0	0	0	0	1500	9	4500	27	12550	75.3	37650	225.9
31	Tapi	100	0.6	300	1.8	1050	6.3	3150	18.9	8950	53.7	26850	161.1
32	Vadodara	400	2.4	1200	7.2	2100	12.6	6300	37.8	18500	111	55500	333
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0
	Total	6900	41.4	20700	124.2	35060	210.4	105180	631.2	313680	1882.12	941040	5646.36

Cost Norms: Rs. 600/ Trainee / Day

Table - 4.1.67 District-wise Varietal Demonstration of wheat crop in Next Three Years of Wheat Crop

Sr. No.	Districts	Year-wise Varietal Demonstration (Phy - No, Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	400	20.0	400	20.0	400	20.0	1200	60
2	Amreli	220	11.0	220	11.0	220	11.0	660	33
3	Anand	400	20.0	400	20.0	400	20.0	1200	60
4	Arvali	60	3.0	60	3.0	60	3.0	180	9
5	Banaskantha	600	30.0	600	30.0	600	30.0	1800	90
6	Bharuch	500	15.0	500	15.0	500	15.0	1500	45
7	Bhavnagar	220	11.0	220	11.0	220	11.0	660	33
8	Botad	50	2.5	50	2.5	50	2.5	150	7.5
9	ChhotaUdaipur	50	2.5	50	2.5	50	2.5	150	7.5
10	Dahod	600	30.0	600	30.0	600	30.0	1800	90
11	Dang	60	3.0	60	3.0	60	3.0	180	9
12	Devv-Dwarka	50	2.5	50	2.5	50	2.5	150	7.5
13	Gandhinagar	200	10.0	200	10.0	200	10.0	600	30
14	GirSomnath	60	3.0	60	3.0	60	3.0	180	9

15	Jamnagar	500	25.0	500	25.0	500	25.0	1500	75
16	Junagadh	350	17.5	350	17.5	350	17.5	1050	52.5
17	Kachchh	100	6.0	100	6.0	100	6.0	300	18
18	Kheda	420	21.0	420	21.0	420	21.0	1260	63
19	Mahesana	900	45.0	900	45.0	900	45.0	2700	135
20	Mahisagar	60	3.0	60	3.0	60	3.0	180	9
21	Morbi	50	2.5	50	2.5	50	2.5	150	7.5
22	Narmada	200	8.0	200	8.0	200	8.0	600	24
23	Navsari	60	3.0	60	3.0	60	3.0	180	9
24	Panchmahal	200	10.0	200	10.0	200	10.0	600	30
25	Patan	50	2.5	50	2.5	50	2.5	150	7.5
26	Porbandar	120	2.4	120	2.4	120	2.4	360	7.2
27	Rajkot	700	30.0	700	30.0	700	30.0	2100	90
28	Sabarkantha	650	32.5	650	32.5	650	32.5	1950	97.5
29	Surat	1650	82.5	1650	82.5	1650	82.5	4950	247.5
30	Surendranagar	500	25.0	500	25.0	500	25.0	1500	75
31	Tapi	1650	82.5	1650	82.5	1650	82.5	4950	247.5
32	Vadodara	800	40.0	800	40.0	800	40.0	2400	120
33	Valsad	0	0	0	0	0	0	0	0
	Total	12430	601.9	12430	601.9	12430	601.9	37290	1805.7

Cost Norms:Rs 5000/acre/demonstration

Table- 4.1.68 Wheat Seed Planning/Seed Village Program (Seed Production Enhancement)

S. N.	District	No. of Taluka	No. of Villages/ Year	Seed rate kg/ha	Wheat Seed Village Program (Phy - No, Fin - Rs. in Lakh)									
					2016-17		2017-18		2018-19		2019-20		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	50	100	1000	50.0	1250	62.5	1370	68.5	1500	75.0	4120	206.0
2	Amreli	11	55	100	1100	55.0	1375	68.8	1507	75.4	1650	82.5	4532	226.6
3	Anand	8	40	100	800	40.0	1000	50.0	1096	54.8	1200	60.0	3296	164.8
4	Arvali	6	15	100	117	5.9	146	7.4	160	8.1	176	8.9	482	24.3
5	Banaskantha	14	60	100	1200	60.0	1500	75.0	1644	82.2	1800	90.0	4944	247.2
6	Bharuch	9	40	100	800	40.0	1000	50.0	1096	54.8	1200	60.0	3296	164.8
7	Bhavnagar	10	47	100	1092	54.6	1365	68.3	1496	74.8	1638	81.9	4499	225.0
8	Botad	4	8	100	108	5.4	135	6.8	148	7.4	162	8.1	445	22.2
9	Chhotaudaipur	6	8	100	72	3.6	90	4.5	99	4.9	108	5.4	297	14.8
10	Dahod	8	35	100	700	35.0	875	43.8	959	48.0	1050	52.5	2884	144.2
11	Dang	3	5	100	100	5.0	125	6.3	137	6.9	150	7.5	412	20.6
12	Dev Dwarka	4	11	100	117	5.9	146	7.4	160	8.1	176	8.9	482	24.3
13	Gandhinagar	4	20	100	400	20.0	500	25.0	548	27.4	600	30.0	1648	82.4
14	Gir Somnath	6	11	100	126	6.3	158	7.9	173	8.6	189	9.5	519	26.0
15	Jamnagar	6	39	100	845	42.3	1056	52.9	1158	58.0	1268	63.5	3481	174.3
16	Junagadh	10	59	100	1274	63.7	1593	79.6	1745	87.3	1911	95.6	5249	262.4
17	Kachchh	10	50	100	1000	50.0	1250	62.5	1370	68.5	1500	75.0	4120	206.0
18	Kheda	10	50	100	1000	50.0	1250	62.5	1370	68.5	1500	75.0	4120	206.0
19	Mahesana	11	45	100	900	45.0	1125	56.3	1233	61.7	1350	67.5	3708	185.4
20	Mahisagar	6	9	100	108	5.4	135	6.8	148	7.4	162	8.1	445	22.2
21	Morbi	5	7	100	90	4.5	113	5.6	123	6.2	135	6.8	371	18.5
22	Narmada	5	20	100	400	20.0	500	25.0	548	27.4	600	30.0	1648	82.4
23	Navsari	6	0	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
24	Panchmahal	7	47	100	364	18.2	455	22.8	499	24.9	546	27.3	1500	75.0
25	Patan	9	40	100	800	40.0	1000	50.0	1096	54.8	1200	60.0	3296	164.8
26	Porbandar	3	11	100	300	15.0	375	18.8	411	20.6	450	22.5	1236	61.8

27	Rajkot	11	60	100	1400	70.0	1750	87.5	1918	95.9	2100	105.0	5768	288.4
28	Sabarkantha	8	55	100	42	845.0	53	1056.3	58	1157.7	63	1267.5	173	3481.4
29	Surat	10	50	100	1000	50.0	1250	62.5	1370	68.5	1500	75.0	4120	206.0
30	Surendranagar	10	40	100	910	45.5	1138	56.9	1247	62.3	1365	68.3	3749	187.5
31	Tapi	6	25	100	500	25.0	625	31.3	685	34.3	750	37.5	2060	103.0
32	Vadodara	8	51	100	1092	54.6	1365	68.3	1496	74.8	1638	81.9	4499	225.0
33	Valsad	6	0	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Total	250	1075	3100	19757	1830.9	24696	2288.6	27067	2508.3	29636	2746.4	81399	7543.3

Table- 4.1.69 District-wise Seed Treatment Demonstrations of Wheat Crop in Next Three Years of Gujarat State

S. N.	Name of the Districts	Year-wise Seed Treatment Demonstrations (Phy - No, Fin - Rs. in Lakh)									
		2016-17		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1900	19.00	1938	19.38	1957	19.57	1976	19.00	5871	57.95
2	Amreli	320	3.20	326	3.26	330	3.30	333	20.00	989	26.56
3	Anand	670	6.70	683	6.83	690	6.90	697	21.00	2070	34.74
4	Arvali	50	0.50	51	0.51	52	0.52	52	22.00	155	23.03
5	Banaskantha	890	8.90	908	9.08	917	9.17	926	23.00	2750	41.25
6	Bharuch	220	2.20	224	2.24	227	2.27	229	24.00	680	28.51
7	Bhavnagar	90	0.90	92	0.92	93	0.93	94	25.00	278	26.85
8	Botad	50	0.50	51	0.51	52	0.52	52	26.00	155	27.03
9	Chhotaudaipur	50	0.50	51	0.51	52	0.52	52	27.00	155	28.03
10	Dahod	370	3.70	377	3.77	381	3.81	385	28.00	1143	35.59
11	Dang	0	0.00	0	0.00	0	0.00	0	29.00	0	29.00
12	Dev Dwarka	50	0.50	51	0.51	52	0.52	52	30.00	155	31.03
13	Gandhinagar	350	3.50	357	3.57	361	3.61	364	31.00	1082	38.18
14	Gir Somnath	80	0.80	82	0.82	82	0.82	83	32.00	247	33.64
15	Jamnagar	380	3.80	388	3.88	391	3.91	395	33.00	1174	40.79
16	Junagadh	1520	15.20	1550	15.50	1566	15.66	1581	34.00	4697	65.16
17	Kachchh	310	3.10	316	3.16	319	3.19	322	35.00	958	41.36

18	Kheda	760	7.60	775	7.75	783	7.83	790	36.00	2348	51.58
19	Mahesana	730	7.30	745	7.45	752	7.52	759	37.00	2256	51.97
20	Mahisagar	80	0.80	82	0.82	82	0.82	83	38.00	247	39.64
21	Morbi	50	0.50	51	0.51	52	0.52	52	39.00	155	40.03
22	Narmada	400	4.00	408	4.08	412	4.12	416	40.00	1236	48.20
23	Navsari	0	0.00	0	0.00	0	0.00	0	41.00	0	41.00
24	Panchmahal	300	3.00	306	3.06	309	3.09	312	42.00	927	48.15
25	Patan	440	4.40	449	4.49	453	4.53	458	43.00	1360	52.02
26	Porbandar	250	2.50	255	2.55	258	2.58	260	44.00	773	49.13
27	Rajkot	1140	11.40	1163	11.63	1174	11.74	1186	45.00	3523	68.37
28	Sabarkantha	1490	14.90	1520	15.20	1535	15.35	1550	46.00	4604	76.55
29	Surat	80	0.80	82	0.82	82	0.82	83	47.00	247	48.64
30	Surendranagar	670	6.70	683	6.83	690	6.90	697	48.00	2070	61.74
31	Tapi	50	0.50	51	0.51	52	0.52	52	49.00	155	50.03
32	Vadodara	470	4.70	479	4.79	484	4.84	489	50.00	1452	59.64
33	Valsad	0	0.00	0	0.00	0	0.00	0	51.00	0	51.00
	Total	14210	142.10	14494	144.94	14636	146.36	14778	52.00	43909	343.31

Cost Norms:Rs.1000/- per demonstration area 0.40 ha

Table- 4.1.70 District-wise Farmer Field Schools of Wheat Crop Covering Identified Critical Technologies in Next Three Years

S. N.	Name of the Districts	Year-wise Farmers Field School (Phy - No, Fin - Rs. in Lakh)									
		2016-17		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	2.0	10	2.0	10	2.0	10	2.0	30	6
2	Amreli	32	6.4	32	6.4	32	6.4	32	6.4	96	19.2
3	Anand	40	8.0	40	8.0	40	8.0	40	8.0	120	24
4	Arvali	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6
5	Banaskantha	24	4.8	24	4.8	24	4.8	24	4.8	72	14.4
6	Bharuch	4	0.8	4	0.8	4	0.8	4	0.8	12	2.4
7	Bhavnagar	9	1.8	9	1.8	9	1.8	9	1.8	27	5.4

8	Botad	5	1.0	5	1.0	5	1.0	5	1.0	15	3
9	Chhota udaipur	5	1.0	5	1.0	5	1.0	5	1.0	15	3
10	Dahod	20	4.0	20	4.0	20	4.0	20	4.0	60	12
11	Dang	2	0.4	2	0.4	2	0.4	2	0.4	6	1.2
12	Dev_Dwarkka	5	1.0	5	1.0	5	1.0	5	1.0	15	3
13	Gandhinagar	20	4.0	20	4.0	20	4.0	20	4.0	60	12
14	GirSomanath	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6
15	Jamnagar	38	7.6	38	7.6	38	7.6	38	7.6	114	22.8
16	Junagadh	100	20.0	100	20.0	100	20.0	100	20.0	300	60
17	Kachchh	20	4.0	20	4.0	20	4.0	20	4.0	60	12
18	Kheda	50	10.0	50	10.0	50	10.0	50	10.0	150	30
19	Mahesana	90	18.0	90	18.0	90	18.0	90	18.0	270	54
20	Mahisagar	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6
21	Morbi	5	1.0	5	1.0	5	1.0	5	1.0	15	3
22	Narmada	5	1.0	5	1.0	5	1.0	5	1.0	15	3
23	Navsari	0	0.0	0	0.0	0	0.0	0	0.0	0	0
24	Panchmahal	10	2.0	10	2.0	10	2.0	10	2.0	30	6
25	Patan	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6
26	Porbandar	25	5.0	25	5.0	25	5.0	25	5.0	75	15
27	Rajkot	90	18.0	90	18.0	90	18.0	90	18.0	270	54
28	Sabarkantha	26	5.2	26	5.2	26	5.2	26	5.2	78	15.6
29	Surat	5	1.0	5	1.0	5	1.0	5	1.0	15	3
30	Surendranagar	40	8.0	40	8.0	40	8.0	40	8.0	120	24
31	Tapi	15	3.0	15	3.0	15	3.0	15	3.0	45	9
32	Vadodara	10	2.0	10	2.0	10	2.0	10	2.0	30	6
33	Valsad	0	0.0	0	0.0	0	0.0	0	0.0	0	0
	Total	729	145.8	729	145.8	729	145.8	729	145.8	2187	437.4

Cost Norms: Rs. 20,000/- per School

Table- 4.1.71 Group Formation /Commodity Interest Groups Formation of wheat crop for Specific Activities (over All State)

Interest Group	Year-wise No. of Group Formation (Phy - No, Fin - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Seed production	926	185.2	926	185.2	926	185.2	2778	555.6
Organic Farming	407	80.8	407	80.8	407	80.8	1221	242.4
Value addition	395	79	395	79	395	79	1185	237
Specific Crop group	658	131.6	658	131.6	658	131.6	1974	394.8
Total	2371	474.2	2371	474.2	2371	474.2	7113	1422.6

Cost Norms:Rs.0.20 lacs/group (for capacity building, input assistance, marketing &for group activities)

Table- 4.1.72 District-wise Group Formation / Commodity Interest Groups Formation for Specific Activities (Phy - No, Fin - Rs. in Lakh)

S. N.	Districts	Seed Production				Organic Farming				Value Addition				Specific Crop Group				Total			
		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20		2017-18		2017-20	
		Ph	Fi	Ph	Fi	Ph	Fi	Ph	Fi	Ph	Fi	Ph	Fi	Ph	Fi	Ph	Fi	Ph	Fi	Ph	Fi
1	Ahmedabad	20	4.0	60	12	2	0.4	6	1.2	5	1.0	15	3	10	2.0	30	6	37	7.4	111	22.2
2	Amreli	40	8.0	120	24	16	3.2	48	9.6	8	1.6	24	4.8	32	6.4	96	19.2	96	19.2	288	57.6
3	Anand	40	8.0	120	24	16	3.2	48	9.6	8	1.6	24	4.8	32	6.4	96	19.2	96	19.2	288	57.6
4	Arvali	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
5	Banaskantha	40	8.0	120	24	16	3.2	48	9.6	24	4.8	72	14.4	32	6.4	96	19.2	112	22.4	336	67.2
6	Bharuch	20	4.0	60	12	2	0.4	6	1.2	5	1.0	15	3	10	2.0	30	6	37	7.4	111	22.2
7	Bhavnagar	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
8	Botad	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
9	Chhota	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
1	Dahod	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
1	Dang	20	4.0	60	12	5	1.0	15	3	5	1.0	15	3	10	2.0	30	6	40	8	120	24
1	Dev_Dwarkk	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
1	Gandhinagar	20	4.0	60	12	8	1.0	24	3	4	0.8	12	2.4	16	3.2	48	9.6	48	9	144	27
1	GirSomanath	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
1	Jamnagar	40	8.0	120	24	16	3.2	48	9.6	8	1.6	24	4.8	32	6.4	96	19.2	96	19.2	288	57.6
1	Junagadh	111	22.2	333	66.6	73	14.4	219	43.8	80	16.0	240	48	72	14.4	216	43.2	336	67.2	100	201.6
1	Kachchh	30	6.0	90	18	20	4.0	60	12	10	2.0	30	6	30	6.0	90	18	90	18	270	54
1	Kheda	50	10.0	150	30	20	4.0	60	12	10	2.0	30	6	40	8.0	120	24	120	24	360	72
1	Mahesana	111	22.2	333	66.6	73	14.4	219	43.8	80	16.0	240	48	72	14.4	216	43.2	336	67.2	100	201.6
2	Mahisagar	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
2	Morbi	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
2	Narmada	20	4.0	60	12	2	0.4	6	1.2	5	1.0	15	3	10	2.0	30	6	37	7.4	111	22.2
2	Navsari	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0	0	0

2	Panchmahal	20	4.0	60	12	2	0.4	6	1.2	15	3.0	45	9	10	2.0	30	6	47	9.4	141	28.2
2	Patan	40	8.0	120	24	16	3.2	48	9.6	24	4.8	72	14	32	6.4	96	19.2	112	22.4	336	67.2
2	Porbandar	15	3.0	45	9	7	1.4	21	4.2	15	3.0	45	9	15	3.0	45	9	52	10.4	156	31.2
2	Rajkot	40	8.0	120	24	16	3.2	48	9.6	8	1.6	24	4.8	32	6.4	96	19.2	96	19.2	288	57.6
2	Sabarkantha	39	7.8	117	23.4	13	2.6	39	7.8	13	2.6	39	7.8	39	7.8	117	23.4	104	20.8	312	62.4
2	Surat	20	4.0	60	12	2	0.4	6	1.2	5	1.0	15	3	10	2.0	30	6	37	7.4	111	22.2
3	Surendranag	40	8.0	120	24	16	3.2	48	9.6	8	1.6	24	4.8	32	6.4	96	19.2	96	19.2	288	57.6
3	Tapi	20	4.0	60	12	2	0.4	6	1.2	5	1.0	15	3	10	2.0	30	6	37	7.4	111	22.2
3	Vadodara	100	20.0	300	60	50	10	150	30	20	4.0	60	12	50	10.0	150	30	220	44	660	132
3	Valsad	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0	0	0
	Total	1031	206.2	309	618	45	90	136	271	50	100	150	300	76	152	228	457	275	549	825	1648

Table- 4.1.73 District-wise INM Demonstrations of wheat crop in Next Five Years in the State

S. N.	Districts	Year-wise INM Demonstration (Phy Area covered in ha, Fin. Rs. in Lakh)									
		2016-17		2017-18		2018-10		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	400	20.0	408.0	20.4	412.0	20.6	416.0	20.8	1236.0	61.8
2	Amreli	550	27.5	561.0	28.05	566.5	28.325	572.0	28.6	1699.5	84.975
3	Anand	500	25.0	510.0	25.5	515.0	25.75	520.0	26	1545.0	77.25
4	Arvali	40	2.0	40.8	2.04	41.2	2.06	41.6	2.08	123.6	6.18
5	Banaskantha	360	18.0	367.2	18.36	370.8	18.54	374.4	18.72	1112.4	55.62
6	Bharuch	500	25.0	510.0	25.5	515.0	25.75	520.0	26	1545.0	77.25
7	Bhavnagar	200	10.0	204.0	10.2	206.0	10.3	208.0	10.4	618.0	30.9
8	Botad	40	2.0	40.8	2.04	41.2	2.06	41.6	2.08	123.6	6.18
9	Chhotaudaipur	40	2.0	40.8	2.04	41.2	2.06	41.6	2.08	123.6	6.18
10	Dahod	3000	150.0	3060.0	153	3090.0	154.5	3120.0	156	9270.0	463.5
11	Dang	50	2.5	51.0	2.55	51.5	2.575	52.0	2.6	154.5	7.725
12	Dev Dwarka	50	2.5	51.0	2.55	51.5	2.575	52.0	2.6	154.5	7.725
13	Gandhinagar	40	2.0	40.8	2.04	41.2	2.06	41.6	2.08	123.6	6.18

14	Gir Somnath	50	2.5	51.0	2.55	51.5	2.575	52.0	2.6	154.5	7.725
15	Jamnagar	200	10.0	204.0	10.2	206.0	10.3	208.0	10.4	618.0	30.9
16	Junagadh	550	27.5	561.0	28.05	566.5	28.325	572.0	28.6	1699.5	84.975
17	Kachchh	50	2.5	51.0	2.55	51.5	2.575	52.0	2.6	154.5	7.725
18	Kheda	200	10.0	204.0	10.2	206.0	10.3	208.0	10.4	618.0	30.9
19	Mahesana	900	45.0	918.0	45.9	927.0	46.35	936.0	46.8	2781.0	139.05
20	Mahisagar	60	3.0	61.2	3.06	61.8	3.09	62.4	3.12	185.4	9.27
21	Morbi	60	3.0	61.2	3.06	61.8	3.09	62.4	3.12	185.4	9.27
22	Narmada	200	10.0	204.0	10.2	206.0	10.3	208.0	10.4	618.0	30.9
23	Navsari	0	0.0	0.0	0	0.0	0	0.0	0	0.0	0
24	Panchmahal	1000	50.0	1020.0	51	1030.0	51.5	1040.0	52	3090.0	154.5
25	Patan	360	18.0	367.2	18.36	370.8	18.54	374.4	18.72	1112.4	55.62
26	Porbandar	60	3.0	61.2	3.06	61.8	3.09	62.4	3.12	185.4	9.27
27	Rajkot	700	35.0	714.0	35.7	721.0	36.05	728.0	36.4	2163.0	108.15
28	Sabarkantha	650	32.5	663.0	33.15	669.5	33.475	676.0	33.8	2008.5	100.425
29	Surat	1750	87.5	1785.0	89.25	1802.5	90.125	1820.0	91	5407.5	270.375
30	Surendranagar	200	10.0	204.0	10.2	206.0	10.3	208.0	10.4	618.0	30.9
31	Tapi	1750	87.5	1785.0	89.25	1802.5	90.125	1820.0	91	5407.5	270.375
32	Vadodara	800	40.0	816.0	40.8	824.0	41.2	832.0	41.6	2472.0	123.6
33	Valsad	0	0.0	0.0	0	0.0	0	0.0	0	0.0	0
	Total	15310	765.5	15616.2	780.81	15769.3	788.465	15922.4	796.12	47307.9	2365.395

Table- 4.1.74 District-wise Demonstrations of wheat crop on Resource Conservation Technologies

S. N.	Districts	Laser Leveling (Phy Area covered in ha, Fin. Rs. in Lakh)									
		2016-17		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	300	15.00	305	15.24	310	15.48	314	15.72	929	46.44
2	Amreli	320	16.00	325	16.26	330	16.51	335	16.77	991	49.54
3	Anand	320	16.00	325	16.26	330	16.51	335	16.77	991	49.54

4	Arvali	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
5	Banaskantha	600	30.00	610	30.48	619	30.96	629	31.44	1858	92.88
6	Bharuch	250	12.50	254	12.70	258	12.90	262	13.10	774	38.70
7	Bhavnagar	320	16.00	325	16.26	330	16.51	335	16.77	991	49.54
8	Botad	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
9	Chhotaudaipur	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
10	Dahod	200	10.00	203	10.16	206	10.32	210	10.48	619	30.96
11	Dang	300	15.00	305	15.24	310	15.48	314	15.72	929	46.44
12	Dev Dwarka	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
13	Gandhinagar	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
14	Gir Somnath	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
15	Jamnagar	250	12.50	254	12.70	258	12.90	262	13.10	774	38.70
16	Junagadh	350	17.50	356	17.78	361	18.06	367	18.34	1084	54.18
17	Kachchh	1000	50.00	1016	50.80	1032	51.60	1048	52.40	3096	154.80
18	Kheda	200	10.00	203	10.16	206	10.32	210	10.48	619	30.96
19	Mahesana	450	22.50	457	22.86	464	23.22	472	23.58	1393	69.66
20	Mahisagar	250	12.50	254	12.70	258	12.90	262	13.10	774	38.70
21	Morbi	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
22	Narmada	250	12.50	254	12.70	258	12.90	262	13.10	774	38.70
23	Navsari	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24	Panchmahal	300	15.00	305	15.24	310	15.48	314	15.72	929	46.44
25	Patan	400	20.00	406	20.32	413	20.64	419	20.96	1238	61.92
26	Porbandar	150	7.50	152	7.62	155	7.74	157	7.86	464	23.22
27	Rajkot	320	16.00	325	16.26	330	16.51	335	16.77	991	49.54
28	Sabarkantha	650	32.50	660	33.02	671	33.54	681	34.06	2012	100.62
29	Surat	300	15.00	305	15.24	310	15.48	314	15.72	929	46.44
30	Surendranagar	320	16.00	325	16.26	330	16.51	335	16.77	991	49.54
31	Tapi	300	15.00	305	15.24	310	15.48	314	15.72	929	46.44
32	Vadodara	400	20.00	406	20.32	413	20.64	419	20.96	1238	61.92
33	Valsad	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Total	9550	477.50	9703	485.14	9856	492.78	9550	477.50	29108	1455.42

Table- 4.1.74 District-Wise Demonstrations of Wheat Crop on Resource Conservation Technologies (Continue...)

S. N.	Name of the Districts	Green Manuring (Phy Area in ha, Fin. Rs. in Lakh)									
		2016-17		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	500	25.00	510	25.50	515	25.75	520	26.00	1545	77.25
2	Amreli	320	16.00	326	16.32	330	16.48	333	16.64	989	49.44
3	Anand	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
4	Arvali	250	12.50	255	12.75	258	12.88	260	13.00	773	38.63
5	Banaskantha	600	30.00	612	30.60	618	30.90	624	31.20	1854	92.70
6	Bharuch	500	25.00	510	25.50	515	25.75	520	26.00	1545	77.25
7	Bhavnagar	320	16.00	326	16.32	330	16.48	333	16.64	989	49.44
8	Botad	150	7.50	153	7.65	155	7.73	156	7.80	464	23.18
9	Chhotaudaipur	150	7.50	153	7.65	155	7.73	156	7.80	464	23.18
10	Dahod	1000	50.00	1020	51.00	1030	51.50	1040	52.00	3090	154.50
11	Dang	250	12.50	255	12.75	258	12.88	260	13.00	773	38.63
12	Dev Dwarka	150	7.50	153	7.65	155	7.73	156	7.80	464	23.18
13	Gandhinagar	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
14	Gir Somnath	250	12.50	255	12.75	258	12.88	260	13.00	773	38.63
15	Jamnagar	250	12.50	255	12.75	258	12.88	260	13.00	773	38.63
16	Junagadh	350	17.50	357	17.85	361	18.03	364	18.20	1082	54.08
17	Kachchh	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
18	Kheda	500	25.00	510	25.50	515	25.75	520	26.00	1545	77.25
19	Mahesana	650	32.50	663	33.15	670	33.48	676	33.80	2009	100.43
20	Mahisagar	250	12.50	255	12.75	258	12.88	260	13.00	773	38.63
21	Morbi	150	7.50	153	7.65	155	7.73	156	7.80	464	23.18
22	Narmada	250	12.50	255	12.75	258	12.88	260	13.00	773	38.63
23	Navsari	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24	Panchmahal	500	25.00	510	25.50	515	25.75	520	26.00	1545	77.25

25	Patan	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
26	Porbandar	150	7.50	153	7.65	155	7.73	156	7.80	464	23.18
27	Rajkot	320	16.00	326	16.32	330	16.48	333	16.64	989	49.44
28	Sabarkantha	320	16.00	326	16.32	330	16.48	333	16.64	989	49.44
29	Surat	500	25.00	510	25.50	515	25.75	520	26.00	1545	77.25
30	Surendranagar	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
31	Tapi	500	25.00	510	25.50	515	25.75	520	26.00	1545	77.25
32	Vadodara	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
33	Valsad	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Total	11530	576.50	11761	588.03	11876	593.80	11991	599.56	35628	1781.39

Cost Norms:Rs 5000/ha demonstration area 0.40 ha

Table- 4.1.75 District-wise Organic Farming Demonstrations of Wheat Crop in Next Three Years

S. N.	Districts	Year wise Organic Farming Demonstration (Phy - No, Fin - Rs. in Lakh)									
		2016-17		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
2	Amreli	220	11.00	224	11.22	227	11.33	229	11.44	680	33.99
3	Anand	400	20.00	408	20.40	412	20.60	416	20.80	1236	61.80
4	Arvali	351	17.60	358	17.95	362	18.13	365	18.30	1085	54.38
5	Banaskantha	600	30.00	612	30.60	618	30.90	624	31.20	1854	92.70
6	Bharuch	500	15.00	510	15.30	515	15.45	520	15.60	1545	46.35
7	Bhavnagar	220	11.00	224	11.22	227	11.33	229	11.44	680	33.99
8	Botad	384	19.20	392	19.58	396	19.78	399	19.97	1187	59.33
9	Chhota udaipur	324	16.20	330	16.52	334	16.69	337	16.85	1001	50.06
10	Dahod	498	24.90	508	25.40	513	25.65	518	25.90	1539	76.94
11	Dang	60	3.00	61	3.06	62	3.09	62	3.12	185	9.27
12	Dev_Dwarka	320	16.00	326	16.32	330	16.48	333	16.64	989	49.44

13	Gandhinagar	200	10.00	204	10.20	206	10.30	208	10.40	618	30.90
14	GirSomanath	224	11.20	228	11.42	231	11.54	233	11.65	692	34.61
15	Jamnagar	415	20.80	423	21.22	427	21.42	432	21.63	1282	64.27
16	Junagadh	291	14.50	297	14.79	300	14.94	303	15.08	899	44.81
17	Kachchh	100	6.00	102	6.12	103	6.18	104	6.24	309	18.54
18	Kheda	420	21.00	428	21.42	433	21.63	437	21.84	1298	64.89
19	Mahesana	900	45.00	918	45.90	927	46.35	936	46.80	2781	139.05
20	Mahisagar	512	25.60	522	26.11	527	26.37	532	26.62	1582	79.10
21	Morbi	320	16.00	326	16.32	330	16.48	333	16.64	989	49.44
22	Narmada	200	8.00	204	8.16	206	8.24	208	8.32	618	24.72
23	Navsari	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24	Panchmahal	200	10.00	204	10.20	206	10.30	208	10.40	618	30.90
25	Patan	50	2.50	51	2.55	52	2.58	52	2.60	155	7.73
26	Porbandar	120	2.40	122	2.45	124	2.47	125	2.50	371	7.42
27	Rajkot	700	30.00	714	30.60	721	30.90	728	31.20	2163	92.70
28	Sabarkantha	540	27.00	551	27.54	556	27.81	562	28.08	1669	83.43
29	Surat	1650	82.50	1683	84.15	1700	84.98	1716	85.80	5099	254.93
30	Surendranagar	415	20.80	423	21.22	427	21.42	432	21.63	1282	64.27
31	Tapi	1650	82.50	1683	84.15	1700	84.98	1716	85.80	5099	254.93
32	Vadodara	664	33.20	677	33.86	684	34.20	691	34.53	2052	102.59
33	Valsad	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Total	13848	672.90	14125	686.36	14263	693.09	14402	699.82	42790	2079.26

Cost Norms: Rs 5000/acre/demonstration

Table- 4.1.76 District-wise Bio-fertilizer and Bio-compost Demonstrations of Wheat Crop

S. N.	Name of the Districts	Year wise Bio-fertilizer and bio-compost Demonstration (Phy - No, Fin - Rs. in Lakh)									
		2016-17		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	400	20.00	408	20.00	412	20.60	416	20.80	1236	61.40
2	Amreli	220	11.00	224	21.00	227	11.33	229	11.44	680	43.77
3	Anand	400	20.00	408	22.00	412	20.60	416	20.80	1236	63.40
4	Arvali	312	15.60	318	23.00	321	16.07	324	16.22	964	55.29
5	Banaskantha	600	30.00	612	24.00	618	30.90	624	31.20	1854	86.10
6	Bharuch	500	15.00	510	25.00	515	15.45	520	15.60	1545	56.05
7	Bhavnagar	121	6.10	123	26.00	125	6.28	126	6.34	374	38.63
8	Botad	106	5.30	108	27.00	109	5.46	110	5.51	328	37.97
9	Chhota udaipur	288	14.40	294	28.00	297	14.83	300	14.98	890	57.81
10	Dahod	330	16.50	337	29.00	340	17.00	343	17.16	1020	63.16
11	Dang	60	3.00	61	30.00	62	3.09	62	3.12	185	36.21
12	Dev_Dwarkka	140	7.00	143	31.00	144	7.21	146	7.28	433	45.49
13	Gandhinagar	200	10.00	204	32.00	206	10.30	208	10.40	618	52.70
14	GirSomanath	98	4.90	100	33.00	101	5.05	102	5.10	303	43.14
15	Jamnagar	375	18.80	383	34.00	386	19.36	390	19.55	1159	72.92
16	Junagadh	263	13.10	268	35.00	271	13.40	274	13.62	813	62.12
17	Kachchh	100	6.00	102	36.00	103	6.18	104	6.24	309	48.42
18	Kheda	420	21.00	428	37.00	433	21.63	437	21.84	1298	80.47
19	Mahesana	900	45.00	918	38.00	927	46.35	936	46.80	2781	131.15
20	Mahisagar	224	11.20	228	39.00	231	11.54	233	11.65	692	62.18
21	Morbi	140	7.00	143	40.00	144	7.21	146	7.28	433	54.49
22	Narmada	200	8.00	204	41.00	206	8.24	208	8.32	618	57.56
23	Navsari	0	0.00	0	42.00	0	0.00	0	0.00	0	42.00
24	Panchmahal	200	10.00	204	43.00	206	10.30	208	10.40	618	63.70

25	Patan	50	2.50	51	44.00	52	2.58	52	2.60	155	49.18
26	Porbandar	120	2.40	122	45.00	124	2.47	125	2.50	371	40.07
27	Raikot	700	20.00	714	46.00	721	20.00	728	21.20	2163	109.10
28	Sabarkantha	358	17.00	365	47.00	369	19.44	372	19.62	1106	94.05
29	Surat	1650	82.50	1683	48.00	1700	84.08	1716	85.80	5099	218.78
30	Surendranagar	375	18.80	383	40.00	386	40.26	390	40.55	1159	97.02
31	Tapi	1650	82.50	1683	50.00	1700	84.08	1716	85.80	5099	220.78
32	Vadodara	600	20.00	612	54.00	618	20.00	624	21.20	1854	112.10
33	Valsad	0	0.00	0	52.00	0	0.00	0	0.00	0	52.00
	Total	12100	585.50	12342	1188.00	12463	603.07	12584	608.92	37389	2399.99

Table- 4.1.77 District-wise IWM Demonstrations of Wheat Crop in Next Three Years

S. N.	Districts	Year-wise IWM Demonstration (Phy - No, Fin - Rs. in Lakh)									
		2016-17		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	400	20.00	413	20.64	419	20.96	416	20.80	1248	62.40
2	Amreli	220	11.00	227	11.35	231	11.53	229	11.44	686	34.32
3	Anand	400	20.00	413	20.64	419	20.96	416	20.80	1248	62.40
4	Arvali	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
5	Banaskantha	600	30.00	619	30.96	629	31.44	624	31.20	1872	93.60
6	Bharuch	500	15.00	516	15.48	524	15.72	520	15.60	1560	46.80
7	Bhavnagar	220	11.00	227	11.35	231	11.53	229	11.44	686	34.32
8	Botad	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
9	Chhota udaipur	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
10	Dahod	600	30.00	619	30.96	629	31.44	624	31.20	1872	93.60
11	Dang	60	3.00	62	3.10	63	3.14	62	3.12	187	9.36
12	Dev_Dwarkka	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
13	Gandhinagar	200	10.00	206	10.32	210	10.48	208	10.40	624	31.20
14	GirSomanath	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
15	Jamnagar	500	25.00	516	25.80	524	26.20	520	26.00	1560	78.00
16	Junagadh	350	17.50	361	18.06	367	18.34	364	18.20	1092	54.60

17	Kachchh	100	6.00	103	6.19	105	6.29	104	6.24	312	18.72
18	Kheda	420	21.00	433	21.67	440	22.01	437	21.84	1310	65.52
19	Mahesana	900	45.00	929	46.44	943	47.16	936	46.80	2808	140.40
20	Mahisagar	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
21	Morbi	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
22	Narmada	200	8.00	206	8.26	210	8.38	208	8.32	624	24.96
23	Navsari	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24	Panchmahal	200	10.00	206	10.32	210	10.48	208	10.40	624	31.20
25	Patan	50	2.50	52	2.58	52	2.62	52	2.60	156	7.80
26	Porbandar	120	2.40	124	2.48	126	2.52	125	2.50	374	7.49
27	Rajkot	700	30.00	722	30.96	734	31.44	728	31.20	2184	93.60
28	Sabarkantha	650	32.50	671	33.54	681	34.06	676	33.80	2028	101.40
29	Surat	1650	82.50	1703	85.14	1729	86.46	1716	85.80	5148	257.40
30	Surendranagar	500	25.00	516	25.80	524	26.20	520	26.00	1560	78.00
31	Tapi	1650	82.50	1703	85.14	1729	86.46	1716	85.80	5148	257.40
32	Vadodara	800	40.00	826	41.28	838	41.92	832	41.60	2496	124.80
33	Valsad	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Total	12340	597.40	12735	616.52	12932	626.08	12834	621.30	38501	1863.89

Cost Norms: Rs 5000/acre/demonstration

4.1.2.9 Researchable Issues:

- To deal with new insect, pest and diseases found in newly released varieties
- Small equipments so as to reduce drudgery of small and marginal farmers
- Need to specify changes agronomical practices due to weather effects
- Growth regulators to bring changes in crop physiology so as to adjust with the climatic variations
- Scheduling of micro nutrients for increasing fertilizer use efficiency while reducing cost
- Product specific varieties
- Genetic enhancement of nutritional densities of Zn and Fe in grains.
- Awareness for product specific wheat varieties and quality of products with feasibility to diversify fortified products.
- Market research combined with weather changes for deciding the crop area for a season

4.1.2.10 Innovative Special Projects:

Project -1

Title: Bracing Up Nutritional Deficiencies and Value Addition of Wheat Through Blending with Locally Available Low Cost Food Grains

Background/ Justification:

Cereals are essential in Indian diet and wheat is the commonly used as the daily diet in Gujarat. Beside cereals small millets like *bajra* and *ragi* are also used as diet by the people of rural and urban areas of Gujarat and these crops are cultivated in Gujarat. Wheat is consumed mostly as chapattis in India and in the form of yeast bread in western countries. Wheat contains more protein than any other cereal grain but is deficient in essential amino acid like lysine. Whole-Wheat flour, which includes the bran and the germ, is useful source of dietary fibre and B complex vitamins. The quantity of calcium & iron is less in wheat as compared to other cereals. Amaranthus is grown in Gujarat with a production of around 1200 qtls. of grains. The amaranthus grains have been reported more nutritive than the cereals and other food grains. The protein content in amaranthus ranges from 16-19% on dry weight basis with 5.5% essential amino acids. The protein of wheat, corn and rice are deficient in essential amino acid like lysine and sulphur containing amino acid. Wheares amino acid composition of amarnthus protein corresponds closely to the standard of WHO. Threonine, isoleucine, valine and leucine content are two-thirds to three forth of the recommended levels of WHO.

Objective:

- (i) To enhance the nutritional value of wheat flour for protein quantity and quality and micronutrients like iron, calcium, etc. through locally acceptable small millets.
- (ii) To work out acceptable blend of raw flour for different nutritional supplements through sensory evaluation.
- (iii) To develop methodology for preparation of different acceptable food products from the above blends and estimation of their nutrient value

Budget (Rs. in Lakh):

Sr. No.	Item	Year - wise Requirement (Rs. in Lakh)			Total (Rs. in Lakh)
		1 st Year	2 nd Year	3 rd Year	
1	Salary (Contractual)	8.20	8.20	8.20	24.60
2	Chemicals & Glassware	1.50	1.50	1.50	4.50

3	POL charges	0.25	0.30	0.35	0.90
4	Institutional & other charges	0.30	0.35	0.40	1.05
5	Technology dissemination	-	0.25	0.30	0.55
6	Travelling	0.20	0.25	0.30	0.75
	Total:	10.45	10.85	11.05	32.35
Grand Total: (Recurring) = 32.35 Estimate of Costs : 32,33,800=00					

Project -2

Title: Value Enhancement of Wheat through Organic Cultivation

Background/ Justification:

Wheat is an important cereal crop commonly used as the daily diet in Gujarat. The increase in food grain production due to green revolutions was associated with high use of agro-chemicals, which on long turn, resulted into decreased soil fertility and productivity due to soil and water degradation. Soil health has decreased which does not support good growth of crops apart from ill effect on human and animal health and degrading environment. The cultivation of HYVs has resulted in reduction of on-farm green biomass, thereby changing the mode of traditional agriculture resulting in the disappearance of cattle from the farms, reducing biodiversity, reducing biological productivity, reducing nutrient recycling and thus creating a crisis of non-sustainability, both economic and ecological. The residues of toxic chemicals lead to the rejection of exported material in global market. Moreover, due to mounting prices of agro-chemicals and fertilizers, the farming is becoming non-profitable.

Organic farming holds promise under such circumstances. Organics not only supply organic carbon, but also supply most of the plants nutrients in available form. They also improve the physical, biological and chemical properties of the soil. It has also been reported that crop grown through organics are rich in quality and taste as well as they can tolerate drought conditions better in comparison to chemical farming. Reports suggest that water requirement in organic farming is also low. Microbes help in sustaining the bio-dynamics of the soil. Seed dressing of wheat with Azatobacter and PSB saves 25 and 50 per cent nitrogen and phosphorus respectively. Awareness in health conscious increased the demand of organic products at national as well as international market.

The organic sources like empowered compost, micro organisms for enahnacing nutritional availability (*Azospirillum*, PSB etc), VAM for extracting nutrition and water from

aquifer, castor cake for nutrition and combating biotic problems can be exploited to raise healthy crop of wheat. These interventions can take care of chemical residue problems that are often reasons for rejection of lots meant for export.

The dissipating natural resource base including water, soil and fossil fuel are the other major concerns of intensive agriculture. The organics will induce natural sustenance cycles of microbes that would play vibrant role in checking cyclic damages triggered by intensive agriculture.

Objectives:

- i. To study the comparative yield and quality of wheat in organic and conventional modules.
- ii. To study comparative incidences of diseases and pests in organic and conventional modules and their impact on quality and yield of wheat.
- iii. To study the comparative alteration in physical and chemical properties of soil by employing organic and conventional modules
- iv. To work out economics of different modules.
- v. To create awareness among the farmers for organic cultivation of wheat.

Budget:

Sr. No.	Item	Year - wise Requirement (Rs. in Lakh)					Total (Rs. in Lakh)
		1 st year	2 nd year	3 rd year	4 th year	5 th year	
1	Recurring Contingency						
	(i) Operational Cost (Appendix-III)	3.500	3.500	3.500	3.500	3.500	17.50
	(ii) Contractual Services (Appendix-IV)	5.976	5.976	5.976	5.976	5.976	29.88
	Total	9.476	9.476	9.476	9.476	9.476	47.38

4.1.3 *Bajra* (Pearl millet):

4.1.3.1 Background:

Pearl millet is the most drought tolerant warm season cereal grown in some of the harsh, arid and dry-semi-arid tropical environments of South Asia and sub-Saharan Africa. It is more tolerant to high temperatures than any other cereal. The best temperature for the germination of pearl millet seed is from 23 to 32°C. The optimum rainfall requirement of pearl millet ranges between 500-800 mm and it can also be successfully grown in areas that receive less than 500 mm of annual rainfall.

India has the largest area (about 8.5 million ha) under pearl millet, which ranks third in area after rice and wheat among cereals. Although the crop is grown in several states of the country, it is a major crop in the dry areas of northwestern India, which comprises of Gujarat, Rajasthan and Haryana. It is valued for both its grain and stover. Its grains have high protein content, balanced amino acid profile, and high levels of iron, zinc and insoluble dietary fibre and are the major source of dietary carbohydrates in the human diet. Therefore it is popularly known as “Nutri food”. Its stover is an important component of livestock ration during the dry period of the year.

Pearl millet is a drought tolerant and thermo resilient cereal grown in the state. It is more tolerant to high temperatures than any other cereal. India ranks fourth in area after rice, wheat and maize among cereals and is grown in Gujarat, Rajasthan, Haryana and Maharashtra. It is valued for both, its grain and stover due to high protein content, balanced amino acid profile, and high levels of iron, zinc and insoluble dietary fiber. It is popularly known as “Nutri food”. In Gujarat, *Bajra* is grown in 26 out of 33 districts covering an area of 1.7 lakh ha in *kharif* with an average productivity 1567 kg/ha and around 2.84 lakh ha area under summer cultivation with an average productivity of 2726 kg/ha. The total area of *Bajra* in the state is 4.54 lakh ha (2016-17) with an average productivity 2292 kg/ha. The area of summer cultivation is increasing gradually due to short period of time window is available to farmer after rabi crops, acute demand of fodder and suitable climatic situation in the state.

Pearl millet is cultivated in both *kharif* and summer seasons in northwestern India. The recent spurt in prices of food grains especially of coarse cereals indicates supply-side constraints to meet their growing demand for non-food uses mainly for poultry; cattle feed, alcohol and starch industry. Further, with the higher prices of wheat, rice and maize in recent years, cattle and poultry feed and alcohol industries are looking for cheaper alternative sources like pearl millet. It is also noted that demand for pearl millet from the health-conscious food

products industry is increasing as it contains more fibre and is good for diabetic and heart patients. However, due to the high instability in grain yields and decline in prices of pearl millet, farmers might shift to other competing crops. The cultivation of pearl millet during the summer might reduce the instability as the crop is grown under irrigated conditions, which gives higher yields and returns. The area under summer pearl millet is still low when compared to *kharif* pearl millet but it is expanding in Gujarat state. Pearl millet is also an important fodder crop in the summer season, as most of the other crops cannot withstand hot temperatures. However, there are some abiotic and biotic constraints in cultivation of pearl millet, such as downy mildew, stem borer, shoot fly, drought, extreme heat and moisture stress.

4.1.3.2 Crop/Area Issues and Priorities:

- To conduct location specific research on priority areas in arid, semi-arid zone vis-a-vis collection and utilization of genetic resources for development of high yielding hybrids with wide adaptability.
- To identify early maturity high yielding disease, pest and bird resistant hybrids for different agro ecological situations.
- Production of parental breeder seeds as per state and national indents.
- Control of diseases using plant products, bio agents and new fungicides.
- Research on moisture conservation techniques for early maturing hybrids under rainfed condition.
- Fertilizer requirement of different intercropping systems keeping pearl millet as a main crop.
- Development of IPM module for the control of pearl millet pest.
- Study on incidence of store grain pests infesting bajra grains.
- Research work on inbuilt bio-fortification of pearl millet particularly mineral micronutrient Fe and Zn.
- Breeding for dry fodder quality improvement in dual purpose hybrids of pearl millet.

4.1.3.3 Current Status of Area, Production and Productivity:

District-wise (average vales, 2008-2011) area, production and productivity and projected area, Production, Productivity of *Bajra* in the State are given in Tables 4.1.78 and 4.1.79 respectively.

Table- 4.1.78 District-wise Average Area, Production and Productivity of Bajara Crop during Last Three Years

(A-Area in 'oo'ha, P-Production '00 T and Y- Yield in kg/ha)(2014-15 to 2016-17)

Sr. No.	District	Kaharif			Summer			Total		
		A	P	Y	A	P	Y	A	P	Y
1	Kachchh	149.32	178.47	1166.37	18.76	44.68	2354.50	168.08	223.15	3520.87
2	Banaskantha	279.86	319.10	1022.63	1429.10	3919.32	2738.07	1708.96	4238.42	3760.70
3	Patan	12.10	11.65	993.97	66.26	191.11	2893.73	78.36	202.76	3887.70
4	Mehesana	48.17	63.68	1321.01	140.51	386.67	2765.95	188.68	450.34	4086.96
5	Sabarkantha	4.73	5.01	1205.05	36.75	105.16	2966.67	41.47	110.17	4171.71
6	Arvalli	19.92	25.88	1233.69	32.83	79.91	2423.18	52.75	105.79	3656.87
7	Gandhinagar	25.34	40.11	1587.35	97.32	312.47	3240.52	122.66	352.58	4827.87
8	Ahmedabad	11.24	13.85	1251.57	7.57	22.86	3080.69	18.82	36.71	4332.27
9	Surendranagar	79.33	163.10	2056.09	9.32	29.99	3333.41	88.65	193.09	5389.49
10	Morbi	27.22	36.72	1346.70	2.36	6.73	2825.33	29.58	43.45	4172.03
11	Rajkot	2.42	6.01	2496.77	1.62	4.43	2825.33	4.03	10.44	5322.10
12	Jamnagar	0.00	0.00	0.00	0.78	2.14	2825.33	0.78	2.14	2825.33
13	D. Dwarka	3.03	5.19	1767.93	0.18	0.48	874.37	3.22	5.67	2642.30
14	Porbandar	0.78	1.38	1767.93	0.17	0.48	2825.33	0.95	1.85	4593.26
15	Junagadh	9.14	16.77	1767.93	4.29	11.52	2825.33	13.42	28.30	4593.26
16	Gir Somnath	38.54	98.48	2550.97	15.51	54.98	3301.33	54.06	153.47	5852.29
17	Amreli	29.52	67.04	2344.01	3.48	9.86	2825.33	32.99	76.90	5169.34
18	Bhavnagar	352.66	876.35	2484.67	2.63	8.00	3032.03	355.30	884.35	5516.69
19	Botad	7.15	19.74	2756.05	0.41	1.12	2825.33	7.56	20.85	5581.37
20	Anand	124.47	243.19	2003.27	349.67	1158.72	3290.36	474.15	1401.90	5293.63
21	Kheda	230.89	354.90	1533.45	234.26	664.58	2857.38	465.15	1019.47	4390.83

22	Panchmahal	4.17	7.11	1767.93	28.23	50.72	1789.39	32.40	57.83	3557.32
23	Mahisagar	80.93	118.57	1467.94	43.02	74.39	1696.93	123.95	192.96	3164.87
24	Dahod	0.00	0.00	0.00	0.05	0.16	1950.96	0.05	0.16	1950.96
25	Vadodara	57.17	93.14	1627.17	48.19	112.27	2340.50	105.35	205.40	3967.67
26	Chhotaudepur	0.00	0.00	0.00	0.11	0.29	874.37	0.11	0.29	874.37
27	Narmada	1.72	3.17	1223.57	3.90	7.13	1967.30	5.62	10.30	3190.87
28	Bharuch	0.40	0.65	544.37	3.24	6.68	2057.69	3.64	7.33	2602.05
29	Surat	0.71	1.17	1767.93	0.40	1.13	2825.33	1.11	2.30	4593.26
30	Dang	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	Navsari	0.00	0.00	0.00	0.28	0.73	874.37	0.28	0.73	874.37
32	Valsad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Tapi	0.66	1.21	1767.93	0.25	0.66	874.37	0.91	1.87	2642.30
Total		1601.58	2771.63	1730.56	2581.45	7269.35	2815.99	1601.58	2771.63	1730.56

Table - 4.1.79 Area, Production, Productivity of Bajra in the State

(A= Area in '00 ha, P= production in '00 T, Y= Yield in kg/ha)

Average of Five Years			Projected						Projected		
			2016-17			2017-18			2018-19		
A	P	Y	A	P	Y	A	P	Y	A	P	Y
1639.53	3943.45	62524.5	1544.9	3009.1	50829.6	1622.2	3633.5	58453.6	1654.65	4076.7	64299.1

4.1.3.4 Major Varieties:

There is significant difference in crop yields from different varieties in *kharif*, for example, grain and fodder yield of early varieties is less than medium and late varieties (Table- 4.1.80), but they are more suitable for resource poor conditions (require less fertilizer dose NPK 40:20:0, while late varieties require 80:40:0) and escape terminal floods and hence give higher grain yield even during abnormal years.

Table - 4.1.80 Potential of New (*kharif*) Varieties of *bajra* in Grain and Fodder Yield

Variety				
	Grain Yield (kg/ha)	Dry Fodder (q/ha)	% Increase over Local (Grain)	% Increase over Local (Fodder)
Early	2160	51	21.2	23.6
Medium	2660	79	17.6	20.2
Late	3471	136	26.8	26.8

AICPMIP (2011)

4.1.3.5 Input management:

4.1.3.5.1 Seed:

The amount required per year for replacing *bajra* seeds in five years is given in Table-4.1.81.

Table - 4.1.81 Amount Required per Year for Replacing *Bajra* Seeds in Five Years

Area Sown (’00 ha) (2011- 12)	Area Proposed to be Covered under HYV/year during 12 th plan (’00 ha)	Seed Quantity Req. (ton)	Estimated Cost on Seed (Rs. in lakhs)	Year (Rs. in Lakh)				
				1 st year	2 nd year	3 rd year	4 th year	5 th year
8663	8490	3396	3396	600	650	675	700	771

4.1.3.5.2 Fertilizer:

District-wise average of five years (2008-2011) fertilizer consumption and projection is shown in Table-4.1.82.

Table - 4.1.82 District-wise Average of Five Years (2008-2011) Fertilizer Consumption and Projection (T)

Sr. No.	District	Total		Projection					
		2008-2011		1 st year		2 nd year		3 rd year	
		DAP	Urea	DAP	Urea	DAP	Urea	DAP	Urea
1	Ahmedabad	1668	2619	1685	2645	1735	2724	1770	2779
2	Amreli	1190	1868	1202	1887	1238	1944	1263	1982
3	Anand	6100	9577	6161	9673	6346	9963	6473	10162
4	Banaskantha	24572	38578	24818	38964	25562	40133	26073	40935
5	Bharuch	138	217	139	219	144	225	146	230
6	Bhavnagar	5044	7919	5094	7998	5247	8238	5352	8403
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	2072	3253	2093	3286	2156	3384	2199	3452
10	Jamnagar	950	1492	960	1506	988	1552	1008	1583
11	Junagadh	1700	2669	1717	2696	1769	2777	1804	2832
12	Kachchh	4610	7238	4656	7310	4796	7529	4892	7680
13	Kheda	7658	12023	7735	12143	7967	12508	8126	12758
14	Mehsana	6896	10827	6965	10935	7174	11263	7317	11488
15	Narmada	132	207	133	209	137	216	140	220
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	1134	1780	1145	1798	1180	1852	1203	1889
18	Patan	6924	10871	6993	10979	7203	11309	7347	11535
19	Porbandar	52	82	53	82	54	85	55	87
20	Rajkot	940	1476	949	1491	978	1535	997	1566
21	Sabarkantha	1722	2704	1739	2731	1791	2812	1827	2869
22	Surat	30	47	30	48	31	49	32	50
23	Surendranagar	2412	3787	2436	3825	2509	3939	2559	4018
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	1382	2170	1396	2191	1438	2257	1466	2302
26	Valsad	0	0	0	0	0	0	0	0
Total		77326	121404	78099	122616	80443	126294	82049	128820

4.1.3.5.3 Pesticide:

District-wise pesticide consumption and projection of *bajra* is indicated in Table-4.1.83.

Table - 4.1.83 District-wise pesticide Consumption and Projection of Bajara

Districts	Area ('00 ha)	Seed Req. (T)	Fertilizer		Pesticide (Litre)			
			N (MT)	P (MT)	Imida cloprid 17.8 SL	Profeno phos 40 EC + Cyper methrin 4%	Azadi rachtin 1500 ppm	Heli lure 5/ha. (Phero mone)
Ahmedabad	145	544	1160	5800	14500	3625	7250	24650
Amreli	101	379	808	4040	10100	2525	5050	17170
Anand	652	2445	5216	26080	65200	16300	32600	110840
Banaskantha	2478	9293	19824	99120	247800	61950	123900	421260
Bharuch	17	64	136	680	1700	425	850	2890
Bhavnagar	494	1853	3952	19760	49400	12350	24700	83980
Gandhinagar	197	739	1576	7880	19700	4925	9850	33490
Jamnagar	74	278	592	2960	7400	1850	3700	12580
Junagadh	168	630	1344	6720	16800	4200	8400	28560
Kheda	801	3004	6408	32040	80100	20025	40050	136170
Kachchhh	523	1961	4184	20920	52300	13075	26150	88910
Mehsana	704	2640	5632	28160	70400	17600	35200	119680
Narmada	14	53	112	560	1400	350	700	2380
Panchmahals	120	450	960	4800	12000	3000	6000	20400
Patan	623	2336	4984	24920	62300	15575	31150	105910
Porbandar	5	19	40	200	500	125	250	850
Rajkot	102	383	816	4080	10200	2550	5100	17340
Sabarkantha	179	671	1432	7160	17900	4475	8950	30430
Surendranagar	318	1193	2544	12720	31800	7950	15900	54060
Vadodara	152	570	1216	6080	15200	3800	7600	25840
State Total	7869	29513	62952	314760	786700	196675	393350	1337390

4.1.3.6 Yield Gap Analysis:

Constraints Analysis and Recommended Interventions for Yield Gaps Analysis of *Bajra*:

Table - 4.1.84 Sustainability Issues and Gap Analysis of Productivity of *Bajra* Crops and Resources

S N	Crop	Factors/ Constrains Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
a	Low adoption of improved package of practices	Lack of awareness	To popularize scientific package of practices through demonstration on farmer's field.	Creating awareness and adoption of scientific package of practices through demonstrations, training, field days, shibir, literature etc	Increase in the production	Productivity growth in sustainability
b	Insect pest and disease problem	Lack of knowledge of insect pest and diseases and their management options	Integrated Pest and disease management	Creating awareness and adoption of IPM through demonstrations, training, shibir, literature etc.	Management of insect pests and diseases leads to increased yield	Productivity growth in sustainability
d	Maintain plant population and land configuration	High seed rate and sowing in flat land	Thinning and sowing on ridge and furrow	Creating awareness and adoption thinning and land configuration through demonstrations, training, shibir, literature etc	Increase in yield	Increase in productivity

Table - 4.1.85 District-wise Grain Yield of Pearl Millet in Gujarat (Average of Last Five Years) and Gap

District	Area ('00 ha)	Production ('00 T)	Yield (Kg/ha)	Potential Yield (Kg/ha)	Gap (Kg/ha)
Ahmedabad	145	229	1511	2845	1334
Amreli	101	156	1508	2845	1337
Anand	652	1400	2128	2845	717
Banaskantha	2478	3674	1417	2845	1428
Bharuch	17	37	2146	2845	699
Bhavnagar	494	1079	2183	2845	662

District	Area ('00 ha)	Production ('00 T)	Yield (Kg/ha)	Potential Yield (Kg/ha)	Gap (Kg/ha)
Gandhinagar	197	390	1965	2845	880
Jamnagar	74	112	1568	2845	1277
Junagadh	168	358	2154	2845	691
Kheda	801	1445	1741	2845	1104
Kachchhh	523	531	1015	2845	1830
Mehsana	704	1292	1799	2845	1046
Narmada	14	33	1978	2845	867
Panchmahals	120	222	1729	2845	1116
Patan	623	591	964	2845	1881
Porbandar	5	9	1962	2845	883
Rajkot	102	123	1273	2845	1572
Sabarkantha	179	369	2044	2845	801
Surendranagar	318	141	1391	2845	1454
Vadodara	152	278	1789	2845	1056
State total	7867	12469	1713	2845	1132

4.1.3.7 Detailed Action Plan with Costs:

A comprehensive package of extension activities, site specific input management along with infrastructural support (by means of special project) that are vital for increasing farm income, productivity and employment and setting the ground for evolution of a 'second Green Revolution' in the state is recommended herewith. The main ingredients of package are:

- Capacity building and skill upgradation of farmers to broaden their knowledge base
- Propagating resource conservation technologies
- Popularizing new technologies and farm practices through demonstrating
 - ✓ Area specific hybrid
 - ✓ Demonstrations on INM with a shift in focus from fertilizer nutrients usage to judicious application

The proposed activities are as under

Table- 4.1.86 District-wise Training Proposed for Capacity Building of Agricultural Staff for Bajra Crop (Rs.800/day /person)

Sr No	Districts	Training for Agricultural Staff (Phy - No, Fin - Rs. in Lakh)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		1 st year		2 nd year		3 rd year		1 st year		2 nd year		3 rd year		1 st year		2 nd year		3 rd year	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
2	Amreli	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
3	Anand	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
4	Banaskantha	80	0.64	80	0.64	80	0.64	70	0.56	70	0.56	70	0.56	65	0.52	65	0.52	65	0.52
5	Bharuch	20	0.16	20	0.16	20	0.16	10	0.08	10	0.08	10	0.08	5	0.04	5	0.04	5	0.04
6	Bhavnagar	40	0.32	40	0.32	40	0.32	30	0.24	30	0.24	30	0.24	25	0.2	25	0.2	25	0.2
7	Dahod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Gandhinagar	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
10	Jamnagar	50	0.4	50	0.4	50	0.4	40	0.32	40	0.32	40	0.32	35	0.28	35	0.28	35	0.28
11	Junagadh	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
12	Kachchh	40	0.32	40	0.32	40	0.32	30	0.24	30	0.24	30	0.24	25	0.2	25	0.2	25	0.2
13	Kheda	50	0.4	50	0.4	50	0.4	40	0.32	40	0.32	40	0.32	35	0.28	35	0.28	35	0.28
14	Mehsana	40	0.32	40	0.32	40	0.32	30	0.24	30	0.24	30	0.24	25	0.2	25	0.2	25	0.2
15	Narmada	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
16	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Panchmahal	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
18	Patan	6	0.05	6	0.05	6	0.05	0	0	0	0	0	0	0	0	0	0	0	0
19	Porbandar	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
20	Rajkot	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
21	Sabarkantha	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
22	Surat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Surendranagar	30	0.24	30	0.24	30	0.24	20	0.16	20	0.16	20	0.16	15	0.12	15	0.12	15	0.12
24	Tapi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Vadodara	20	0.16	20	0.16	20	0.16	10	0.08	10	0.08	10	0.08	5	0.04	5	0.04	5	0.04
26	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	676	5.41	676	5.41	676	5.41	480	3.84	480	3.84	480	3.84	385	3.08	385	3.08	385	3.08

Table- 4.1.87 Training Proposed for Capacity Building of Farmers for *Bajra* crop District-wise) on Different Technologies

Sr No	Districts	Year-wise No. of Farmers to be Trained (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	300	1.8	300	1.8	300	1.8	900	5.4
2	Amreli	300	1.8	300	1.8	300	1.8	900	5.4
3	Anand	600	3.6	600	3.6	600	3.6	1800	10.8
4	Banaskantha	800	4.8	800	4.8	800	4.8	2400	14.4
5	Bharuch	200	1.2	200	1.2	200	1.2	600	3.6
6	Bhavnagar	500	3	500	3	500	3	1500	9
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	700	4.2	700	4.2	700	4.2	2100	12.6
10	Jamnagar	200	1.2	200	1.2	200	1.2	600	3.6
11	Junagadh	300	1.8	300	1.8	300	1.8	900	5.4
12	Kachchh	600	3.6	600	3.6	600	3.6	1800	10.8
13	Kheda	900	5.4	900	5.4	900	5.4	2700	16.2
14	Mehsana	600	3.6	600	3.6	600	3.6	1800	10.8
15	Narmada	100	0.6	100	0.6	100	0.6	300	1.8
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	400	2.4	400	2.4	400	2.4	1200	7.2
18	Patan	800	4.8	800	4.8	800	4.8	2400	14.4
19	Porbandar	300	1.8	300	1.8	300	1.8	900	5.4
20	Rajkot	500	3	500	3	500	3	1500	9
21	Sabarkantha	600	3.6	600	3.6	600	3.6	1800	10.8
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	800	4.8	800	4.8	800	4.8	2400	14.4
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	600	3.6	600	3.6	600	3.6	1800	10.8
26	Valsad	0	0	0	0	0	0	0	0
	Total	10100	60.6	10100	60.6	10100	60.6	30300	181.8

(Rs.600/day /farmer)

Table - 4.1.88 Varietal Demonstration of Bajra Crop (phy and fin- 2017-18 to 2019-20)

Sr No	Districts	Year- wise No. of FLDs to be Taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	0.40	8	0.40	8	0.40	24	1.2
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	15	0.75	15	0.75	15	0.75	45	2.25
4	Banaskantha	20	1.00	20	1.00	20	1.00	60	3
5	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75
6	Bhavnagar	10	0.50	10	0.50	10	0.50	30	1.5
7	Dahod	0	0.00	0	0.00	0	0.00	0	0
8	Dang	0	0.00	0	0.00	0	0.00	0	0
9	Gandhinagar	7	0.35	7	0.35	7	0.35	21	1.05
10	Jamnagar	10	0.50	10	0.50	10	0.50	30	1.5
11	Junagadh	5	0.25	5	0.25	5	0.25	15	0.75
12	Kachchh	10	0.50	10	0.50	10	0.50	30	1.5
13	Kheda	10	0.50	10	0.50	10	0.50	30	1.5
14	Mehsana	8	0.40	8	0.40	8	0.40	24	1.2
15	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
16	Navsari	0	0.00	0	0.00	0	0.00	0	0
17	Panchmahal	7	0.35	7	0.35	7	0.35	21	1.05
18	Patan	10	0.50	10	0.50	10	0.50	30	1.5
19	Porbandar	7	0.35	7	0.35	7	0.35	21	1.05
20	Rajkot	5	0.25	5	0.25	5	0.25	15	0.75
21	Sabarkantha	10	0.50	10	0.50	10	0.50	30	1.5
22	Surat	0	0.00	0	0.00	0	0.00	0	0
23	Surendranagar	8	0.40	8	0.40	8	0.40	24	1.2
24	Tapi	0	0.00	0	0.00	0	0.00	0	0
25	Vadodara	6	0.30	6	0.30	6	0.30	18	0.9
26	Valsad	0	0.00	0	0.00	0	0.00	0	0
	Total	171	8.55	171	8.55	171	8.55	513	25.65

Cost Norms:Rs.5000/demonstration

Table- 4.1.89 District-wise INM Demonstration for Bajra Crop (phy and fin- 2017-18 to 2019-20)

Sr No	Districts	Year-wise No. of INM Demonstration to be Taken (Phy - No. Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4	0.2	4	0.2	4	0.2	12	0.6
2	Amreli	1	0.05	1	0.05	1	0.05	3	0.15
3	Anand	11	0.55	11	0.55	11	0.55	33	1.65
4	Banaskantha	16	0.8	16	0.8	16	0.8	48	2.4
5	Bharuch	1	0.05	1	0.05	1	0.05	3	0.15
6	Bhavnagar	6	0.3	6	0.3	6	0.3	18	0.9
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	3	0.15	3	0.15	3	0.15	9	0.45
10	Jamnagar	6	0.3	6	0.3	6	0.3	18	0.9
11	Junagadh	1	0.05	1	0.05	1	0.05	3	0.15
12	Kachchh	6	0.3	6	0.3	6	0.3	18	0.9
13	Kheda	6	0.3	6	0.3	6	0.3	18	0.9
14	Mehsana	4	0.2	4	0.2	4	0.2	12	0.6
15	Narmada	1	0.05	1	0.05	1	0.05	3	0.15
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	3	0.15	3	0.15	3	0.15	9	0.45
18	Patan	6	0.3	6	0.3	6	0.3	18	0.9
19	Porbandar	3	0.15	3	0.15	3	0.15	9	0.45
20	Rajkot	1	0.05	1	0.05	1	0.05	3	0.15
21	Sabarkantha	6	0.3	6	0.3	6	0.3	18	0.9
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	4	0.2	4	0.2	4	0.2	12	0.6
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	2	0.1	2	0.1	2	0.1	6	0.3
26	Valsad	0	0	0	0	0	0	0	0
	Total	91	4.55	91	4.55	91	4.55	273	13.65

Table- 4.1.90 IPM Demonstration for Bajra Crop (phy and fin- 2017-18 to 2019-20)

Sr No	Districts	Year-wise No. of IPM Demonstration to be taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	5	0.25	5	0.25	5	0.25	15	0.75
2	Amreli	2	0.1	2	0.1	2	0.1	6	0.3
3	Anand	12	0.6	12	0.6	12	0.6	36	1.8
4	Banaskantha	17	0.85	17	0.85	17	0.85	51	2.55
5	Bharuch	2	0.1	2	0.1	2	0.1	6	0.3
6	Bhavnagar	7	0.35	7	0.35	7	0.35	21	1.05
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	4	0.2	4	0.2	4	0.2	12	0.6
10	Jamnagar	7	0.35	7	0.35	7	0.35	21	1.05
11	Junagadh	2	0.1	2	0.1	2	0.1	6	0.3
12	Kachchh	7	0.35	7	0.35	7	0.35	21	1.05
13	Kheda	7	0.35	7	0.35	7	0.35	21	1.05
14	Mehsana	5	0.25	5	0.25	5	0.25	15	0.75
15	Narmada	2	0.1	2	0.1	2	0.1	6	0.3
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	4	0.2	4	0.2	4	0.2	12	0.6
18	Patan	7	0.35	7	0.35	7	0.35	21	1.05
19	Porbandar	4	0.2	4	0.2	4	0.2	12	0.6
20	Rajkot	2	0.1	2	0.1	2	0.1	6	0.3
21	Sabarkantha	7	0.35	7	0.35	7	0.35	21	1.05
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	5	0.25	5	0.25	5	0.25	15	0.75
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	3	0.15	3	0.15	3	0.15	9	0.45
26	Valsad	0	0	0	0	0	0	0	0
	Total	111	5.55	111	5.55	111	5.55	333	16.65

Cost Norms:Rs.5000/demonstration

Table- 4.1.91 District-wise Demonstrations of Bajra Crop on Resource Conservation Technologies (Phy -Area covered in ha, Fin – Rs. in lakh)

Sr No	Districts	Laser Leveling							
		1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	300	15	300	15	300	15	900	45
2	Amreli	320	16	320	16	320	16	960	48
3	Anand	320	16	320	16	320	16	960	48
4	Banaskantha	600	30	600	30	600	30	1800	90
5	Bharuch	250	12.5	250	12.5	250	12.5	750	37.5
6	Bhavnagar	320	16	320	16	320	16	960	48
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	150	7.5	150	7.5	150	7.5	450	22.5
10	Jamnagar	250	12.5	250	12.5	250	12.5	750	37.5
11	Junagadh	350	17.5	350	17.5	350	17.5	1050	52.5
12	Kachchh	1000	50	1000	50	1000	50	3000	150
13	Kheda	200	10	200	10	200	10	600	30
14	Mehsana	450	22.5	450	22.5	450	22.5	1350	67.5
15	Narmada	250	12.5	250	12.5	250	12.5	750	37.5
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	300	15	300	15	300	15	900	45
18	Patan	400	20	400	20	400	20	1200	60
19	Porbandar	150	7.5	150	7.5	150	7.5	450	22.5
20	Rajkot	320	16	320	16	320	16	960	48
21	Sabarkantha	650	32.5	650	32.5	650	32.5	1950	97.5
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	320	16	320	16	320	16	960	48
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	400	20	400	20	400	20	1200	60
26	Valsad	0	0	0	0	0	0	0	0
	Total	7300	365	7300	365	7300	365	21900	1095

Cost Norms: Rs 5000/ha demonstration area 0.40 ha

Table- 4.1.92 Resource Conservation Demonstrations of Bajra Crop (phy and fin- 2017-18 to 2019-20)

Sr No	Districts	Year-wise No. of Demonstration to be Taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	0.4	8	0.4	8	0.4	24	1.2
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	15	0.75	15	0.75	15	0.75	45	2.25
4	Banaskantha	20	1	20	1	20	1	60	3
5	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75
6	Bhavnagar	10	0.5	10	0.5	10	0.5	30	1.5
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	7	0.35	7	0.35	7	0.35	21	1.05
10	Jamnagar	10	0.5	10	0.5	10	0.5	30	1.5
11	Junagadh	5	0.25	5	0.25	5	0.25	15	0.75
12	Kachchh	10	0.5	10	0.5	10	0.5	30	1.5
13	Kheda	10	0.5	10	0.5	10	0.5	30	1.5
14	Mehsana	8	0.4	8	0.4	8	0.4	24	1.2
15	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	7	0.35	7	0.35	7	0.35	21	1.05
18	Patan	10	0.5	10	0.5	10	0.5	30	1.5
19	Porbandar	7	0.35	7	0.35	7	0.35	21	1.05
20	Rajkot	5	0.25	5	0.25	5	0.25	15	0.75
21	Sabarkantha	10	0.5	10	0.5	10	0.5	30	1.5
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	8	0.4	8	0.4	8	0.4	24	1.2
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	6	0.3	6	0.3	6	0.3	18	0.9
26	Valsad	0	0	0	0	0	0	0	0
	Total	171	8.55	171	8.55	171	8.55	513	25.65

Cost Norms:Rs.5000/demonstration

Table- 4.1.93 Bio-fertilizer Demonstrations of Bajra Crop

Sr No	Districts	Year wise No. of Bio-fertilizers Demonstration to be Taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	0.24	8	0.24	8	0.24	24	0.72
2	Amreli	5	0.15	5	0.15	5	0.15	15	0.45
3	Anand	15	0.45	15	0.45	15	0.45	45	1.35
4	Banaskantha	20	0.60	20	0.60	20	0.60	60	1.8
5	Bharuch	5	0.15	5	0.15	5	0.15	15	0.45
6	Bhavnagar	10	0.30	10	0.30	10	0.30	30	0.9
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	7	0.21	7	0.21	7	0.21	21	0.63
10	Jamnagar	10	0.30	10	0.30	10	0.30	30	0.9
11	Junagadh	5	0.15	5	0.15	5	0.15	15	0.45
12	Kachchh	10	0.30	10	0.30	10	0.30	30	0.9
13	Kheda	10	0.30	10	0.30	10	0.30	30	0.9
14	Mehsana	8	0.24	8	0.24	8	0.24	24	0.72
15	Narmada	5	0.15	5	0.15	5	0.15	15	0.45
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	7	0.21	7	0.21	7	0.21	21	0.63
18	Patan	10	0.30	10	0.30	10	0.30	30	0.9
19	Porbandar	7	0.21	7	0.21	7	0.21	21	0.63
20	Rajkot	5	0.15	5	0.15	5	0.15	15	0.45
21	Sabarkantha	10	0.30	10	0.30	10	0.30	30	0.9
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	8	0.24	8	0.24	8	0.24	24	0.72
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	6	0.18	6	0.18	6	0.18	18	0.54
26	Valsad	0	0	0	0	0	0	0	0
	Total	171	5.13	171	5.13	171	5.13	513	15.39

Cost Norms:Rs.3000/demonstration

Table- 4.1.94 Vermi Compost Demonstrations of Bajra Crop

Sr No	Districts	Year-wise No. of Vermi-compost Demonstration to be Taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	0.40	8	0.40	8	0.40	24	1.2
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	15	0.75	15	0.75	15	0.75	45	2.25
4	Banaskantha	20	1.00	20	1.00	20	1.00	60	3
5	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75
6	Bhavnagar	10	0.50	10	0.50	10	0.50	30	1.5
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	7	0.35	7	0.35	7	0.35	21	1.05
10	Jamnagar	10	0.50	10	0.50	10	0.50	30	1.5
11	Junagadh	5	0.25	5	0.25	5	0.25	15	0.75
12	Kachchh	10	0.50	10	0.50	10	0.50	30	1.5
13	Kheda	10	0.50	10	0.50	10	0.50	30	1.5
14	Mehsana	8	0.40	8	0.40	8	0.40	24	1.2
15	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	7	0.35	7	0.35	7	0.35	21	1.05
18	Patan	10	0.50	10	0.50	10	0.50	30	1.5
19	Porbandar	7	0.35	7	0.35	7	0.35	21	1.05
20	Rajkot	5	0.25	5	0.25	5	0.25	15	0.75
21	Sabarkantha	10	0.50	10	0.50	10	0.50	30	1.5
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	8	0.40	8	0.40	8	0.40	24	1.2
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	6	0.30	6	0.30	6	0.30	18	0.9
26	Valsad	0	0	0	0	0	0	0	0
	Total	171	8.55	171	8.55	171	8.55	513	25.65

Cost Norms:Rs.5000/demonstration

Table- 4.1.95 Demonstrations on Plant Health Management for Bajra Crop (Use of Bio-pesticides)

Sr No	Districts	Year-wise No. of Demonstrations to be Taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	5	0.25	5	0.25	5	0.25	15	0.75
2	Amreli	2	0.10	2	0.10	2	0.10	6	0.3
3	Anand	12	0.6	12	0.6	12	0.6	36	1.8
4	Banaskantha	17	0.85	17	0.85	17	0.85	51	2.55
5	Bharuch	2	0.10	2	0.10	2	0.10	6	0.3
6	Bhavnagar	7	0.35	7	0.35	7	0.35	21	1.05
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	4	0.20	4	0.20	4	0.20	12	0.6
10	Jamnagar	7	0.35	7	0.35	7	0.35	21	1.05
11	Junagadh	2	0.10	2	0.10	2	0.10	6	0.3
12	Kachchh	7	0.35	7	0.35	7	0.35	21	1.05
13	Kheda	7	0.35	7	0.35	7	0.35	21	1.05
14	Mehsana	5	0.25	5	0.25	5	0.25	15	0.75
15	Narmada	2	0.10	2	0.10	2	0.10	6	0.3
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	4	0.20	4	0.20	4	0.20	12	0.6
18	Patan	7	0.35	7	0.35	7	0.35	21	1.05
19	Porbandar	4	0.20	4	0.20	4	0.20	12	0.6
20	Rajkot	2	0.10	2	0.10	2	0.10	6	0.3
21	Sabarkantha	7	0.35	7	0.35	7	0.35	21	1.05
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	5	0.25	5	0.25	5	0.25	15	0.75
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	3	0.15	3	0.15	3	0.15	9	0.45
26	Valsad	0	0	0	0	0	0	0	0
	Total	111	5.55	117	5.55	117	5.55	345	16.65

Cost Norms:Rs.5000/demonstration

Table- 4.1.96 Demonstrations on Soil Health Management for Bajra Crop (Use of FYM, Gypsum, Castor Cake etc.)

Sr No	Districts	Year wise No. of Demonstrations (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	0.40	8	0.40	8	0.40	24	1.2
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	15	0.75	15	0.75	15	0.75	45	2.25
4	Banaskantha	20	1.00	20	1.00	20	1.00	60	3
5	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75
6	Bhavnagar	10	0.50	10	0.50	10	0.50	30	1.5
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	7	0.35	7	0.35	7	0.35	21	1.05
10	Jamnagar	10	0.50	10	0.50	10	0.50	30	1.5
11	Junagadh	5	0.25	5	0.25	5	0.25	15	0.75
12	Kachchh	10	0.50	10	0.50	10	0.50	30	1.5
13	Kheda	10	0.50	10	0.50	10	0.50	30	1.5
14	Mehsana	8	0.40	8	0.40	8	0.40	24	1.2
15	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	7	0.35	7	0.35	7	0.35	21	1.05
18	Patan	10	0.50	10	0.50	10	0.50	30	1.5
19	Porbandar	7	0.35	7	0.35	7	0.35	21	1.05
20	Rajkot	5	0.25	5	0.25	5	0.25	15	0.75
21	Sabarkantha	10	0.50	10	0.50	10	0.50	30	1.5
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	8	0.40	8	0.40	8	0.40	24	1.2
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	6	0.30	6	0.30	6	0.30	18	0.9
26	Valsad	0	0	0	0	0	0	0	0
	Total	171	8.55	171	8.55	171	8.55	513	25.65

Cost Norms:Rs.5000/demonstration

Table- 4.1.97 Demonstrations on Value Addition for Bajra Crop (Use of ZincSulphate, Ferus Sulphate)

Sr No	Districts	Year-wise No. of Demonstrations (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	0.24	8	0.24	8	0.24	24	0.72
2	Amreli	5	0.15	5	0.15	5	0.15	15	0.45
3	Anand	15	0.45	15	0.45	15	0.45	45	1.35
4	Banaskantha	20	0.60	20	0.60	20	0.60	60	1.8
5	Bharuch	5	0.15	5	0.15	5	0.15	15	0.45
6	Bhavnagar	10	0.30	10	0.30	10	0.30	30	0.9
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	7	0.21	7	0.21	7	0.21	21	0.63
10	Jamnagar	10	0.30	10	0.30	10	0.30	30	0.9
11	Junagadh	5	0.15	5	0.15	5	0.15	15	0.45
12	Kachchh	10	0.30	10	0.30	10	0.30	30	0.9
13	Kheda	10	0.30	10	0.30	10	0.30	30	0.9
14	Mehsana	8	0.24	8	0.24	8	0.24	24	0.72
15	Narmada	5	0.15	5	0.15	5	0.15	15	0.45
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	7	0.35	7	0.35	7	0.35	21	1.05
18	Patan	10	0.30	10	0.30	10	0.30	30	0.9
19	Porbandar	7	0.21	7	0.21	7	0.21	21	0.63
20	Rajkot	5	0.15	5	0.15	5	0.15	15	0.45
21	Sabarkantha	10	0.30	10	0.30	10	0.30	30	0.9
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	8	0.24	8	0.24	8	0.24	24	0.72
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	6	0.18	6	0.18	6	0.18	18	0.54
26	Valsad	0	0	0	0	0	0	0	0
	Total	171	5.13	171	5.13	171	5.13	513	15.39

Cost Norms:Rs.3000/demonstration

Table- 4.1.98 Seed Production Enhancement for Bajra Crop

Sr No	Districts	Year-wise Seed Production to be Taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	1.20	8	1.20	8	1.20	24	3.6
2	Amreli	5	0.75	5	0.75	5	0.75	15	2.25
3	Anand	15	2.25	15	2.25	15	2.25	45	6.75
4	Banaskantha	20	3.00	20	3.00	20	3.00	60	9
5	Bharuch	5	0.75	5	0.75	5	0.75	15	2.25
6	Bhavnagar	10	1.50	10	1.50	10	1.50	30	4.5
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	7	1.05	7	1.05	7	1.05	21	3.15
10	Jamnagar	10	1.50	10	1.50	10	1.50	30	4.5
11	Junagadh	5	0.75	5	0.75	5	0.75	15	2.25
12	Kachchh	10	1.50	10	1.50	10	1.50	30	4.5
13	Kheda	10	1.50	10	1.50	10	1.50	30	4.5
14	Mehsana	8	1.20	8	1.20	8	1.20	24	3.6
15	Narmada	5	0.75	5	0.75	5	0.75	15	2.25
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	7	1.05	7	1.05	7	1.05	21	3.15
18	Patan	10	1.50	10	1.50	10	1.50	30	4.5
19	Porbandar	7	1.05	7	1.05	7	1.05	21	3.15
20	Rajkot	5	0.75	5	0.75	5	0.75	15	2.25
21	Sabarkantha	10	1.50	10	1.50	10	1.50	30	4.5
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	8	1.20	8	1.20	8	1.20	24	3.6
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	6	0.90	6	0.90	6	0.90	18	2.7
26	Valsad	0	0	0	0	0	0	0	0
	Total	171	25.65	171	25.65	171	25.65	513	76.95

Cost Norms:Rs.15000/hactare

Table- 4.1.99 Water Resources Development for Bajra Crop (Farm Ponds, Bunding, Water Harvesting, Well Recharge, etc.)

Sr No	Districts	Year-wise No. of Demonstrations to be Taken (Phy - No, Fin - Rs. in Lakh)							
		1 st year		2 nd year		3 rd year		TOTAL	
		Phy*	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4	4.00	4	4.00	5	5.00	13	13
2	Amreli	4	4.00	4	4.00	5	5.00	13	13
3	Anand	2	2.00	2	2.00	3	3.00	7	7
4	Banaskantha	6	6.00	6	6.00	7	7.00	19	19
5	Bharuch	1	1.00	1	1.00	1	1.00	3	3
6	Bhavnagar	4	4.00	4	4.00	4	4.00	12	12
7	Dahod	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0
9	Gandhinagar	2	2.00	2	2.00	3	3.00	7	7
10	Jamnagar	5	5.00	5	5.00	6	6.00	16	16
11	Junagadh	3	3.00	3	3.00	4	4.00	10	10
12	Kachchh	6	6.00	6	6.00	7	7.00	19	19
13	Kheda	3	3.00	3	3.00	4	4.00	10	10
14	Mehsana	4	4.00	4	4.00	5	6.00	13	14
15	Narmada	1	1.00	1	1.00	2	2.00	4	4
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	2	2.00	2	2.00	3	3.00	7	7
18	Patan	5	5.00	5	5.00	6	6.00	16	16
19	Porbandar	2	2.00	2	2.00	3	3.00	7	7
20	Rajkot	3	3.00	3	3.00	4	4.00	10	10
21	Sabarkantha	6	6.00	6	6.00	7	7.00	19	19
22	Surat	0	0	0	0	0	0	0	0
23	Surendranagar	6	6.00	6	6.00	7	7.00	19	19
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	0	0	0	0	0	0	0	0
26	Valsad	0	0	0	0	0	0	0	0
	Total	69	69.00	69	69.0	86	86.0	224	224

Cost Norms:Rs. 1.00 lakh/unit

4.1.3.8 Researchable Issues:

- To manage emerging insect, pest and diseases found in newly released varieties
- Small equipments so as to reduce drudgery of small and marginal farmers
- Need to specify changes agronomical practices due to weather effects
- Scheduling of micro nutrients for increasing fertilizer use efficiency while reducing cost
- Market research combined with weather changes for deciding the crop area for a season

4.1.4 Maize:

4.1.4.1 Background:

Maize (*Zea mays* L) is an important cereal crop accounting for a little more than half of the production of coarse cereals. It ranks third after rice and wheat across the world and India in production. It was grown in 1830 lakh hectare land with production 165.1 m.m. tons and yield 5820 kg/ha across the world in 2016-17. United States of America contribute 34.00 % in global maize production. In India, maize was cultivated in 96.0 lakhs ha land with a production 26.00 m.m.tons and productivity 2700 kg/ha contributing 2.3% at global level (NcoMM special report-2017) in 2016-17. Maize contributes 9% to total cereal production in India. The Gujarat state had grown maize in 5.00 lakhs hectare land with production 8.4 m.m. tons and 1800 kg/ha yield in 2016. Panchmahals, Dahod, Vadodara, Chhota Udaipur, Mahisagar, Sabarkantha, Aravali and Banaskantha are main districts where maize is grown in *kharif* and *rabi* season. Maize is a staple food and fodder of tribal people of eastern region of Gujarat and becoming emerged as raw materials for maize based industries like, starch, protein, oil, ethanol (biofuel), poultry and animal feed including specialty corns (quality protein maize, sweet corn, popcorn and baby corn). It survives and resilience under climate change than paddy and wheat. Non-adoption of the recommended doses of inputs due to high risk under rainfed agro-climatic regions, non-availability of high yielding varieties, quality seed, and poor resource base of the farmers who largely grow maize are the limiting factors in increasing area and production. With a view to enhance production and productivity of maize, interventions like, promoting production of high yielding varieties/hybrid seeds through public and private sectors, organizing demonstrations with cluster approach and subsidized inputs like, fertilizers, bio-fertilizers, micronutrients and plant protection, farm mechanization support including seed treatment; creation of institutional infrastructure for value addition, demonstration of technology and entrepreneurship development, setting up small processing units for value addition, etc are to be promoted.

Vision:

To meet the growing demand, enhancement of maize yield in coming years is a big challenge in the era of climate change. Meeting such challenge will only be possible through science-based technological interventions.

Mission:

1. To develop and identify early maturity and high yielding hybrids for rain fed *kharif* and *rabi* season through multi-location and multidisciplinary research programme.

2. To develop and identify medium, late maturity and high yielding hybrids for assured irrigated *kharif* and *rabi* season through multi-location and multidisciplinary research programme.
3. To develop and identify specialty corns like, Quality Protein Maize, Sweet corn, Popcorn, High starch and Oil, and Baby corn (Food and Nutritional Security) including biofuel corn.
5. Collection, acclimatization and maintenance of elite maize germplasms. In addition, new inbred lines development and their use in heterosis breeding for development of hybrid suitable to agro climatic zones of Gujarat are done.
6. Maintenance and production of quality seed of released varieties and parental inbred lines of single cross hybrids with production of hybrid quality seed for farmers.
7. To develop agronomical cultivation package and practices the latest recommended hybrids/varieties and their quality seed production for optimum yield under rain fed *kharif* and *rabi* conditions.
8. Dissemination of latest and improved maize technology on farmers field through various extension education means.

4.1.4.2 Crop/Area Issues:

- Increasing productivity of rainfed maize crop
- Poor soil fertility and moisture holding capacity particularly in Panchmahals, Dahod, Chhota Udaipur, Aravalli, Sabarkantha and Banaskantha districts.
- 40% area of maize need medium to late maturity agro-ecological situations suited single cross hybrids including specialty corns (Quality Protein Maize, Sweet corn, Popcorn, high oil and starch corns)
- Poor adaptation of recommendations for maize cultivation by tribal farmers.
- In *kharif* season, weed is major problem in *kharif* cultivation of maize, so, there is need of herbicide tolerant event.
- Scattered / uneven distribution of rainfall and hydroclimatic extremes
- Non-availability of quality seed of suitable and high yielding varieties/hybrids at proper time and location at affordable cost.
- Poor mechanization and acute labour shortage during critical crop stages for field operations.
- High cost inputs including fertilizers, biofertilizers, etc.

- **Insect pests-** Stem borer, Cob borer and Termite **Diseases-** *Maydis* Leaf Blight, *Turcicum* Leaf Blight, Banded Leaf & Sheath Blight, *Curvularia* Leaf Spot, Latewilt might be prevalent at congenial field conditions during crop growth.

4.1.4.3 Priority for Comprehensive Maize Cultivation:

- Yield stability and narrowing gap in yield level between districts in *kharif* and *rabi* maize areas under climate change. For it, erect genotypes, early to medium maturing, high yielding, drought and heat tolerant single cross hybrid.
- Micro irrigation/ water harvesting structure in water deficient area and effective drainage structure in flood prone/ low lying area
- Molecular breeding research to develop herbicide tolerant, heat & drought tolerant and value added nutritional trait varieties/hybrids
- Accelerate recommended maize cultivation practices with respect to season and agro-climatic zones. Post harvest management with value addition
- Promoting contract farming for organic specialty corn cultivation and establishing organic input supply chain and collection centre with proper storage.
- Crop residue management for improvement and of soil organic carbon content/ soil health
- Promoting maize, shredder machine
- Promoting *rabi* maize cultivation through micro irrigation or as per recommendation

4.1.4.4 Current Status of Area, Production and Productivity:

The district-wise and year-wise area, production and productivity of maize is given in Tables 4.1.100 to 4.1.104.

Table- 4.1.100 Present Status of Area, Production and Productivity of Maize of the State during 2011-12

Sr. No.	Districts	Kharif			Rabi & Summer			Total		
		Area ('00 ha)	Production (oo T)	Productivity (kg/ha)	Area ('00 ha)	Production (oo T)	Productivity (kg/ha)	Area ('00 ha)	Production (oo T)	Productivity (kg/ha)
1	Ahmedabad	1	1	1250	0	0	0	1	1	1250
2	Amreli	11	15	1382	0	0	0	11	15	1382
3	Anand	5	6	1214	1	2	2060	6	8	1355
4	Banaskantha	100	185	1853	5	9	1800	105	194	1850
5	Bharuch	24	32	1352	8	16	2005	32	48	1515
6	Bhavnagar	28	36	1286	0	0	0	28	36	1286
7	Dahod	1176	1549	1317	200	372	1862	1376	1921	1396
8	Dang	30	40	1319	0	0	0	30	40	1319
9	Gandhinagar	4	6	1462	0.5	1	1600	4.5	7	1477
10	Jamnagar	31	47	1505	0	0	0	31	47	1505
11	Junagadh	0	0	0	0	0	0	0	0	0
12	Kachchh	0	0	0	0	0	0	0	0	0
13	Kheda	170	242	1424	3	6	1868	173	248	1432
14	Mehsana	8	11	1391	0	0	0	8	11	1391
15	Narmada	53	72	1356	29	59	2051	82	131	1602
16	Navsari	0	0	0	0	0	0	0	0	0
17	Panchmahal	1137	1264	1112	300	600	2000	1437	1864	1297
18	Patan	0	0	0	0	0	0	0	0	0
19	Porbandar	1	1	1000	0	0	0	1	1	1000
20	Rajkot	26	39	1519	0	0	0	26	39	1519
21	Sabarkantha	885	1205	1362	200	532	2658	1085	1737	1601
22	Surat	9	13	1393	10	26	2550	19	38	2002
23	Surendranagar	0	0	0	0	0	0	0	0	0
24	Tapi	13	17	1300	1	2	2250	14	19	1368
25	Vadodara	465	856	1840	216	475	2197	681	1330	1953
26	Valsad	0	0	0	0.9	2	1945	0.9	2	1945
	Total	4177	5637	1350	974	2101	2156	5151	7738	1502

Table- 4.1.101 Present Status of Area, Production and Productivity of Maize of the State during 2012-13

Sr. No.	Districts	Kharif			Rabi & Summer			Total		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
		('00 ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)
1	Ahmedabad	1	2	1638	0	0	0	1	2	1638
2	Amreli	16	26	1638	0	0	0	16	26	1638
3	Anand	1	2	1638	1	2	2060	2	4	1849
4	Arvalli	0	0	0	0	0	0	0	0	0
5	Banaskantha	98	186	1900	5	9	1800	103	195	1895
6	Bharuch	26	43	1638	8	14	1800	34	57	1676
7	Bhavnagar	32	52	1638	0	0	0	32	52	1638
8	Botad	0	0	0	0	0	0	0	0	0
9	Chhota-Udipur	0	0	0	0	0	0	0	0	0
10	Dahod	1200	2040	1700	200	300	1500	1400	2340	1671
11	Dang	27	44	1638	0	0	0	27	44	1638
12	DevbhiDwarka	0	0	0	0	0	0	0	0	0
13	Gandhinagar	3	5	1638	0.5	1	1600	3.5	6	1633
14	Girsomnath	0	0	0	0	0	0	0	0	0
15	Jamnagar	2	3	1638	0	0	0	2	3	1638
16	Junagadh	0	0	0	0	0	0	0	0	0
17	Kachchh	0	0	0	0	0	0	0	0	0
18	Kheda	167	301	1800	3	5	1700	170	306	1798
19	Mahisagar	0	0	0	0	0	0	0	0	0
20	Mehsana	6	10	1638	0	0	0	6	10	1638
21	Morbi	0	0	0	0	0	0	0	0	0
22	Narmada	53	87	1638	29	55	1900	82	142	1731
23	Navsari	0	0	0	0	0	0	0	0	0
24	Panchmahal	1151	1607	1396	300	600	2000	1451	2207	1521
25	Patan	0	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0	0
27	Rajkot	6	10	1638	0	0	0	6	10	1638
28	Sabarkantha	869	1401	1612	200	532	2658	1069	1932	1808
29	Surat	9	15	1638	10	26	2550	19	40	2118
30	Surendranagar	0	0	0	0	0	0	0	0	0
31	Tapi	10	16	1638	1	2	2100	11	18	1680
32	Vadodara	433	823	1900	216	475	2197	649	1297	1999
33	Valsad	0	0	0	0.9	2	1945	0.9	2	1945
	Total	4110	6672	1623	974	2022	2075	5084	8694	1710

Table- 4.1.102 Present Status of Area, Production and Productivity of Maize of the State during 2013-14

Sr. No.	Districts	Kharif			Rabi & Summer			Total		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
		(00ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)
1	Ahmedabad	0	0	0	0	0	0	0	0	0
2	Amreli	0.5	1	1400	0	0	0	0.5	1	1400
3	Anand	4	5	1267	1	2	2060	5	7	1426
4	Arvalli	0	0	0	0	0	0	0	0	0
5	Banaskantha	89	164	1843	0.1	0	2079	89.1	164	1843
6	Bharuch	25	32	1267	8	16	2005	33	48	1446
7	Bhavnagar	2	3	1267	0	0	0	2	3	1267
8	Botad	0	0	0	0	0	0	0	0	0
9	Chhoto-Udipur	0	0	0	0	0	0	0	0	0
10	Dahod	1155	932	807	307	572	1862	1462	1504	1029
11	Dang	37	47	1266	0	0	0	37	47	1266
12	DevbhiDwarka	0	0	0	0	0	0	0	0	0
13	Gandhinagar	0.5	1	1266	0.5	1	1600	1	1	1433
14	Girsomnath	0	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0	0
17	Kachchh	47	60	1267	0	0	0	47	60	1267
18	Kheda	75	114	1514	3	6	1868	78	119	1528
19	Mahisagar	0	0	0	0	0	0	0	0	0
20	Mehsana	4	5	1267	0	0	0	4	5	1267
21	Morbi	0	0	0	0	0	0	0	0	0
22	Narmada	55	70	1266	29	59	2051	84	129	1537

Sr. No.	Districts	<i>Kharif</i>			<i>Rabi & Summer</i>			Total		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
		(00ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)
23	Navsari	0	0	0	0	0	0	0	0	0
24	Panchmahal	1053	1697	1612	341	779	2285	1394	2477	1777
25	Patan	0	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0	0
27	Rajkot	6	8	1267	0	0	0	6	8	1267
28	Sabarkantha	533	618	1159	200	532	2658	733	1149	1568
29	Surat	6	8	1266	10	26	2550	16	33	2069
30	Surendranagar	0	0	0	0	0	0	0	0	0
31	Tapi	24	30	1266	1	2	2250	25	33	1305
32	Vadodara	300	596	1987	216	475	2197	516	1071	2075
33	Valsad	4	5	1267	0.9	2	1945	4.9	7	1392
	Total	3420	4393	1285	1118	2471	2211	4538	6864	1513

Table- 4.1.103 Present Status of Area, Production and Productivity of Maize of the State during 2014-15

Sr. No.	Districts	<i>Kharif</i>			<i>Rabi & Summer</i>			Total		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
		(00ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)	(00ha)	(oo T)	(kg/ha)
1	Ahmedabad	0.5	1	2000	0	0	0	0.5	1	2000
2	Amreli	0.5	1	1400	0	0	0	0.5	1	1400
3	Anand	4	5	1267	1	2	2060	5	7	1426
4	Arvalli	356	472	1326	18	36	2000	374	508	1358
5	Banaskantha	81	149	1843	3	6	2079	84	156	1851
6	Bharuch	25	32	1267	8	16	2005	33	48	1446

Sr. No.	Districts	Kharif			Rabi & Summer			Total		
		Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)
7	Bhavnagar	11	14	1248	2	4	2200	13	18	1394
8	Botad	0	0	0	0	0	0	0	0	0
9	Chheto-Udipur	283	607	2145	100	220	2200	383	827	2159
10	Dahod	1148	990	862	268	536	2000	1416	1526	1077
11	Dang	10	13	1266	0	0	0	10	13	1266
12	DevbhiDwarka	0	0	0	0	0	0	0	0	0
13	Gandhinagar	0.5	1	1266	0.5	1	1600	1	1	1433
14	Girsomnath	0	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0	0
17	Kachchh	47	59	1248	0	0	0	47	59	1248
18	Kheda	75	114	1514	3	6	1868	78	119	1528
19	Mahisagar	396	543	1371	18	50	2800	414	593	1433
20	Mehsana	4	5	1248	0	0	0	4	5	1248
21	Morbi	1	1	1248	0	0	0	1	1	1248
22	Narmada	55	70	1266	29	59	2051	84	129	1537
23	Navsari	0	0	0	1	2	2000	1	2	2000
24	Panchmahal	900	1451	1612	341	779	2285	1241	2230	1797
25	Patan	0	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0	0
27	Rajkot	6	9	1500	0	0	0	6	9	1500
28	Sabarkantha	533	914	1715	200	532	2658	733	1446	1972
29	Surat	3	4	1470	3	8	2500	6	12	1985

Sr. No.	Districts	Kharif			Rabi & Summer			Total		
		Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)
30	Surendranagar	1	1	1248	8	18	2200	9	19	2094
31	Tapi	12	23	1931	1	2	2250	13	25	1956
32	Vadodara	300	596	1987	216	475	2197	516	1071	2075
33	Valsad	4	5	1267	0.9	2	1945	4.9	7	1392
	Total	4256.5	6078	1428	1221	2753	2254	5478	8832	1612

Table- 4.1.104 Present Status of Area, Production and Productivity of Maize of the State during 2015-16

Sr. No.	Districts	Kharif			Rabi & Summer			Total		
		Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)
1	Ahmedabad	0.5	1	2100	0	0	0	0.5	1	2000
2	Amreli	0.5	1	1400	0	0	0	0.5	1	1400
3	Anand	3	4	1320	1	2	2060	4	6	1505
4	Arvalli	341	452	1326	18	36	2000	359	488	1360
5	Banaskantha	56	93	1658	3	6	2079	59	99	1679
6	Bharuch	20	26	1320	4	8	2005	24	34	1434
7	Bhavnagar	7	9	1320	2	4	2200	9	14	1516
8	Botad	0	0	0	0	0	0	0	0	0
9	Chhito-Udipur	222	475	2140	340	748	2200	562	1223	2176
10	Dahod	1073	1279	1192	218	436	2000	1291	1715	1328
11	Dang	20	26	1320	0	0	0	20	26	1320
12	DevbhiDwarka	0	0	0	0	0	0	0	0	0
13	Gandhinagar	0.5	1	1266	0.5	1	1600	1	1	1433

Sr. No.	Districts	Kharif			Rabi & Summer			Total		
		Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)	Area (00ha)	Production (oo T)	Productivity (kg/ha)
14	Girsomnath	0	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0	0
17	Kachchh	10	13	1320	18	45	2500	28	58	2079
18	Kheda	75	135	1795	3	6	1868	78	140	1798
19	Mahisagar	421	577	1371	18	50	2800	439	628	1430
20	Mehsana	2	3	1320	0	0	0	2	3	1320
21	Morbi	1	1	1320	0	0	0	1	1	1320
22	Narmada	53	71	1332	12	25	2051	65	95	1465
23	Navsari	0	0	0	1	2	2000	1	2	2000
24	Panchmahal	900	1451	1612	341	779	2285	1241	2230	1797
25	Patan	0	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0	0
27	Rajkot	1	1	1320	0	0	0	1	1	1320
28	Sabarkantha	150	278	1851	200	532	2658	350	809	2312
29	Surat	6	9	1449	4	10	2500	10	19	1869
30	Surendranagar	0	0	0	0	0	0	0	0	0
31	Tapi	8	21	2643	5	11	2250	13	32	2492
32	Vadodara	300	596	1987	216	475	2197	516	1071	2075
33	Valsad	4	5	1267	0.9	2	1945	4.9	7	1392
	Total	3674.5	5528	1504	1405	3177	2261	5080	8705	1714

Source: Directorate of Agriculture, Gandhinagar

4.1.4.5 Input Management:

4.1.4.5.1 Seed:

Seed production and Seed Availability at Seed Farm/Research Station (District-wise)

The MMRS, AAU, Godhra in association with the regional centers of Anand Agricultural University produced breeder seed of various released varieties, hybrids (Table - 4.1.105).

Table- 4.1.105 Breeder Seed Production of Maize by AAU, Anand

(Quantity in q.)

S. N.	Variety/Hybrid/ Parents	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
1	Guiarat Makai-2	10.64	3.45	9.84	10.14	-	18.30	52.37
2	Guiarat Makai-3	1.00	31.00	30.48	33.25	30.20	12.20	138.13
3	Guiarat Makai-4	-	33.40	4.82	40.20	-	9.60	88.02
4	Guiarat Makai-6	78.56	57.00	38.64	8.28	131.97	27.00	341.45
5	Narmada Moti	15.68	30.20	15.70	15.00	17.07	6.00	99.65
6	Popcorn	1.00	6.00	2.80	3.53	0.20	2.00	15.53
7	WOSC	1.66	1.15	0.97	0.95	4.22	-	8.95
8	HQPM-1	23.00	10.96	3.77	13.58	2.80	-	54.11
9	GAYMH-1	-	-	11.60	29.35	-	17.70	58.65
10	GAWMH-2	-	-	3.28	17.34	-	23.52	44.14
11	IGI-1101	-	-	-	2.52	-	1.00	3.52
12	IGI-1102	-	-	-	0.15	-	-	0.15
13	IGI-1103	-	-	-	1.04	-	1.00	2.04
	Total	131.54	173.16	121.9	175.33	186.46	118.32	906.71

4.1.4.5.2 Fertilizers:

Table- 4.1.106 District-wise Fertilizer Consumption and Projection in Maize Crop- 2015-16

Sr. No.	District	Area ('00 ha)	Nutrient Requirement (T/ha)				Fertilizer Requirement (T/ha)			
			N	P	K	Total	Urea	DAP	MoP	ZnSO4
1	Ahmedabad	0.5	8	3	0	11	15	7	0	2
2	Amreli	0.5	8	3	0	11	15	7	0	2
3	Anand	4	64	24	0	88	119	52	0	12
4	Arvalli	359	5744	2154	0	7898	10662	4667	0	1077
5	Banaskantha	59	944	354	0	1298	1752	767	0	177
6	Bharuch	24	384	144	0	528	713	312	0	72
7	Bhavnagar	9	144	54	0	198	267	117	0	27
8	Botad	0	0	0	0	0	0	0	0	0
9	Chhto-Udipur	562	8992	3372	0	12364	16691	7306	0	1686
10	Dahod	1291	20656	7746	0	28402	38343	16783	0	3873
11	Dang	20	320	120	0	440	594	260	0	60
12	DevbhiDwarka	0	0	0	0	0	0	0	0	0
13	Gandhinagar	1	16	6	0	22	30	13	0	3
14	Girsomnath	0	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0	0
17	Kachchh	28	448	168	0	616	832	364	0	84
18	Kheda	78	1248	468	0	1716	2317	1014	0	234
19	Mahisagar	439	7024	2634	0	9658	13038	5707	0	1317
20	Mehsana	2	32	12	0	44	59	26	0	6
21	Morbi	1	16	6	0	22	30	13	0	3

22	Narmada	65	1040	390	0	1430	1931	845	0	195
23	Navsari	1	16	6	0	22	30	13	0	3
24	Panchmahal	1241	19856	7446	0	27302	36858	16133	0	3723
25	Patan	0	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0	0
27	Rajkot	1	16	6	0	22	30	13	0	3
28	Sabarkantha	350	5600	2100	0	7700	10395	4550	0	1050
29	Surat	10	160	60	0	220	297	130	0	30
30	Surendranagar	0	0	0	0	0	0	0	0	0
31	Tapi	13	208	78	0	286	386	169	0	39
32	Vadodara	516	8256	3096	0	11352	15325	6708	0	1548
33	Valsad	4.9	78.4	29.4	0	107.8	146	637	0	15
	Total	5080	81278	30479	0	111758	150873	66612	0	15240

Source: Directorate of Agriculture, Gandhinagar Recommended fertilizer dose of maize is 160-60-60 (N-P-K kg/ha)

Table- 4.1.107 District-wise Requirement of,quality seed Pesticides for Stem Borer and Weed Management in *Kharif and Rabi* Maize

Sr. No.	District	Area ('00ha)	Seed Rate kg/ha	Total Seed Quantity (T)	Pesticides Quantity Required, Kg	
					Whorl Application	For Weed Atrazin
					Furadan(kg/ha)	kg/ha
1	Ahmedabad	0.5	20	1	400	100
2	Amreli	0.5	20	1	400	100
3	Anand	4	20	8	3200	800
4	Arvalli	359	20	718	287200	71800
5	Banaskantha	59	20	118	47200	11800
6	Bharuch	24	20	48	19200	4800
7	Bhavnagar	9	20	18	7200	1800
8	Botad	0	0	0	0	0
9	Chhto-Udipur	562	20	1124	449600	112400
10	Dahod	1291	20	2582	1032800	258200
11	Dang	20	20	40	16000	4000
12	DevbhiDwarka	0	0	0	0	0
13	Gandhinagar	1	20	2	800	200
14	Girsomnath	0		0	0	0
15	Jamnagar	0	0	0	0	0
16	Junagadh	0	0	0	0	0
17	Kachchh	28	20	56	22400	5600
18	Kheda	78	20	156	62400	15600
19	Mahisagar	439	20	878	351200	87800
20	Mehsana	2	20	4	1600	400
21	Morbi	1	20	2	800	200
22	Narmada	65	20	130	52000	13000
23	Navsari	1	20	2	800	200

Sr. No.	District	Area ('00ha)	Seed Rate kg/ha	Total Seed Quantity (T)	Pesticides Quantity Required, Kg	
					Whorl Application	For Weed Atrazin
					Furadan(kg/ha)	kg/ha
24	Panchmahal	1241	20	2482	992800	248200
25	Patan	0	0	0	0	0
26	Porbandar	0	0	0	0	0
27	Rajkot	1	20	2	800	200
28	Sabarkantha	350	20	700	280000	70000
29	Surat	10	20	20	8000	2000
30	Surendranagar	0	0	0	0	0
31	Tapi	13	20	26	10400	2600
32	Vadodara	516	20	1032	412800	103200
33	Valsad	4.9	20	9.8	3920	980
	Total	5080	-	10159.8	4063920	1015980

4.1.4.6 Constraints Analysis and Recommended Interventions for Yield Gaps Analysis of Maize:

Table - 4.1.108 District-wise yield gap analysis of Maize (Average of 2013-14, 2014-15 and 2015-16)

Sr. No.	Districts	Average Yield in g/ha		Yield Gap %	Reasons for Gap
		District	FLD		
1	Banaskantha	1764	3800	53.58	Technology & input management
2	Dahod	1144	3000	61.86	Technology & input management
3	Panchmahal	1500	3275	54.20	Technology & input management
4	Sabarkantha	1950	3200	39.01	Technology & input management
	Total (Average)	1589.50	3318.75	52.16	

Source: Gujarat Agricultural Statistics

Table- 4.1.109 Sustainability Issues and Gap Analysis of Productivity of Maize Crop and Resources

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
i	Lesser Adoption of seed treatment	Stem borer and fungal diseases	To popularize practice of seed treatment for maintaining crop health.	Educating and motivating farmers on its importance and adoption through demonstrations and trainings.	Entire maize growing area with no exception in seed born diseases and termite affected areas.	Productivity growth on sustainable basis.
ii	Sowing of traditional seed	Low awareness about certified seed	Awareness campaign for use of certified seed. certified seed and produced good quality seed in own farm	Farmers field schools, campaigns.	Entire maize growing areas every year.	Improvement in yield on sustainable basis.
iii	Broadcasting of the seed	Farmers apply excess seed in irrigated Maize with broadcasting of seed after harvest of previous crop.	Application of recommended seed in line sowing	Farmers participatory approach and demonstration	In cotton-maize & paddy-maize cropping system	Improvement in productivity
iv	Poor fertilizer management	Farmers apply excess fertilizer in irrigated Maize and low or no fertilizer in rainfed Maize	Application of recommended dose of fertilizers. Use of organic manure and use of site specific micro-nutrient	Farmers participatory approach and demonstration	Entire Maize growing area	Improvement in productivity with sustainable soil health

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
			management.			
v	High incidence of weeds	<i>Chinopodium albam</i> and <i>Amaranthus spp.</i> seriously affect maize yields in different cropping systems	Improve the efficiency of existing herbicides. Capacity building for spraying techniques	State level strategic plan for the management of <i>Chinopodium albam</i> and <i>Amaranthus spp.</i> Capacity building of extension agencies and farmers for appropriate spraying techniques. On farm demonstrations of herbicides	Entire Maize growing area	Economic benefits are increased profitability and increased food security
vi	No or low use of Organic manure	Low production and higher price of well decomposed organic manures	Awareness campaign for production of organic manures in own farms	Farmers field schools, campaigns	Entire Maize growing area	Improvement in productivity with sustainable soil health
vii	Excess irrigation in irrigated maize	Due to lower rates of irrigation water in canal irrigation system, farmers pond their fields throughout the crop season	Judicious use of water.	Training and demonstrations on proper water management.	4% growth in area under proper water management.	Increase in water use efficiency and sustain soil health
viii	Growing of companion crop lucerne in standing maize crop	Improvement in soil fertility and gain more income harvesting becomes difficult	Evolve best package of practice to generate more income	Experiment should be carried out	Entire Maize growing area	Salinity is reduced due to deeper root system of Lucerne and addition of organic matter in

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
						the soil. Increase the palatibility of the cattlefeed.

In order to close the gaps and realizing the maize crop vision, sentence required reconstruction based on vision

Table- 4.1.110 Activity Output Matrix of Maize

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
1. Water Management	Irregular water supply in canal water so farmers use more water. Lack of drainage facility	Supply of water in the canal as per the crop requirement. Drainage facility is created	Irrigation Department and SAUs have jointly to work for solving this problem	Demonstration proposed
	Salinity stress mitigationat farmers'fields	Greenmanuring and gypsumuse. Tolerantvarieties.	Subsidyon gypsum (@ 75 per centandits availability be ensured.	Demonstrationon greenmanuring and gypsum proposed.
	Water loggingand secondary salinization	Bio-drainage throughtree plantation.	DDA will ensure the characterization of water loggedareas and plantation of treespecies	
	Wate rharvestingand recharging	Construction of water harvesting structures near catchmentarea of drain, panchayati / farmers land.	DDA/concerned departments in consultation with SAUs scientist	Projectonwater harvesting proposed.
	Water sheddevelopment in rainfed	Sprinkler/ dripirrigation	DDA/concerned	Project proposed.

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
	areas	after creating facility of community ponds/ water harvesting structure.	departments in consultation with GGRC	
	Groundwater testing for fluoride contamination	Survey of marked sites for nitrate contamination and characterization of nitrate contaminated areas.	DDA will conduct survey and identify the areas of high fluoride containing waters.	Survey for study of groundwater quality proposed.
2. Management of Salinity/ Sodicity/Alkalinity	Avoid irrigation with brackish water in drought years because it leads to secondary salinity; wherever available make conjunctive use of good quality water. Tolerance of current and improved varieties to salinity needs further investigations.	Cropping pattern will be studied. The yield of Rabi crops will be recorded For farms where farmers have given variable number of irrigation with brackish water in Kharif season.	Dept. of Agriculture / KVK Survey and soil sampling will be done by DDA and KVK. Demonstrations will be laid out by DDA in collaboration with KVK scientist	Survey proposed. Demonstrations Proposed in plan.
	Work is also needed to adapt agronomic practices, especially the time and method of sowing and amount of fertilizer and irrigation in order to increase ecological sustainability, profitability and	Necessary amelioration measures should be adopted <i>Gatun penic</i> grass to be adopted	Demonstrations will be laid out by DDA in collaboration with SAUs scientist and supply of gypsum may be ensured by DDA	Demonstrations proposed in plan.

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
	yield.			
3. RCTs				
i) ZeroTillage	<p>Environmental (Carbon sequestration, soil fertility gains etc.) and economic benefits (saving in labour, diesel, machinery wear and tear etc) will be catalogued and calculated. Zero till technology will be extended to maize and other cropping system</p> <p>Improve agronomic efficiency of nutrients. It also improves nitrogen and water efficiency. Improve biological activity in the soil.</p> <p>Reduce energy budget for Cotton-maize & rice-maize cropping system.</p> <p>Increase of soil organic matter. It improves soil structure and</p>	<p>Some farmers have adopted zero-tillage in maize crop and they found beneficial effect on soil fertility and yield.</p>	<p>The efforts are required to popularize the zero tillage system in whole cotton-maize & paddy-maize growing area.</p>	<p>The Govt. has to give 60% subsidy to purchase seed drill for small and marginal farmers.</p>

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
	<p>reduced leaching of N.</p> <p>The cultivation cost of maize crop reduced so farmer gain more profit</p>			
(ii) Laser-Leveling	<p>Laser landleveling for water saving, land saving and improve yields of maize and other crops.</p>	<p>DDA will organize and monitor the distribution of laser leveler especially on custom hire services.</p>	<p>DDA in consultation with KVK.</p>	<p>Demonstrations proposed. The Govt. has to give 60 per cent subsidy to purchase Laser landleveler for small and marginal farmers.</p>
(iv) Green Manuring	<p>The improvement in the productivity of crops and also improvement in the soil health.</p>	<p>DDA will ensure the timely availability of dhaincha seed at 75 per cent subsidy. 50 per cent area will be covered during the plan period of five years.</p>	<p>DDA Ten per cent area will be covered.</p>	<p>Demonstrations will propose. The Govt. has to give 50 per cent subsidy to purchase dhaincha seed for small and marginal farmers</p>
4. Seed Production	<p>1. Seed planning</p>	<p>1. Selection of improved variety at</p>	<p>DDAs in consultation with KVKs.</p>	<p>Project proposed.</p>

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
		farmersfield. 2. Motivating farmers to produce the seed of best variety 3. Mandatory testing of new variety through SAUs.		
	2. Quality seed	Seed production at farmers' field with farmers participatory approach.	DDA and KVK.	Project proposed.
	3. Seed treatment	1. Motivating farmers for seed treatment 2. Demonstrations will be laid out by DDA in collaboration with KVK scientist	DDA's Data or all activities will be presented in the officers workshop	Survey proposed.
5. Site Specific Nutrient Management	Number of split application and timing of top dress N with reference to irrigation	The project will be, test and promote intervention for the sustainable cotton-maize & paddy-maize cropping system through site specific nutrient	DDA and KVK will conduct survey.	Survey of doses of fertilizer application in cotton, paddy and maize crops.

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
		management. Fertilizer recommendation will be based on the principles of SSNM.		
	Legume in cropping rotation	Integrated soil and crop management for rehabilitation of legume production in cotton-maize & paddy-maize cropping system.	DDA will ensure quality seed of important legumes green gram for summer season	Demonstration will be laid out on green gram.
	Crop residue	Surface residue management for improving soil health. Improving the efficiency of nutrient utilization.	Machinery for uniform distribution of residue will be ensured by DDA residue retention machinery, second generation machinery, precision and no-till farming for crops and cropping system.	Demonstrations proposed
	Bio-fertilizers	Integrate chemical fertilizers with bio-fertilizers to improve the efficiency of chemical fertilizers	DDA will ensure the availability of location specific quality bio-fertilizers	Demonstrations proposed under INM, free supply of bio fertilizer to the small and

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
				marginal farmers.
6. IWM	Spraying techniques for improving efficiency of herbicides. Monitoring of herbicide resistance.	Demonstration of varieties at farmer's field. Survey & demonstrations	DDA / SAUs / KVK	Survey proposed.
7. Maize Timely Seeding of Maize	Delayed harvesting of cotton / padd, availability of irrigation, excess / untimely rains Zero tillage, short duration varieties / hybrid of maize	Extension and development agencies should approach in a farmers' Participator approach for each of possible solution. Evaluating and refining the technology for arrangement of stubbles, developing guidelines for achieving good establishment with residue retention Efficient use of N fertilizer. The technology need to be further developed for other cropping systems and other crops.	DDAs / KVK DDA	Demonstrations proposed. Campaigns, hoarding / posters, field days, district level training camps

4.1.4.7 Detailed Action Plan with Costs:

Table - 4.1.111 Training Proposed for Capacity Building of Agricultural Staff for Maize Crop (District-wise) (Rs 800/ day/ person)

(Phy - No, Fin - Rs. in Lakh) **Cost Norms:** (Rs 800/ day/ person)

Sr No	Districts	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	15	0.12	15	0.12	15	0.12	45	0.36
2	Amreli	25	0.2	25	0.2	25	0.2	75	0.6
3	Anand	50	0.4	50	0.4	50	0.4	150	1.2
4	Arvalli	100	0.8	100	0.8	100	0.8	300	2.4
5	Banaskantha	100	0.8	100	0.8	100	0.8	300	2.4
6	Bharuch	25	0.2	25	0.2	25	0.2	75	0.6
7	Bhavnagar	0	0	0	0	0	0	0	0
8	Botad	0	0	0	0	0	0	0	0
9	Chhhto-Udipur	200	1.6	200	1.6	200	1.6	600	4.8
10	Dahod	200	1.6	200	1.6	200	1.6	600	4.8
11	<u>Dang</u>	25	0.2	25	0.2	25	0.2	75	0.6
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	20	0.16	20	0.16	20	0.16	60	0.48
14	Girsomnath	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0
16	Junagadh	25	0.2	25	0.2	25	0.2	75	0.6
17	Kachchh	25	0.2	25	0.2	25	0.2	75	0.6
18	Kheda	50	0.4	50	0.4	50	0.4	150	1.2
19	Mahisagar	100	0.8	100	0.8	100	0.8	300	2.4
20	Mehsana	15	0.12	15	0.12	15	0.12	45	0.36

Sr No	Districts	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	50	0.4	50	0.4	50	0.4	150	1.2
23	Navsari	25	0.2	25	0.2	25	0.2	75	0.6
24	Panchmahal	200	1.6	200	1.6	200	1.6	600	4.8
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	0	0	0	0
28	Sabarkantha	200	1.6	200	1.6	200	1.6	600	4.8
29	Surat	50	0.4	50	0.4	50	0.4	150	1.2
30	Surendranagar	0	0	0	0	0	0	0	0
31	<u>Tapi</u>	25	0.2	25	0.2	25	0.2	75	0.6
32	Vadodara	100	0.8	100	0.8	100	0.8	300	2.4
33	Valsad	20	0.16	20	0.16	20	0.16	60	0.48
	Total	1645	13.16	1645	13.16	1645	13.16	4935	39.48

Table- 4.1.112 Training Proposed for Capacity Building of Farmers at District Level for Maize crop (Phy - No, Fin - Rs. in Lakh)

Sr. No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	500	3	500	3	500	3	1500	9
2	Amreli	1500	9	1500	9	1500	9	4500	27
3	Anand	2500	15	2500	15	2500	15	7500	45
4	Arvalli	500	3	500	3	500	3	1500	9
5	Banaskantha	2500	15	2500	15	2500	15	7500	45
6	Bharuch	1500	9	1500	9	1500	9	4500	27
7	Bhavnagar	0	0	0	0	0	0	0	0
8	Botad	0	0	0	0	0	0	0	0
9	Chheto-Udipur	500	3	500	3	500	3	1500	9

Sr. No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	Dahod	3000	18	3000	18	3000	18	9000	54
11	Dang	500	3	500	3	500	3	1500	9
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	500	3	500	3	500	3	1500	9
14	Girsomnath	0	0	0	0	0	0	0	0
15	Junagadh	500	3	500	3	500	3	1500	9
16	Kachchh	500	3	500	3	500	3	1500	9
17	Kheda	1500	9	1500	9	1500	9	4500	27
18	Mahisagar	500	3	500	3	500	3	1500	9
19	Mehsana	1000	6	1000	6	1000	6	3000	18
20	Morbi	0	0	0	0	0	0	0	0
21	Narmada	2500	15	2500	15	2500	15	7500	45
22	Navsari	500	3	500	3	500	3	1500	9
23	Panchmahal	3500	21	3500	21	3500	21	10500	63
24	Patan	0	0	0	0	0	0	0	0
25	Porbandar	0	0	0	0	0	0	0	0
26	Rajkot	0	0	0	0	0	0	0	0
27	Sabarkantha	3000	18	3000	18	3000	18	9000	54
28	Surat	500	3	500	3	500	3	1500	9
29	Surendranagar	0	0	0	0	0	0	0	0
30	Surendranagar	0	0	0	0	0	0	0	0
31	Tapi	500	3	500	3	500	3	1500	9
32	Vadodara	2000	12	2000	12	2000	12	6000	36
33	Valsad	500	3	500	3	500	3	1500	9
	Total	30500	183	30500	183	30500	183	91500	549

Table- 4.1.113 District- wise Varietal Demonstrations for Maize Crop -2017-18 to 2019-20 (Phy - No, Fin - Rs. in Lakh)

SN	Districts	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	50	2.5	50	2.5	50	2.5	150	7.5
2	Amreli	50	2.5	50	2.5	50	2.5	150	7.5
3	Anand	25	1.25	25	1.25	25	1.25	75	3.75
4	Arvalli	200	10	200	10	200	10	600	30
5	Banaskantha	200	10	200	10	200	10	600	30
6	Bharuch	25	1.25	25	1.25	25	1.25	75	3.75
7	Bhavnagar	0	0	0	0	0	0	0	0
8	Botad	0	0	0	0	0	0	0	0
9	Chhto-Udipur	200	10	200	10	200	10	600	30
10	Dahod	500	25	500	25	500	25	1500	75
11	Dang	50	2.5	50	2.5	50	2.5	150	7.5
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	25	1.25	25	1.25	25	1.25	75	3.75
14	Girsomnath	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0
17	Kachchh	0	0	0	0	0	0	0	0
18	Kheda	50	2.5	50	2.5	50	2.5	150	7.5
19	Mahisagar	200	10	200	10	200	10	600	30
20	Mehsana	50	2.5	50	2.5	50	2.5	150	7.5
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	100	5	100	5	100	5	300	15
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	500	25	500	25	500	25	1500	75
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0
27	Rajkot	50	2.5	50	2.5	50	2.5	150	7.5
28	Sabarkantha	500	25	500	25	500	25	1500	75

SN	Districts	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
29	Surat	1650	82.5	1650	82.5	1650	82.5	4950	247.5
30	Surendranagar	500	25	500	25	500	25	1500	75
31	Tapi	50	2.5	50	2.5	50	2.5	150	7.5
32	Vadodara	500	25	500	25	500	25	1500	75
33	Valsad	50	2.5	50	2.5	50	2.5	150	7.5
	Total	5525	276.25	5525	276.25	5525	276.25	16575	828.75

Cost Norms: Rs 5000/acre/demonstration C-DAP

Table- 4.1.114 District wise Farmer Field Schools of Maize Crop Covering Identified Critical Technologies in Next Three Years

(Phy - No, Fin - Rs. in Lakh)

SN	Districts	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	0	0	0	0	0	0	0	0
3	Anand	2	0.8	2	0.8	2	0.8	6	2.4
4	Arvalli	5	1	5	1	5	1	15	3
5	Banaskantha	5	1	5	1	5	1	15	3
6	Bharuch	2	0.8	2	0.8	2	0.8	6	2.4
7	Bhavnagar	0	0	0	0	0	0	0	0
8	Botad	0	0	0	0	0	0	0	0
9	Chhota-Udiour	5	1	5	1	5	1	15	3
10	Dahod	5	1	5	1	5	1	15	3
11	Dang	2	0.8	2	0.8	2	0.8	6	2.4
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Girsomnath	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0
17	Kachchh	0	0	0	0	0	0	0	0

SN	Districts	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
18	Kheda	2	0.8	2	0.8	2	0.8	6	2.4
19	Mahisagar	2	0.8	2	0.8	2	0.8	6	2.4
20	Mehsana	0	0	0	0	0	0	0	0
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	0	0	0	0	0	0	0	0
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	2	1	2	1	2	1	6	3
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	0	0	0	0
28	Sabarkantha	5	1	5	1	5	1	15	3
29	Surat	1	0.2	1	0.2	1	0.2	3	0.6
30	Surendranagar	0	0	0	0	0	0	0	0
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	2	0.4	2	0.4	2	0.4	6	1.2
33	Valsad	0	0	0	0	0	0	0	0
	Total	40	10.6	40	10.6	40	10.6	120	31.8

Cost Norms: Rs. 20,000/- per School

Table- 4.1.115 District wise Group formation/Commodity Interest Groups Formationof Maize Crop for Specific Activities

Cost Norms: Rs.0.20 lakh/group (Phy - No, Fin - Rs. in Lakh)

Sr. No.	Districts	Seed Production		Organic Farming		Value Addition		Specific Crop		Total	
		2017-2020		2017-2020		2017-2020		2017-2020		2017-2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0
2	Amreli	0	0	0	0	5	1	5	1	10	2
3	Anand	0	0	5	1	10	2	10	2	25	5
4	Arvalli	10	2	20	4	25	5	25	5	80	16
5	Banaskantha	10	2	10	2	15	3	15	3	50	10
6	Bharuch	0	0	15	3	20	4	20	4	55	11
7	Bhavnagar	0	0	0	0	0	0	0	0	0	0
8	Botad	0	0	0	0	0	0	0	0	0	0
9	Chhota-udipur	10	2	40	8	45	9	45	9	140	28
10	Dahod	50	10	25	5	30	6	30	6	135	27
11	Dang	0	0	30	6	35	7	35	7	100	20
12	DevbhiDwarka	0	0	0	0	0	0	0	0	0	0
13	Gandhinagar	0	0	35	7	40	8	40	8	115	23
14	Girsomnath	0	0	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0	0	0
16	Junagadh	0	0	45	9	50	10	50	10	145	29
17	Kachchh	0	0	50	10	55	11	55	11	160	32
18	Kheda	10	2	55	11	60	12	60	12	185	37
19	Mahisagar	10	2	80	16	85	17	85	17	260	52
20	Mehsana	0	0	60	12	65	13	65	13	190	38
21	Morbi	0	0	0	0	0	0	0	0	0	0
22	Narmada	50	10	65	13	70	14	70	14	255	51
23	Navsari	0	0	70	14	75	15	75	15	220	44
24	Panchmahal	100	20	75	15	80	16	80	16	335	67
25	Patan	0	0	0	0	0	0	0	0	0	0
26	Porbandar	0	0	85	17	90	18	90	18	265	53

Sr. No.	Districts	Seed Production		Organic Farming		Value Addition		Specific Crop		Total	
		2017-2020		2017-2020		2017-2020		2017-2020		2017-2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
27	Rajkot	0	0	90	18	95	19	95	19	280	56
28	Sabarkantha	100	20	95	19	100	20	100	20	395	79
29	Surat	0	0	100	20	105	21	105	21	310	62
30	Surendranagar	0	0	105	21	110	22	110	22	325	65
31	Tapi	0	0	110	22	115	23	115	23	340	68
32	Vadodara	100	20	115	23	120	24	120	24	455	91
33	Valsad	0	0	120	24	125	25	125	25	370	74
	Total	450	90	1500	300	1625	325	1625	325	5200	1040

Table- 4.1.116 District-wise Group Formation / Commodity Interest Groups Formation of Maize Crop for Specific Seed

Production

(Phy - No, Fin - Rs. in Lakh)

Sr No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	0	0	0	0	0	0	0	0
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	10	2	10	2	10	2	30	6
5	Banaskantha	10	2	10	2	10	2	30	6
6	Bharuch	0	0	0	0	0	0	0	0
7	Bhavnagar	0	0	0	0	0	0	0	0
8	Botad	0	0	0	0	0	0	0	0
9	Chhota-udipur	10	2	10	2	10	2	30	6
10	Dahod	10	2	0	0	0	0	10	2
11	Dang	0	0	0	0	0	0	0	0
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Girsomnath	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0

Sr No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
17	Kachchh	0	0	0	0	0	0	0	0
18	Kheda	10	2	0	0	0	0	10	2
19	Mahisagar	10	2	10	2	10	2	30	6
20	Mehsana	0	0	10	2	10	2	20	4
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	10	2	10	2	10	2	30	6
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	20	4	20	4	20	4	60	12
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	0	0	0	0
28	Sabarkantha	20	4	20	4	20	4	60	12
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	0	0	0	0	0	0	0	0
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	20	4	20	4	20	4	60	12
33	Valsad	0	0	0	0	0	0	0	0
	Total	130	26	120	24	120	24	370	74

Cost Norms: Rs.0.20 lakh/group (for capacity building, input assistance, marketing and for group specific activities)

Table- 4.1.117 District wise Group Formation / Commodity Interest Groups Formation of Maize Crop for Specific Organic Farming

Sr No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	13	2.6	13	2.6	13	2.6	39	7.8
3	Anand	1	0.20	1	0.20	1	0.20	3	0.6
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	2	0.4	2	0.4	2	0.4	6	1.2
6	Bharuch	3	0.6	3	0.6	3	0.6	9	1.8

Sr No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
7	Bhavnagar	4	0.8	4	0.8	4	0.8	12	2.4
8	Botad	0	0	0	0	0	0	0	0
9	Chota-udaipur	15	3	15	3	15	3	45	9
10	Dahod	5	1	5	1	5	1	15	3
11	Dang	6	1.2	6	1.2	6	1.2	18	3.6
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	7	1.4	7	1.4	7	1.4	21	4.2
14	Girsomnath	0	0	0	0	0	0	0	0
15	Jamnagar	8	1.6	8	1.6	8	1.6	24	4.8
16	Junagadh	9	1.8	9	1.8	9	1.8	27	5.4
17	Kachchh	10	2	10	2	10	2	30	6
18	Kheda	11	2.2	11	2.2	11	2.2	33	6.6
19	Mahisagar	11	2.2	11	2.2	11	2.2	33	6.6
20	Mehsana	12	2.4	12	2.4	12	2.4	36	7.2
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	13	2.6	13	2.6	13	2.6	39	7.8
23	Navsari	14	2.8	14	2.8	14	2.8	42	8.4
24	Panchmahal	15	3	15	3	15	3	45	9
25	Patan	16	3.2	16	3.2	16	3.2	48	9.6
26	Porbandar	17	3.4	17	3.4	17	3.4	51	10.2
27	Rajkot	18	3.6	18	3.6	18	3.6	54	10.8
28	Sabarkantha	19	3.8	19	3.8	19	3.8	57	11.4
29	Surat	20	4	20	4	20	4	60	12
30	Surendranagar	21	4.2	21	4.2	21	4.2	63	12.6
31	Tapi	22	4.4	22	4.4	22	4.4	66	13.2
32	Vadodara	23	4.6	23	4.6	23	4.6	69	13.8
33	Valsad	24	4.8	24	4.8	24	4.8	72	14.4
	Total	339	67.8	339	67.8	339	67.8	1017	203.4

Cost Norms: Rs.0.20 lakh/group (for capacity building, input assistance, marketing and for group specific activities) (Phy - No, Fin - Rs. in Lakh)

Table- 4.1.118 District wise Group Formation / Commodity Interest Groups Formation of Maize Crop for Specific Value Addition

Sr No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	8	1.6	1.6	8	1.6	8	11.2	17.6
2	Amreli	1	0.2	0.20	1	0.20	1	1.4	2.2
3	Anand	2	0.4	0.4	2	0.4	2	2.8	4.4
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	3	0.6	0.6	3	0.6	3	4.2	6.6
6	Bharuch	4	0.8	0.8	4	0.8	4	5.6	8.8
7	Bhavnagar	5	1	1	5	1	5	7	11
8	Botad	1	0.2	0.20	1	0.20	1	1.4	2.2
9	Chota-udaipur	6	1.2	1.2	6	1.2	6	8.4	13.2
10	Dahod	16	3.2	3.2	16	3.2	16	22.4	35.2
11	Dang	7	1.4	1.4	7	1.4	7	9.8	15.4
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	8	1.6	1.6	8	1.6	8	11.2	17.6
14	Girsomnath	0	0	0	0	0	0	0	0
15	Jamnagar	9	1.8	1.8	9	1.8	9	12.6	19.8
16	Junagadh	10	2	2	10	2	10	14	22
17	Kachchh	11	2.2	2.2	11	2.2	11	15.4	24.2
18	Kheda	12	2.4	2.4	12	2.4	12	16.8	26.4
19	Mahisagar	16	3.2	3.2	16	3.2	16	22.4	35.2
20	Mehsana	13	2.6	2.6	13	2.6	13	18.2	28.6
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	14	2.8	2.8	14	2.8	14	19.6	30.8
23	Navsari	15	3	3	15	3	15	21	33
24	Panchmahal	16	3.2	3.2	16	3.2	16	22.4	35.2
25	Patan	17	3.4	3.4	17	3.4	17	23.8	37.4
26	Porbandar	18	3.6	3.6	18	3.6	18	25.2	39.6
27	Rajkot	19	3.8	3.8	19	3.8	19	26.6	41.8
28	Sabarkantha	20	4	4	20	4	20	28	44

Sr No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
29	Surat	21	4.2	4.2	21	4.2	21	29.4	46.2
30	Surendranagar	22	4.4	4.4	22	4.4	22	30.8	48.4
31	Tapi	23	4.6	4.6	23	4.6	23	32.2	50.6
32	Vadodara	24	4.8	24	4.8	24	4.8	72	14.4
33	Valsad	25	5	25	5	25	5	75	15
	Total	366	73.2	112.4	326.8	112.4	326.8	590.8	726.8

Cost Norms: Rs.0.20 lakh/group (for capacity building, input assistance, marketing and for group specific activities) (Phy - No, Fin - Rs. in Lakh)

Table- 4.1.119 District wise Group Formation / Commodity Interest Groups Formation of Maize Crop for Specific Crop

Sr No	Districts	1 st year		2 nd year		3 rd year		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	1	0.2	0.20	1	0.20	1	1.4	2.2
3	Anand	2	0.4	0.4	2	0.4	2	2.8	4.4
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	3	0.6	0.6	3	0.6	3	4.2	6.6
6	Bharuch	4	0.8	0.8	4	0.8	4	5.6	8.8
7	Bhavnagar	5	1	1	5	1	5	7	11
8	Botad	5	1	1	5	1	5	7	11
9	Chota-Ujdaipur	16	3.2	3.2	16	3.2	16	22.4	35.2
10	Dahod	6	1.2	1.2	6	1.2	6	8.4	13.2
11	Dang	7	1.4	1.4	7	1.4	7	9.8	15.4
12	DevbhiDwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	8	1.6	1.6	8	1.6	8	11.2	17.6
14	Girsomnath	0	0	0	0	0	0	0	0
15	Jamnagar	9	1.8	1.8	9	1.8	9	12.6	19.8
16	Junagadh	10	2	2	10	2	10	14	22
17	Kachchh	11	2.2	2.2	11	2.2	11	15.4	24.2
18	Kheda	12	2.4	2.4	12	2.4	12	16.8	26.4

19	Mahisagar	0	0	0	0	0	0	0	0
20	Mehsana	13	2.6	2.6	13	2.6	13	18.2	28.6
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	14	2.8	2.8	14	2.8	14	19.6	30.8
23	Navsari	15	3	3	15	3	15	21	33
24	Panchmahal	16	3.2	3.2	16	3.2	16	22.4	35.2
25	Patan	17	3.4	3.4	17	3.4	17	23.8	37.4
26	Porbandar	18	3.6	3.6	18	3.6	18	25.2	39.6
27	Rajkot	19	3.8	3.8	19	3.8	19	26.6	41.8
28	Sabarkantha	20	4	4	20	4	20	28	44
29	Surat	21	4.2	4.2	21	4.2	21	29.4	46.2
30	Surendranagar	22	4.4	4.4	22	4.4	22	30.8	48.4
31	Tapi	23	4.6	4.6	23	4.6	23	32.2	50.6
32	Vadodara	24	4.8	24	4.8	24	4.8	72	14.4
33	Valsad	25	5	25	5	25	5	75	15
	Total	346	69.2	108.4	306.8	108.4	306.8	562.8	682.8

Cost Norms: Rs.0.20 lakh/group (for capacity building, input assistance, marketing and for group specific activities (Phy - No, Fin - Rs. in Lakh)

4.1.4.8 Researchable Issues:

1. Molecular Breeding and Elite germplasm availability need to be intensified
2. Soil health maintenance of maize field due to waterlogging.
3. Proper and efficient INM according to variety/hybrid and seasonwise

4.1.5 Sorghum:

4.1.5.1 Background:

Sorghum is the most important food and fodder crop of dry land agriculture. Sorghum grains are important as food as well as livestock & poultry feed. The stem and foliage are used as a fodder, hay, silage and pasture. The sweet sorghum stems can be used for ethanol production.

Sorghum is used in preparation of different types of food and unleavened bread is the most common food made from sorghum flour. The dough is sometimes fermented before the bread is prepared, and the grains boiled to make a porridge or gruel. It is also used in the preparation of biscuit. Beer is prepared from sorghum grain in many parts of Africa.

Though sorghum is known for its versatile use, hardiness, dependability, stability of yield and adaptability over wide range of climate, the edapho-climatic conditions in the sorghum growing areas of the world limit the crop production. The crop is often grown in poor soil by farmers who have little resources for irrigation and purchase of fertilizers, insecticides and other inputs. Therefore, there is a need for the development of cultivars more adaptable to the adverse climatic conditions of the semi-arid tropics and those with high input responsive. Farmers should be motivated for cultivation of input responsive cultivars in the high input system.

In the world, sorghum is cultivated over 43.75 million hectares producing 54.15 million tones of grains with an average yield of 1238 kg/ha. Nearly 80% of the cultivated area in the world lies in Asia and Africa.

In India, sorghum ranks third in area and production after rice and wheat. The crop accounts for nearly 52% of the area and 63% of production under millets with an area of 15.8 million hectare and a production of 11.85 million tones. Maharashtra, Karnataka, Andhra Pradesh, Gujarat, Tamilnadu and Madhya Pradesh are the major sorghum growing states. The area under sorghum cultivation in the country has remained more or less unstable in the last two decades.

In Gujarat, sorghum is grown as grain crop in South Gujarat, dual purpose in North Gujarat, Kutchh, and Saurashtra while partly as fodder in dairy developed. The total rabi and kharif grain sorghum occupied 84.4 thousand hectares with 11.12 lakh tonnes production and average 1323 kg/ha productivity in the state (2015-16).

Over the past 25 years, as many as 20 varieties and hybrids for grain and fodder have been released for cultivation.

Vision:

Gujarat states a harbinger in sorghum production and yield through cultivation of sorghum in high input system with improved cultivars and scientific production technology. Sorghum is an important crop of semi-arid tropics with immense climate resilient and food security potential and livelihood support for marginal and poor farmers.

Mission:

Amplification of quality sorghum production through increasing productivity and cultivation of improved cultivars with better quality.

4.1.5.2 Crop/Area Issues:**Scope:**

- There is scope for exploitation of heterosis.
- Scope for genetic improvement through conventional and molecular breeding
- Potential as high valuable gluten free and rich sources of minerals and fibrous food.
- To catch the fodder requirement of the state during phase of fast growing dairy industries and reduction of area under cereal crop.
- Suitable for industrial uses like ethanol production and as secondary source of generation energy
- Can be served as sorghum syrup instead of honey in the hotel industries.
- Crop for saline soil.
- To reduce malnutrition among the children.
- Potential in export of sorghum based traditional processed products.
- Entrepreneurship development and capacity build up through popularization of processing technology for sorghum.

Challenges and issues

- Sorghum Area: Sorghum area in the kharif season is decreasing day by day due to scenario for cash crop cultivation in the state
- Sorghum Productivity: Area wise fluctuation for yield have to be minimize gap between zone, area and soil type widely differed needs reduce. Now farmers having reach soil and inputs are cultivating cash crops like cotton, castor, pigeon pea, groundnut etc. and sorghum is left for cultivation in poor soil, less rainfall and poor farmers which also adversely affect productivity.
- Scattered / uneven distribution of rainfall, often flood and draught situation risk in some pockets

- Poor mechanization and acute labour shortage in major area of state.
- Increasing bird damage issues due to decreasing area under cereal crops.
- Poor waste /stalk management
- Quality of sorghum: Trade base quality sorghum should have to be produced
- Weed management
- Macro/ micro nutrient management.
- Unorganised processing and limited utilization due to lack of nutritional value of sorghum based processed products.
- Limitation in export of processed products due to unhygienic processing and handling.

Focus:

Keeping in view the above facts, following key focus areas are identified in order to overcome the issue of sorghum production.

- Training programmes for extension officials and farmers
- Motivation of farmers for scientific and high input sorghum cultivation
- Production and distribution of improved seeds to the farmers.
- Awareness of consumers regarding health benefits of sorghum in food and thereby increasing demand of quality grain sorghum and ultimately high price.
- Adoption of mechanisation to overcome labour problems.
- Development of technology for processing of sorghum processed products.

4.1.5.3 Priority for Comprehensive Sorghum Cultivation:

- Production of improved seed
- Mechanisation for harvesting and reduce bird damages.
- Storage and transportation facility to be improved and should be easily available
- Increase economical importance
- Silage making should be popularised
- Development of processed products for entrepreneurship and export.
- Conversion of sorghum in value added products.

4.1.5.4 Current Status of Area, Production and Productivity:

Table- 4.1.120 District-wise Area, Production and Yield in Gujarat state based on Final Forecast reports for the year 2011-12 to 2015-16 Total Sorghum

Area: 00" hact. Prod: 00 MT" Yield : kg/ha

S N	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			Average		
		Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel
1	Ahmedabad	90	96	106	0	0	0	0	0	0	0	0	0	0	0	0	18	19	106
2	Amreli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	Anand	0	0	0	0	0	0	4	6	144	0	0	0	3	4	141	1	2	143
4	Arvalli	0	0	0	0	0	0	0	0	0	0	0	142	1	1	119	0	0	124
5	Banaskantha	36	36	100	68	83	122	34	41	119	65	64	977	78	86	110	56	62	110
6	Bharuch	158	142	899	135	153	113	100	89	891	58	54	925	106	108	102	111	109	981
7	Bhavnagar	3	3	100	3	4	133	36	51	143	6	8	135	59	83	141	21	30	140
8	Botad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	Chhotaudepur	0	0	0	0	0	0	0	0	0	1	1	116	1	1	940	0	0	105
10	Dahod	1	1	100	3	4	133	0	0	0	1	1	122	0	0	119	1	1	124
11	Dang	33	45	136	28	34	121	26	33	130	12	13	108	19	27	141	24	30	129
12	Devbhumi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	Gandhinagar	87	86	989	25	20	800	12	10	817	0	0	743	1	0	768	25	23	932
14	Gir Somnath	0	0	0	0	0	0	0	0	0	2	3	142	0	0	0	0	1	142
15	Jamnagar	0	0	0	0	0	0	0	0	0	0	0	142	0	0	0	0	0	142
16	Junagadh	56	84	150	2	3	150	41	57	139	15	24	163	20	29	149	27	40	148
17	Kachchh	0	0	0	0	0	0	824	119	144	0	0	0	1	1	141	165	238	144
18	Kheda	1	1	100	10	11	110	2	2	132	5	7	142	0	1	119	4	4	120
19	Mahisagar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	141	0	0	141
20	Mehesana	35	35	100	5	7	140	1	2	144	0	0	0	0	0	0	8	9	106
21	Morbi	0	0	0	0	0	0	0	0	0	21	25	122	32	45	141	11	14	133
22	Narmada	90	110	122	114	151	132	91	100	110	60	55	909	59	58	980	83	95	114
23	Navsari	17	18	105	26	33	126	10	12	119	19	26	135	10	12	121	17	20	123
24	Panchmahal	7	8	114	6	6	100	6	7	114	1	1	122	1	1	139	4	5	111
25	Patan	0	0	0	0	0	0	3	4	128	9	12	129	133	188	141	29	41	140

S N	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			Average		
		Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel
26	Porbandar	99	85	859	36	32	889	144	311	216	139	265	190	51	87	172	94	156	166
27	Rajkot	1	1	100	0	0	0	11	16	144	5	5	122	0	0	0	3	4	135
28	Sabarkantha	0	0	0	0	0	0	0	0	0	2	3	142	3	4	119	1	1	128
29	Surat	182	204	112	91	144	158	105	170	162	153	190	124	126	173	137	131	176	134
30	Surendranagar	88	90	102	2	2	100	212	305	143	0	0	0	151	212	140	91	122	134
31	Tapi	182	250	137	197	331	168	161	240	149	118	155	130	134	189	140	159	233	146
32	Vadodara	70	99	141	41	49	119	46	59	128	1	1	978	1	1	985	32	42	131
33	Valsad	4	4	100	4	6	150	3	4	140	3	3	123	3	4	137	3	4	129
GUJARAT STATE		124	139	112	796	107	134	187	271	144	696	918	131	991	131	132	111	148	132

Table- 4.1.121 District-wise Area, Production and Yield in Gujarat state based on Final Forecast reports for the year 2011-12 to

2015-16 Kharif Sorghum

Area: 00" hact. Prod: 00 MT" Yield : kg/ha

SR. No.	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			AVERAGE (Five		
		Are a	Prod .	Yield	Are a	Prod .	Yield	Area	Prod .	Yield	Are a	Prod .	Yield	Are a	Prod .	Yield	Area	Prod.	Yield
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Anand	0	0	0	0	0	0	4	6	144	0	0	0	3	4	141	1	2	1431
4	Arvalli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	Banaskantha	32	32	994	68	83	121	34	41	119	65	64	977	78	86	110	55	61	1102
6	Bharuch	39	47	122	37	57	155	30	30	993	10	12	123	16	16	993	26	32	1228
7	Bhavnagar	0	0	0	3	4	146	35	50	144	0	0	0	59	83	141	19	27	1417
8	Botad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Chhotaudepur	0	0	0	0	0	0	0	0	0	0	0	159	1	0	853	0	0	1080
10	Dahod	1	1	994	3	4	146	0	0	0	1	1	122	0	0	0	1	1	1244
11	Dang	33	45	135	24	30	125	26	33	130	12	13	108	19	27	141	23	30	1306
12	Devbhumi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Gandhinagar	83	82	994	25	20	779	12	10	817	0	0	743	1	0	768	24	23	930
14	Gir Somnath	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SR. No.	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			AVERAGE (Five)		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
15	Jamnagar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0	144	0	0	0	12	17	141	2	3	1414
17	Kachchh	0	0	0	0	0	0	824	119	144	0	0	0	1	1	141	165	238	1443
18	Kheda	0	0	0	0	0	0	1	2	144	0	0	0	0	0	0	0	0	1443
19	Mahisagar	0	0	0	0	0	0	0	0		0	0	0	0	0	141	0	0	1414
20	Mehesana	35	35	994	5	7	146	1	2	144	0	0	0	0	0	0	8	9	1063
21	Morbi	0	0	0	0	0	0	0	0		21	25	122	32	45	141	11	14	1338
22	Narmada	66	87	130	72	106	147	57	59	103	38	38	101	42	41	974	55	66	1206
23	Navsari	7	7	994	14	20	146	2	3	144	6	8	122	5	7	141	7	9	1303
24	Panchmahal	0	0	0	1	1	146	0	0	144	1	1	122	1	1	141	1	1	1225
25	Patan	0	0	0	0	0	0	2	2	144	6	7	122	13	188	141	28	39	1406
26	Porbandar	0	0	0	0	0	0	1	1	143	5	6	122	2	2	141	1	2	1279
27	Rajkot	1	1	994	0	0	0	11	16	144	5	5	122	0	0	0	3	4	1355
28	Sabarkantha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Surat	16	186	112	64	115	179	81	144	177	89	121	135	78	123	157	96	138	1443
30	Surendranagar	48	47	994	0	0	0	208	301	144	0	0	0	14	207	141	80	111	1377
31	Tapi	15	214	138	16	290	178	132	211	159	98	132	135	11	172	146	133	204	1536
32	Vadodara	15	17	115	13	17	126	31	44	144	0	0	0	0	0	0	12	16	1334
33	Valsad	3	3	994	4	6	146	3	4	144	2	3	122	3	4	141	3	4	1326
GUJARAT STATE		68	804	117	49	760	153	149	214	143	35	438	121	74	102	137	756	1035	1370

Source: Directorate of Aagri., Gandhinagar

Table-4.1.122 District-wise Area, Production and Yield in Gujarat state based on Final Forecast reports for the year 2011-12 to

2015-16 Rabi Sorghum

Area: 00" hact. Prod: 00 MT" Yield : kg/ha

SR.	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			AVERAGE		
		Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel
1	Ahmedabad	90	96	106	0	0	0	0	0	0	0	0	0	0	0	0	18	19	106
2	Amreli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	Anand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4	Arvalli	0	0	0	0	0	0	0	0	0	0	0	142	1	1	119	0	0	124
5	Banaskantha	4	4	106	0	0	0	0	0	0	0	0	0	0	0	0	1	1	100
6	Bharuch	119	95	801	98	96	976	70	59	847	48	41	860	90	92	102	85	77	904
7	Bhavnagar	3	3	106	0	0	0	1	1	112	6	8	142	0	0	0	2	2	126
8	Botad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	Chhotaudepur	0	0	0	0	0	0	0	0	0	1	1	106	1	1	101	0	0	104
10	Dahod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119	0	0	119
11	Dang	0	0	0	4	4	108	0	0	0	0	0	0	0	0	0	1	1	100
12	Devbhumi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	Gandhinagar	4	4	106	0	0	0	0	0	0	0	0	0	0	0	0	1	1	100
14	Gir Somnath	0	0	0	0	0	0	0	0	0	2	3	142	0	0	0	0	1	142
15	Jamnagar	0	0	0	0	0	0	0	0	0	0	0	142	0	0	0	0	0	142
16	Kachchh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17	Junagadh	56	84	148	2	3	133	41	57	139	15	24	163	8	12	162	24	36	149
18	Kheda	1	1	106	10	11	108	1	1	112	5	7	142	0	1	119	3	4	119
19	Mahisagar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20	Mehesana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21	Morbi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	Narmada	24	23	973	42	45	106	34	41	122	22	16	727	17	17	996	28	28	102
23	Navsari	10	11	106	12	13	108	8	9	112	13	19	142	5	5	101	10	11	118
24	Panchmahal	7	8	106	5	5	108	6	7	112	0	0	0	0	0	119	4	4	109
25	Patan	0	0	0	0	0	0	2	2	112	3	5	142	0	0	119	1	1	132
26	Porbandar	99	85	856	36	32	911	143	311	216	135	259	192	49	85	173	92	154	167

SR.	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			AVERAGE		
		Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel
27	Rajkot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
28	Sabarkantha	0	0	0	0	0	0	0	0	0	2	3	142	3	4	119	1	1	128
29	Surat	17	18	108	27	29	108	24	27	112	63	70	109	47	49	104	36	39	107
30	Surendranagar	40	43	106	2	2	108	4	4	112	0	0	0	5	5	119	10	11	108
31	Tapi	28	36	128	35	41	117	29	29	100	20	23	110	17	16	976	26	29	112
32	Vadodara	55	82	150	28	32	111	15	15	974	1	1	978	1	1	985	20	26	130
33	Valsad	1	1	106	0	0	0	0	0	112	0	0	142	1	1	119	0	0	111
GUJARAT STATE		558	594	106	301	313	104	376	562	149	337	480	142	244	290	119	363	448	123

Source: Directorate of Agri., Gandhinagar

4.1.5.5 Major Sorghum Varieties:

The state has three major seasons viz; the hot weather (March to mid June), *Kharif* (Mid June to September) and *Rabi* (October to February).

Considering the rainfall pattern, topography, soil characters, climatic zones have been identified in Gujarat are as below:

Table- 4.1.123 Agro-climatic Zone-wise Recommended Variety/Hybrid of Sorghum

Zone	Rainfall (mm)	Area under zone	Season	Recommended Variety/Hybrid
I	More than 1500 (Heavy rainfall)	South Gujarat	<i>Kharif</i>	GNJ 1, GJ 38, GJ 42, GFS 4, GFS 5 and CSV 21F.
II	1000-1500	South Gujarat	<i>Kharif and Rabi i</i>	GNJ 1, GJ 38, GJ 40, GFS 4, GFS 5 and CSV 21F.
III	800-1000	Middle Gujarat	<i>Kharif</i>	GNJ 1, GJ 38, GFS 4, GFS 5 and CSV 21F, GFS-11
IV	625- 875	North Gujarat (Dry Zone)	<i>Kharif</i>	GNJ 1, GJ 39, GFS 4, GFS 5 and CSV 21F

V-VI	400-700(Kutchh and North Saurashtra)	West Zone	<i>Kharif</i>	GNJ 1, GJ 39, GFS 4, GFS 5 and CSV 21F
VII	750-1000	South Saurashtra	Post rainy	GNJ 1, GJ 39, GFS 4, GFS 5 and CSV 21F
VIII	625-1000	Bhal and Coastal	Post rainy region	GNJ 1, GJ 39, GFS 4, GFS 5 and CSV 21F

In Gujarat, sorghum is grown as grain crop in South Gujarat, dual purpose in North Gujarat, Kutchh, and Saurashtra while partly as fodder in dairy developed.

4.1.5.6 Input Management:

4.1.5.6.1 Seed:

Table- 4.1.124 Projected Seed Requirement of Breeder Seed of Sorghum Crop during 2017-2020 for Gujarat State

Sr. No	Seed/Area	Requirement of Seed			
		2017-18	2018-19	2019-20	Total
1	Breeder Seed	130	143	158	431
2	Foundation Seed	11842	13034	14334	39210
3	Certified Seed	1076500	1184900	1303100	3564500
4	Targeted Area (00 ha)	1077	1185	1303	3565

Table- 4.1.125 Targeted (year wise) Area (ha) and Targeted Seed Replacement Rate (SRR) Based on Seed Rate (kg/ha) during 2017-2020 for Gujarat State

Sr. No.	Districts	Targeted (Year-wise) Area in ha			Seed Rate kg/ha	Targeted Seed Replacement Rate (SRR) (%)		
		2017-18	2018-19	2019-20		2017-18	2018-19	2019-20
1	Ahemdabad	0.50	0.50	0.50	10	15	20	25
2	Amreli	1.00	1.00	1.00	10	15	20	25
3	Anand	3.50	4.00	4.50	10	15	20	25

Sr. No.	Districts	Targeted (Year-wise) Area in ha			Seed Rate kg/ha	Targeted Seed Replacement Rate (SRR) (%)		
		2017-18	2018-19	2019-20		2017-18	2018-19	2019-20
4	Aravalli	1.00	1.00	1.00	10	15	20	25
5	Banaskantha	86.00	95.00	104.50	10	15	20	25
6	Bharuch	116.00	127.50	140.50	10	15	20	25
7	Bhavnagar	65.00	71.50	79.00	10	15	20	25
8	Botad	1.00	1.00	1.00	10	15	20	25
9	Chhota Udaipur	1.50	2.00	2.00	10	15	20	25
10	Dahod	0.50	0.50	0.50	10	15	20	25
11	Dang	20.00	22.00	24.00	10	15	20	25
12	Devbhumi Dwarka	1.50	1.50	2.00	10	15	20	25
13	Gandhinagar	0.50	0.50	0.50	10	15	20	25
14	Gir Somnath	2.00	2.00	2.00	10	15	20	25
15	Jamnagar	1.00	1.00	1.00	10	15	20	25
16	Junagadh	21.00	23.00	25.50	10	15	20	25
17	Kheda	2.00	2.00	2.00	10	15	20	25
18	Kutch	0.50	0.50	0.50	10	15	20	25
19	Mahisagar	0.50	0.50	0.50	10	15	20	25
20	Mehsana	0.50	0.50	0.50	10	15	20	25
21	Morbi	35.00	38.50	42.50	10	15	20	25
22	Narmada	65.00	71.50	79.00	10	15	20	25
23	Navsari	10.00	11.00	12.00	10	15	20	25
24	Panchmahal	1.00	1.00	1.00	10	15	20	25
25	Patan	145.00	160.00	176.00	10	15	20	25
26	Porbandar	55.00	60.50	66.60	10	15	20	25
27	Rajkot	0.50	1.00	1.00	10	15	20	25
28	Sabarkantha	3.50	3.90	4.00	10	15	20	25
29	Surat	130.00	143.00	157.00	10	15	20	25
30	Surendranagar	151.00	166.00	182.50	10	15	20	25

Sr. No.	Districts	Targeted (Year-wise) Area in ha			Seed Rate kg/ha	Targeted Seed Replacement Rate (SRR) (%)		
		2017-18	2018-19	2019-20		2017-18	2018-19	2019-20
31	Tapi	150.00	165.00	181.50	10	15	20	25
32	Vadodara	1.50	2.00	2.50	10	15	20	25
33	Valsad	3.50	4.00	4.50	10	15	20	25
Gujarat		1076.5	1184.9	1303.1		15	20	25

4.1.5.6.2 Fertilizer:

Table- 4.1.126 Consumption of Chemical Fertilizers in Gujarat (2010-2011 to 2014-2015) (In Tonne)

Consumption of Chemical Fertilizers in Gujarat				
Years	Nitrogenous (N)	Phosphatic (P ₂ O ₅)	Potassic (K ₂ O)	Total (NPK)
2010-11	1241221	517999	179941	1939161
2011-12	1183298	417021	132738	1733056
2012-13	1007.7	257.82	76.46	1341.97
2013-14	1158.93	315.37	90.6	1564.9
2014-15	1217.51	351.99	14.51	1584.01
Total	2427903	935945	312861	2427903

4.1.5.6.3 Plant protection/Pesticide:

Pests

Sorghum crop is mainly attacked by Shoot Fly and stem bore pest and resulting in considerable yield losses. This key pest can be managed by following measures.

Shoot fly

- Early sowing of sorghum immediately after the receipt of monsoon to minimize the shoot fly incidence.
- Seed treatment with imidacloprid 70 WS @ 10 g/kg of seeds or thiomethoxam 30 FS @ 3 g/kg of seed.
- Use higher seed rate 10 to 12 kg/hectare and remove the shoot fly damaged seedlings at the time of transplanting and transplant only healthy seedlings
- Soil application of phorate 10 G @ 10 kg/ha at the time of sowing.

Stem Borer

- Set up of light traps till mid night to monitor, attract and kill adults of stem borer.
- Seed treatment with thiomethoxam 30 FS @ 3 g/kg of seed.
- Whorl application of phorate 10 G @ 1 kg/ha after 30-35 days of sowing.
- Release of Trichogramma egg parasitoids @ 5 lakhs at 7, 14 and 21 days after sowing.
- Plough soon after harvest, remove and destroy the stubbles.

Diseases:

During rainy season, the sorghum yield and quality are adversely affected by Grain Mold and Sugary disease. The disease infestation can be controlled by following measures.

Sorghum Grain Mold

- Soaking of seeds in warm water for half an hour and remove floated and unhealthy seeds. Plant population per unit area should be maintained.
- Harvest crop at the stage of physiological maturity

Sorghum Sugary Disease

→ Use healthy seed for sowing. Soaking seeds with 5% salt solution will aid to remove ergot infested seeds, as ergot infested seeds will float in the salt solution.

4.1.5.6.4 Farm Mechanization/ Farm equipment

(1) Sorghum Mechanical Harvester (Reaper)

(2) Mechanism to control bird damage to grain sorghum

Request has been send to convener, Renewable energy committee

4.1.5.7 Gap Analysis of Sorghum Crop:

Sustainability Issues and Gap Analysis of Productivity of Sorghum Crop and Resources

Table- 4.1.127 Sustainability Issues and Gap Analysis of Productivity of Crop and Resources

Sr.No	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Performance indicator	Sustainability outputs
I	Sorghum cultivation by poor farmers in low input system	<ul style="list-style-type: none"> ▪ low fertile soil ▪ less inputs to crop ▪ Use of low yielding traditional cultivars 	Motivation to farmers	Field demonstration of high yielding cultivars with high inputs and realizing economic gain from sorghum cultivars	10% growth	Increase production of quality grain and fodder
II	Less use of fertilizers	Lack of awareness regarding importance of fertilizers for sorghum	Educating farmer on impact of fertilizers application on	Farmers participatory approach	5 % growth	Increasing in yield of grain as well as fodder sorghum

Sr.No	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Performance indicator	Sustainability outputs
			sorghum productivity			
III	Cultivation of local cultivar instead of improved variety and quality seed	Less awareness of farmers for utilization of improved variety seed and also less popularization regarding high yielding sorghum variety.	<ul style="list-style-type: none"> ▪ Awareness in farmers ▪ Popularization of improved cultivars ▪ Quality seed production 	<ul style="list-style-type: none"> ▪ Demonstration of improved cultivars to increase farmers awareness and popularization of improved cultivars ▪ Concerned department and seed corporation should produce and multiply quality seeds 	15% growth	Increase in grain and fodder yield
IV	High incidence of shoot fly, stem borer and diseases	Lac of knowledge regarding insect pest and diseases management	Campaign of control of insect pest and diseases on community bases	Campaign FLDs on IPM	5 % increase	Higher quality of grain and fodder yield
V	Low level of mechanization and low price of grain	<ul style="list-style-type: none"> • Un-mechanized harvesting, threshing, handling and threshing of seed. • Lack in awareness about nutritional benefit of sorghum in daily diet. 	<ul style="list-style-type: none"> • Development of small tools and machinery for mechanized operations. • Awareness regarding health benefits of Sorghum 	<p>Design, development, and modification of sorghum related tools and machinery.</p> <p>Improvement in sorghum handling and storage technology.</p>	10 % increase	Improvement in level of mechanization and prices of grain

Sr.No	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Performance indicator	Sustainability outputs
				ToT related to nutritional banifits of sorghum and its processed products by Campaigning / Advertising/ Awareness programs/ workshops.		
VI	Value addition	Uses only for <i>roti</i> by village population	To develop value added products for entrepreneur and exporter.	Novel Processing, Storage and Packaging Technology.	10 % increase	Value addition in sorghum crop.

Recommended interventions for the state with detail Action plan with cost in Lakh Rupees

Training proposed for capacity building of Agricultural staff (District wise)(Rs.900/day /person)

Training proposed for capacity building of farmers (District wise) on different technologies. (Rs.600/day /farmer)

Training proposed to women for Awareness related to sorghum based value added products (at district level)

Varietal demonstration (phy and fin- 2017-18 to 2019-20) (Rs.2000/demonstration)

Pest Management demonstration (Rs.2000/demonstration)

Bio Pesticide demonstration(Rs.2000/demonstration)

Nutrient Management demonstration (Rs.2000/demonstration)

Biofertilizer demonstration(Rs.2000/demonstration)

Farmers Field School covering identified critical technologies

Group formation/ commodity interest group formation for value addition product

Farm Mechanization demonstration [Sorghum Mechanical harvester, threshing, storage and handling]

Project outcome and growth rate during the plan period

Development of eco-friendly bird escaping device

Requested to convene, renewable energy committee for development.

Availability of green fodder silage making to the farmers

4.1.5.8 Detailed Action Plan with Costs:

Table- 4.1.128 Training Proposed for Capacity Building of Staff for Sorghum Crop under Plan (at District Level)

(Phy - No, Fin - Rs. in Lakh) Note- 20 officials per Training (20 x Rs. 900/- per day= 18000/- per training)

Sr.No.	District	Number of staff to be trained during plan period (Both from State Agil. Uni. And State Agril. Dept. staff)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Ahemdabad	0	0.00	0	0.00	0	0.00	0	0.00
2	Amreli	2	0.36	3	0.54	4	0.72	9	1.62
3	Anand	2	0.36	3	0.54	4	0.72	9	1.62
4	Aravalli	1	0.18	2	0.36	3	0.54	6	1.08
5	Banaskantha	10	1.80	12	2.16	14	2.52	36	6.48
6	Bharuch	14	2.52	16	2.88	19	3.42	49	8.82
7	Bhavnagar	8	1.44	9	1.62	11	1.98	28	5.04
8	Botad	4	0.72	6	1.08	8	1.44	18	3.24
9	Chhota Udaipur	3	0.54	4	0.72	5	0.90	12	2.16
10	Dahod	1	0.18	2	0.36	3	0.54	6	1.08
11	Dang	4	0.72	6	1.08	8	1.44	18	3.24
12	Devbhumi Dwarka	4	0.72	6	1.08	8	1.44	18	3.24
13	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
14	Gir Somnath	3	0.54	4	0.72	5	0.90	12	2.16
15	Jamnagar	1	0.18	2	0.36	3	0.54	6	1.08
16	Junagadh	3	0.54	4	0.72	4	0.72	11	1.98
17	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
18	Kutch	3	0.54	5	0.90	7	1.26	15	2.70
19	Mahisagar	2	0.36	4	0.72	6	1.08	12	2.16
20	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
21	Morbi	4	0.72	5	0.90	6	1.08	15	2.70
22	Narmada	8	1.44	9	1.62	11	1.98	28	5.04
23	Navsari	1	0.18	2	0.36	2	0.36	5	0.90
24	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
25	Patan	6	1.08	7	1.26	8	1.44	21	3.78
26	Porbandar	7	1.26	8	1.44	9	1.62	24	4.32

Sr.No.	District	Number of staff to be trained during plan period (Both from State Agil. Uni. And State Agril. Dept. staff)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
27	Rajkot	0	0.00	0	0.00	0	0.00	0	0.00
28	Sabarkantha	2	0.36	4	0.72	6	1.08	12	2.16
29	Surat	10	1.80	13	2.34	16	2.88	39	7.02
30	Surendranagar	10	1.80	12	2.16	14	2.52	36	6.48
31	Tapi	15	2.70	20	3.60	24	4.32	59	10.62
32	Vadodara	2	0.36	4	0.72	6	1.08	12	2.16
33	Valsad	2	0.36	4	0.72	6	1.08	12	2.16
Gujarat		132	23.76	176	31.68	220	39.60	528	95.04

Table- 4.1.129 Training Proposed for Capacity Building of Farmers for Sorghum Crop under Plan (Seed production technology)

Sr. No.	District	Training proposed for capacity building of farmers (District wise) (Phv - No. Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
1	Ahemdabad	0	0.00	0	0.00	0	0.00	0	0.00
2	Amreli	8	0.96	12	1.44	16	1.92	36	4.32
3	Anand	8	0.96	12	1.44	16	1.92	36	4.32
4	Aravalli	4	0.48	8	0.96	12	1.44	24	2.88
5	Banaskantha	40	4.80	48	5.76	56	6.72	144	17.28
6	Bharuch	56	6.72	64	7.68	76	9.12	196	23.52
7	Bhavnagar	32	3.84	36	4.32	44	5.28	112	13.44
8	Botad	16	1.92	24	2.88	32	3.84	72	8.64
9	Chhota Udaipur	12	1.44	16	1.92	20	2.40	48	5.76
10	Dahod	4	0.48	8	0.96	12	1.44	24	2.88
11	Dang	16	1.92	24	2.88	32	3.84	72	8.64
12	Devbhumi Dwarka	16	1.92	24	2.88	32	3.84	72	8.64
13	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
14	Gir Somnath	12	1.44	16	1.92	20	2.40	48	5.76
15	Jamnagar	4	0.48	8	0.96	12	1.44	24	2.88
16	Junagadh	12	1.44	16	1.92	16	1.92	44	5.28

Sr. No.	District	Training proposed for capacity building of farmers (District wise) (Phy - No. Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
17	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
18	Kutch	12	1.44	20	2.40	28	3.36	60	7.20
19	Mahisagar	8	0.96	16	1.92	24	2.88	48	5.76
20	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
21	Morbi	16	1.92	20	2.40	24	2.88	60	7.20
22	Narmada	32	3.84	36	4.32	44	5.28	112	13.44
23	Navsari	4	0.48	8	0.96	8	0.96	20	2.40
24	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
25	Patan	24	2.88	28	3.36	32	3.84	84	10.08
26	Porbandar	28	3.36	32	3.84	36	4.32	96	11.52
27	Rajkot	0	0.00	0	0.00	0	0.00	0	0.00
28	Sabarkantha	8	0.96	16	1.92	24	2.88	48	5.76
29	Surat	40	4.80	52	6.24	64	7.68	156	18.72
30	Surendranagar	40	4.80	48	5.76	56	6.72	144	17.28
31	Tapi	60	7.20	80	9.60	96	11.52	236	28.32
32	Vadodara	8	0.96	16	1.92	24	2.88	48	5.76
33	Valsad	8	0.96	16	1.92	24	2.88	48	5.76
Gujarat		528	63.36	704	84.48	880	105.6	2112	253.44

Note- 20 Farmers per Training (20 x Rs. 600/- per day= 12000/- per training)

Table- 4.1.130 Training proposed to women for Awareness related to sorghum based value added products (at district level)

Sr. No.	District	Training proposed for capacity building of farmers (District wise) (Phy - No. Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Ahemdabad	40	4.80	60	7.20	85	10.20	185	22.20
2	Amreli	20	2.40	30	3.60	40	4.80	90	10.80
3	Anand	30	3.60	40	4.80	60	7.20	130	15.60
4	Aravalli	20	2.40	30	3.60	40	4.80	90	10.80

5	Banaskantha	20	2.40	30	3.60	40	4.80	90	10.80
6	Bharuch	30	3.60	40	4.80	60	7.20	130	15.60
7	Bhavnagar	30	3.60	40	4.80	60	7.20	130	15.60
8	Botad	20	2.40	30	3.60	40	4.80	90	10.80
9	Chhota Udaipur	20	2.40	30	3.60	40	4.80	90	10.80
10	Dahod	10	1.20	15	1.80	20	2.40	45	5.40
11	Dang	30	3.60	40	4.80	60	7.20	130	15.60
12	Devbhumi Dwarka	20	2.40	30	3.60	40	4.80	90	10.80
13	Gandhinagar	30	3.60	40	4.80	60	7.20	130	15.60
14	Gir Somnath	20	2.40	30	3.60	40	4.80	90	10.80
15	Jamnagar	30	3.60	40	4.80	60	7.20	130	15.60
16	Junagadh	30	3.60	40	4.80	60	7.20	130	15.60
17	Kheda	20	2.40	30	3.60	40	4.80	90	10.80
18	Kutch	20	2.40	30	3.60	40	4.80	90	10.80
19	Mahisagar	10	1.20	15	1.80	20	2.40	45	5.40
20	Mehsana	20	2.40	30	3.60	40	4.80	90	10.80
21	Morbi	20	2.40	30	3.60	40	4.80	90	10.80
22	Narmada	20	2.40	30	3.60	40	4.80	90	10.80
23	Navsari	20	2.40	30	3.60	40	4.80	90	10.80
24	Panchmahal	10	1.20	15	1.80	20	2.40	45	5.40
25	Patan	30	3.60	40	4.80	60	7.20	130	15.60
26	Porbandar	20	2.40	30	3.60	40	4.80	90	10.80
27	Rajkot	40	4.80	60	7.20	80	9.60	180	21.60
28	Sabarkantha	20	2.40	30	3.60	40	4.80	90	10.80
29	Surat	50	6.00	70	8.40	90	10.80	210	25.20
30	Surendranagar	30	3.60	40	4.80	50	6.00	120	14.40
31	Tapi	30	3.60	40	4.80	50	6.00	120	14.40
32	Vadodara	40	4.80	60	7.20	80	9.60	180	21.60
33	Valsad	30	3.60	40	4.80	50	6.00	120	14.40
Gujarat		830	99.60	1185	142.2	1625	195	3640	436.80

Note- 20 Women per Training (20 x Rs. 600/- per day= 12000/- per training)

Table- 4.1.131 Varietal Demonstrations of Sorghum Crop (Including Production Technology, Plant Protection) to be Conducted in Sorghum Crop (Both for Grain as well as Fodder Sorghum Varieties) in One Acre Area

Sr. No.	District	(Phv. Area covered in ha. Fin. Rs. In lacs) (Demo of one acre. Rs. 2000/- per acre)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
1	Ahemdabad	0	0.0	0	0.0	0	0.0	0	0.0
2	Amreli	16	0.3	24	0.5	32	0.6	72	1.4
3	Anand	16	0.3	24	0.5	32	0.6	72	1.4
4	Aravalli	8	0.2	16	0.3	24	0.5	48	1.0
5	Banaskantha	80	1.6	96	1.9	112	2.2	288	5.8
6	Bharuch	112	2.2	128	2.6	152	3.0	392	7.8
7	Bhavnagar	64	1.3	72	1.4	88	1.8	224	4.5
8	Botad	32	0.6	48	1.0	64	1.3	144	2.9
9	Chhota Udaipur	24	0.5	32	0.6	40	0.8	96	1.9
10	Dahod	8	0.2	16	0.3	24	0.5	48	1.0
11	Dang	32	0.6	48	1.0	64	1.3	144	2.9
12	Devbhumi Dwarka	32	0.6	48	1.0	64	1.3	144	2.9
13	Gandhinagar	0	0.0	0	0.0	0	0.0	0	0.0
14	Gir Somnath	24	0.5	32	0.6	40	0.8	96	1.9
15	Jamnagar	8	0.2	16	0.3	24	0.5	48	1.0
16	Junagadh	24	0.5	32	0.6	32	0.6	88	1.8
17	Kheda	0	0.0	0	0.0	0	0.0	0	0.0
18	Kutch	24	0.5	40	0.8	56	1.1	120	2.4
19	Mahisagar	16	0.3	32	0.6	48	1.0	96	1.9
20	Mehsana	0	0.0	0	0.0	0	0.0	0	0.0
21	Morbi	32	0.6	40	0.8	48	1.0	120	2.4
22	Narmada	64	1.3	72	1.4	88	1.8	224	4.5
23	Navsari	8	0.2	16	0.3	16	0.3	40	0.8
24	Panchmahal	0	0.0	0	0.0	0	0.0	0	0.0
25	Patan	48	1.0	56	1.1	64	1.3	168	3.4

Sr. No.	District	(Phv. Area covered in ha. Fin. Rs. In lacs) (Demo of one acre. Rs. 2000/- per acre)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
26	Porbandar	56	1.1	64	1.3	72	1.4	192	3.8
27	Rajkot	0	0.0	0	0.0	0	0.0	0	0.0
28	Sabarkantha	16	0.3	32	0.6	48	1.0	96	1.9
29	Surat	80	1.6	104	2.1	128	2.6	312	6.2
30	Surendranagar	80	1.6	96	1.9	112	2.2	288	5.8
31	Tapi	120	2.4	160	3.2	192	3.8	472	9.4
32	Vadodara	16	0.3	32	0.6	48	1.0	96	1.9
33	Valsad	16	0.3	32	0.6	48	1.0	96	1.9
Gujarat		1056	21.12	1408	28.16	1760	35.2	4224	84.48

Table- 4.1.132 Pest management demonstrations to be conducted in sorghum crop in one acre area during the plan period

Sr.No.	District	(Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
1	Ahemdabad	0	0.0	0	0.0	0	0.0	0	0.00
2	Amreli	2	0.04	3	0.06	4	0.08	9	0.18
3	Anand	2	0.04	3	0.06	4	0.08	9	0.18
4	Aravalli	1	0.02	2	0.04	3	0.06	6	0.12
5	Banaskantha	10	0.20	12	0.24	14	0.28	36	0.72
6	Bharuch	14	0.28	16	0.32	19	0.38	49	0.98
7	Bhavnagar	8	0.16	9	0.18	11	0.22	28	0.56
8	Botad	4	0.08	6	0.12	8	0.16	18	0.36
9	Chhota Udaipur	3	0.06	4	0.08	5	0.10	12	0.24
10	Dahod	1	0.02	2	0.04	3	0.06	6	0.12
11	Dang	4	0.08	6	0.12	8	0.16	18	0.36
12	Devbhumi Dwarka	4	0.08	6	0.12	8	0.16	18	0.36
13	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
14	Gir Somnath	3	0.06	4	0.08	5	0.10	12	0.24
15	Jamnagar	1	0.02	2	0.04	3	0.06	6	0.12

Sr.No.	District	(Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
16	Junagadh	3	0.06	4	0.08	4	0.08	11	0.22
17	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
18	Kutch	3	0.06	5	0.10	7	0.14	15	0.30
19	Mahisagar	2	0.04	4	0.08	6	0.12	12	0.24
20	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
21	Morbi	4	0.08	5	0.10	6	0.12	15	0.30
22	Narmada	8	0.16	9	0.18	11	0.22	28	0.56
23	Navsari	1	0.02	2	0.04	2	0.04	5	0.10
24	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
25	Patan	6	0.12	7	0.14	8	0.16	21	0.42
26	Porbandar	7	0.14	8	0.16	9	0.18	24	0.48
27	Rajkot	0	0.00	0	0.00	0	0.00	0	0.00
28	Sabarkantha	2	0.04	4	0.08	6	0.12	12	0.24
29	Surat	10	0.20	13	0.26	16	0.32	39	0.78
30	Surendranagar	10	0.20	12	0.24	14	0.28	36	0.72
31	Tapi	15	0.30	20	0.40	24	0.48	59	1.18
32	Vadodara	2	0.04	4	0.08	6	0.12	12	0.24
33	Valsad	2	0.04	4	0.08	6	0.12	12	0.24
Gujarat		132	2.64	176	3.52	220	4.40	528	10.56

Table- 4.1.133 Bio-pesticide demonstrations to be conducted in sorghum crop in one acre area during the plan period

Sr.No.	District	Projection of Bio-pesticide demonstrations (Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
1	Ahemdabad	0	0.0	0	0.0	0	0.0	0	0.00
2	Amreli	2	0.04	3	0.06	4	0.08	9	0.18
3	Anand	2	0.04	3	0.06	4	0.08	9	0.18
4	Aravalli	1	0.02	2	0.04	3	0.06	6	0.12
5	Banaskantha	10	0.20	12	0.24	14	0.28	36	0.72
6	Bharuch	14	0.28	16	0.32	19	0.38	49	0.98
7	Bhavnagar	8	0.16	9	0.18	11	0.22	28	0.56
8	Botad	4	0.08	6	0.12	8	0.16	18	0.36
9	Chhota Udaipur	3	0.06	4	0.08	5	0.10	12	0.24
10	Dahod	1	0.02	2	0.04	3	0.06	6	0.12
11	Dang	4	0.08	6	0.12	8	0.16	18	0.36
12	Devbhumi Dwarka	4	0.08	6	0.12	8	0.16	18	0.36
13	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
14	Gir Somnath	3	0.06	4	0.08	5	0.10	12	0.24
15	Jamnagar	1	0.02	2	0.04	3	0.06	6	0.12
16	Junagadh	3	0.06	4	0.08	4	0.08	11	0.22
17	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
18	Kutch	3	0.06	5	0.10	7	0.14	15	0.30
19	Mahisagar	2	0.04	4	0.08	6	0.12	12	0.24
20	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
21	Morbi	4	0.08	5	0.10	6	0.12	15	0.30
22	Narmada	8	0.16	9	0.18	11	0.22	28	0.56
23	Navsari	1	0.02	2	0.04	2	0.04	5	0.10
24	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
25	Patan	6	0.12	7	0.14	8	0.16	21	0.42
26	Porbandar	7	0.14	8	0.16	9	0.18	24	0.48
27	Rajkot	0	0.00	0	0.00	0	0.00	0	0.00

Sr.No.	District	Projection of Bio-pesticide demonstrations (Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
28	Sabarkantha	2	0.04	4	0.08	6	0.12	12	0.24
29	Surat	10	0.20	13	0.26	16	0.32	39	0.78
30	Surendranagar	10	0.20	12	0.24	14	0.28	36	0.72
31	Tapi	15	0.30	20	0.40	24	0.48	59	1.18
32	Vadodara	2	0.04	4	0.08	6	0.12	12	0.24
33	Valsad	2	0.04	4	0.08	6	0.12	12	0.24
Gujarat		132	2.64	176	3.52	220	4.40	528	10.56

Table- 4.1.134 Nutrient management demonstrations to be conducted in sorghum crop in one acre area during the plan period

Sr.No.	District	Projection of Nutrient management demonstrations (Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
1	Ahemdabad	0	0.0	0	0.0	0	0.0	0	0.00
2	Amreli	2	0.04	3	0.06	4	0.08	9	0.18
3	Anand	2	0.04	3	0.06	4	0.08	9	0.18
4	Aravalli	1	0.02	2	0.04	3	0.06	6	0.12
5	Banaskantha	10	0.20	12	0.24	14	0.28	36	0.72
6	Bharuch	14	0.28	16	0.32	19	0.38	49	0.98
7	Bhavnagar	8	0.16	9	0.18	11	0.22	28	0.56
8	Botad	4	0.08	6	0.12	8	0.16	18	0.36
9	Chhota Udaipur	3	0.06	4	0.08	5	0.10	12	0.24
10	Dahod	1	0.02	2	0.04	3	0.06	6	0.12
11	Dang	4	0.08	6	0.12	8	0.16	18	0.36
12	Devbhumi Dwarka	4	0.08	6	0.12	8	0.16	18	0.36
13	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
14	Gir Somnath	3	0.06	4	0.08	5	0.10	12	0.24
15	Jamnagar	1	0.02	2	0.04	3	0.06	6	0.12
16	Junagadh	3	0.06	4	0.08	4	0.08	11	0.22

Sr.No.	District	Projection of Nutrient management demonstrations (Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
17	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
18	Kutch	3	0.06	5	0.10	7	0.14	15	0.30
19	Mahisagar	2	0.04	4	0.08	6	0.12	12	0.24
20	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
21	Morbi	4	0.08	5	0.10	6	0.12	15	0.30
22	Narmada	8	0.16	9	0.18	11	0.22	28	0.56
23	Navsari	1	0.02	2	0.04	2	0.04	5	0.10
24	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
25	Patan	6	0.12	7	0.14	8	0.16	21	0.42
26	Porbandar	7	0.14	8	0.16	9	0.18	24	0.48
27	Rajkot	0	0.00	0	0.00	0	0.00	0	0.00
28	Sabarkantha	2	0.04	4	0.08	6	0.12	12	0.24
29	Surat	10	0.20	13	0.26	16	0.32	39	0.78
30	Surendranagar	10	0.20	12	0.24	14	0.28	36	0.72
31	Tapi	15	0.30	20	0.40	24	0.48	59	1.18
32	Vadodara	2	0.04	4	0.08	6	0.12	12	0.24
33	Valsad	2	0.04	4	0.08	6	0.12	12	0.24
Gujarat		132	2.64	176	3.52	220	4.40	528	10.56

Table- 4.1.135 Bio-fertilizer demonstrations to be conducted in sorghum crop in one acre area during the plan period

Sr.No.	District	Projection of Bio-fertilizer demonstrations (Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
1	Ahemdabad	0	0.0	0	0.0	0	0.0	0	0.00
2	Amreli	2	0.04	3	0.06	4	0.08	9	0.18
3	Anand	2	0.04	3	0.06	4	0.08	9	0.18
4	Aravalli	1	0.02	2	0.04	3	0.06	6	0.12
5	Banaskantha	10	0.20	12	0.24	14	0.28	36	0.72
6	Bharuch	14	0.28	16	0.32	19	0.38	49	0.98

Sr.No.	District	Projection of Bio-fertilizer demonstrations (Phv. Area covered in ha. Fin. Rs. In lacs)							
		2017-18		2018-19		2019-20		Total	
		Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.
7	Bhavnagar	8	0.16	9	0.18	11	0.22	28	0.56
8	Botad	4	0.08	6	0.12	8	0.16	18	0.36
9	Chhota Udaipur	3	0.06	4	0.08	5	0.10	12	0.24
10	Dahod	1	0.02	2	0.04	3	0.06	6	0.12
11	Dang	4	0.08	6	0.12	8	0.16	18	0.36
12	Devbhumi Dwarka	4	0.08	6	0.12	8	0.16	18	0.36
13	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
14	Gir Somnath	3	0.06	4	0.08	5	0.10	12	0.24
15	Jamnagar	1	0.02	2	0.04	3	0.06	6	0.12
16	Junagadh	3	0.06	4	0.08	4	0.08	11	0.22
17	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
18	Kutch	3	0.06	5	0.10	7	0.14	15	0.30
19	Mahisagar	2	0.04	4	0.08	6	0.12	12	0.24
20	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
21	Morbi	4	0.08	5	0.10	6	0.12	15	0.30
22	Narmada	8	0.16	9	0.18	11	0.22	28	0.56
23	Navsari	1	0.02	2	0.04	2	0.04	5	0.10
24	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
25	Patan	6	0.12	7	0.14	8	0.16	21	0.42
26	Porbandar	7	0.14	8	0.16	9	0.18	24	0.48
27	Rajkot	0	0.00	0	0.00	0	0.00	0	0.00
28	Sabarkantha	2	0.04	4	0.08	6	0.12	12	0.24
29	Surat	10	0.20	13	0.26	16	0.32	39	0.78
30	Surendranagar	10	0.20	12	0.24	14	0.28	36	0.72
31	Tapi	15	0.30	20	0.40	24	0.48	59	1.18
32	Vadodara	2	0.04	4	0.08	6	0.12	12	0.24
33	Valsad	2	0.04	4	0.08	6	0.12	12	0.24
Gujarat		132	2.64	176	3.52	220	4.40	528	10.56

Table- 4.1.136 Farmer Field Schools of Sorghum Crop Covering Identified Critical Technologies

Sr.No.	District	(Phy - No, Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Ahemdabad	0	0.0	0	0.0	0	0.0	0	0.0
2	Amreli	2	0.4	3	0.6	4	0.8	9	1.8
3	Anand	2	0.4	3	0.6	4	0.8	9	1.8
4	Aravalli	0	0.0	0	0.0	0	0.0	0	0.0
5	Banaskantha	10	2.0	12	2.4	14	2.8	36	7.2
6	Bharuch	1	0.2	12	2.4	15	3.0	28	5.6
7	Bhavnagar	8	1.6	9	1.8	10	2.0	27	5.4
8	Botad	4	0.8	5	1.0	6	1.2	15	3.0
9	Chhota Udaipur	2	0.4	3	0.6	4	0.8	9	1.8
10	Dahod	0	0.0	1	0.2	2	0.4	3	0.6
11	Dang	4	0.8	6	1.2	8	1.6	18	3.6
12	Devbhumi Dwarka	4	0.8	6	1.2	8	1.6	18	3.6
13	Gandhinagar	0	0.0	0	0.0	0	0.0	0	0.0
14	Gir Somnath	2	0.4	3	0.6	4	0.8	9	1.8
15	Jamnagar	1	0.2	2	0.4	3	0.6	6	1.2
16	Junagadh	2	0.4	3	0.6	4	0.8	9	1.8
17	Kheda	0	0.0	0	0.0	0	0.0	0	0.0
18	Kutch	3	0.6	5	1.0	7	1.4	15	3.0
19	Mahisagar	2	0.4	3	0.6	4	0.8	9	1.8
20	Mehsana	0	0.0	0	0.0	0	0.0	0	0.0
21	Morbi	3	0.6	4	0.8	5	1.0	12	2.4
22	Narmada	5	1.0	6	1.2	7	1.4	18	3.6
23	Navsari	2	0.4	2	0.4	2	0.4	6	1.2
24	Panchmahal	0	0.0	0	0.0	0	0.0	0	0.0
25	Patan	2	0.4	3	0.6	4	0.8	9	1.8
26	Porbandar	3	0.6	4	0.8	5	1.0	12	2.4
27	Rajkot	0	0.0	0	0.0	0	0.0	0	0.0

Sr.No.	District	(Phy - No, Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
28	Sabarkantha	2	0.4	3	0.6	4	0.8	9	1.8
29	Surat	10	2.0	12	2.4	14	2.8	36	7.2
30	Surendranagar	5	1.0	7	1.4	10	2.0	22	4.4
31	Tapi	12	2.4	15	3.0	20	4.0	47	9.4
32	Vadodara	2	0.4	4	0.8	6	1.2	12	2.4
33	Valsad	2	0.4	4	0.8	6	1.2	12	2.4
	Gujarat	95	19.00	140	28.00	180	36.00	415	83.00

Table- 4.1.137 Group Formation/Commodity Interest Groups Formation of Sorghum for value addition product

Sr.No.	District	(Phy - No, Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Ahemdabad	3	6.0	5	10.0	8	16.0	16	32.0
2	Amreli	1	2.0	2	4.0	3	6.0	6	12.0
3	Anand	2	4.0	3	6.0	5	10.0	10	20.0
4	Aravalli	1	2.0	2	4.0	3	6.0	6	12.0
5	Banaskantha	1	2.0	2	4.0	3	6.0	6	12.0
6	Bharuch	2	4.0	3	6.0	5	10.0	10	20.0
7	Bhavnagar	2	4.0	3	6.0	5	10.0	10	20.0
8	Botad	1	2.0	2	4.0	3	6.0	6	12.0
9	Chhota Udaipur	1	2.0	2	4.0	3	6.0	6	12.0
10	Dahod	0	0.0	1	2.0	1	2.0	2	4.0
11	Dang	2	4.0	3	6.0	5	10.0	10	20.0
12	Devbhumi Dwarka	1	2.0	2	4.0	3	6.0	6	12.0
13	Gandhinagar	2	4.0	3	6.0	5	10.0	10	20.0
14	Gir Somnath	1	2.0	2	4.0	3	6.0	6	12.0
15	Jamnagar	2	4.0	3	6.0	5	10.0	10	20.0
16	Junagadh	2	4.0	3	6.0	5	10.0	10	20.0

Sr.No.	District	(Phy - No, Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
17	Kheda	1	2.0	2	4.0	3	6.0	6	12.0
18	Kutch	1	2.0	2	4.0	3	6.0	6	12.0
19	Mahisagar	0	0.0	1	2.0	1	2.0	2	4.0
20	Mehsana	1	2.0	2	4.0	3	6.0	6	12.0
21	Morbi	1	2.0	2	4.0	3	6.0	6	12.0
22	Narmada	1	2.0	2	4.0	3	6.0	6	12.0
23	Navsari	1	2.0	2	4.0	3	6.0	6	12.0
24	Panchmahal	0	0.0	1	2.0	1	2.0	2	4.0
25	Patan	2	4.0	3	6.0	5	10.0	10	20.0
26	Porbandar	1	2.0	2	4.0	3	6.0	6	12.0
27	Rajkot	3	6.0	5	10.0	7	14.0	15	30.0
28	Sabarkantha	1	2.0	2	4.0	3	6.0	6	12.0
29	Surat	4	8.0	6	12.0	8	16.0	18	36.0
30	Surendranagar	2	4.0	3	6.0	4	8.0	9	18.0
31	Tapi	2	4.0	3	6.0	4	8.0	9	18.0
32	Vadodara	3	6.0	5	10.0	7	14.0	15	30.0
33	Valsad	2	4.0	3	6.0	4	8.0	9	18.0
Gujarat		50	100.00	87	174.00	130	260.00	267	534.00

Table- 4.1.138 Farm mechanization demonstrations to be conducted in sorghum crop during the plan period [e.g. Sorghum Mechanical harvester] To the Cooperative society

Sr.No	District	Farm mechanization demonstrations (Phy - No, Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Ahemdabad	0	0.0	0	0.0	0	0.0	0	0.0
2	Amreli	0	0.0	1	1.0	2	2.0	3	3.0
3	Anand	0	0.0	1	1.0	2	2.0	3	3.0
4	Aravalli	0	0.0	0	0.0	1	1.0	1	1.0
5	Banaskantha	8	8.0	10	10.0	12	12.0	30	30.0
6	Bharuch	10	10.0	12	12.0	15	15.0	37	37.0
7	Bhavnagar	6	6.0	7	7.0	9	9.0	22	22.0
8	Botad	2	2.0	3	3.0	4	4.0	9	9.0
9	Chhota Udaipur	1	1.0	2	2.0	3	3.0	6	6.0
10	Dahod	0	0.0	0	0.0	1	1.0	1	1.0
11	Dang	2	2.0	4	4.0	6	6.0	12	12.0
12	Devbhumi Dwarka	2	2.0	4	4.0	6	6.0	12	12.0
13	Gandhinagar	0	0.0	0	0.0	0	0.0	0	0.0
14	Gir Somnath	1	1.0	2	2.0	3	3.0	6	6.0
15	Jamnagar	0	0.0	0	0.0	1	1.0	1	1.0
16	Junagadh	1	1.0	2	2.0	2	2.0	5	5.0
17	Kheda	0	0.0	0	0.0	0	0.0	0	0.0
18	Kutch	1	1.0	3	3.0	5	5.0	9	9.0
19	Mahisagar	0	0.0	2	2.0	4	4.0	6	6.0
20	Mehsana	0	0.0	0	0.0	0	0.0	0	0.0
21	Morbi	2	2.0	3	3.0	4	4.0	9	9.0
22	Narmada	5	5.0	6	6.0	7	7.0	18	18.0
23	Navsari	0	0.0	0	0.0	0	0.0	0	0.0
24	Panchmahal	0	0.0	0	0.0	0	0.0	0	0.0
25	Patan	4	4.0	5	5.0	6	6.0	15	15.0

Sr.No	District	Farm mechanization demonstrations (Phy - No, Fin - Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
26	Porbandar	5	5.0	6	6.0	7	7.0	18	18.0
27	Rajkot	0	0.0	0	0.0	0	0.0	0	0.0
28	Sabarkantha	0	0.0	2	2.0	4	4.0	6	6.0
29	Surat	8	8.0	10	10.0	12	12.0	30	30.0
30	Surendranagar	8	8.0	10	10.0	12	12.0	30	30.0
31	Tapi	12	12.0	15	15.0	18	18.0	45	45.0
32	Vadodara	0	0.0	2	2.0	4	4.0	6	6.0
33	Valsad	0	0.0	2	2.0	4	4.0	6	6.0
Gujarat		78	78.00	114	114.00	154	154.00	346	346.00

Table- 4.1.139 Project Outcome and Growth of Sorghum during the Plan Period

(Area in 'oo'ha, P-Production'00;tones and Y- Yield in q/ha)

Sr.No.	District	2017-18			2018-19			2019-20		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahemdabad	0.5	0.6	1120	0.5	0.6	1232	0.5	0.7	1355
2	Amreli	1.0	1.0	950	1.0	1.0	1045	1.0	1.1	1150
3	Anand	3.5	5.4	1555	4.0	6.8	1711	4.5	8.5	1882
4	Aravalli	1.0	1.3	1310	1.0	1.4	1441	1.0	1.6	1585
5	Banaskantha	86.0	104.3	1213	95.0	126.7	1334	104.5	153.3	1467
6	Bharuch	116.0	130.6	1126	127.5	157.9	1239	140.5	191.5	1363
7	Bhavnagar	65.0	101.1	1555	71.5	122.3	1711	79.0	148.7	1882
8	Botad	1.0	1.0	950	1.0	1.0	1045	1.0	1.1	1150
9	Chhota Udaipur	1.5	1.6	1034	2.0	2.3	1137	2.0	2.5	1251
10	Dahod	0.5	0.7	1310	0.5	0.7	1441	0.5	0.8	1585
11	Dang	20.0	31.1	1555	22.0	37.6	1711	24.0	45.2	1882
12	DevbhumiDwarka	1.5	1.2	800	1.5	1.3	880	2.0	1.9	968
13	Gandhinagar	0.5	0.4	844	0.5	0.5	929	0.5	0.5	1022
14	Gir Somnath	2.0	1.6	800	2.0	1.8	880	2.0	1.9	968

Sr.No.	District	2017-18			2018-19			2019-20		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
15	Jamnagar	1.0	0.8	800	1.0	0.9	880	1.0	1.0	968
16	Junagadh	21.0	34.6	1646	23.0	41.6	1811	25.5	50.8	1992
17	Kheda	2.0	3.1	1555	2.0	3.4	1711	2.0	3.8	1882
18	Kutch	0.5	0.7	1310	0.5	0.7	1441	0.5	0.8	1585
19	Mahisagar	0.5	0.8	1555	0.5	0.9	1711	0.5	0.9	1882
20	Mehsana	0.5	0.6	1150	0.5	0.6	1265	0.5	0.7	1392
21	Morbi	35.0	54.4	1555	38.5	65.9	1711	42.5	80.0	1882
22	Narmada	65.0	70.1	1078	71.5	84.8	1186	79.0	103.0	1304
23	Navsari	10.0	13.4	1336	11.0	16.2	1470	12.0	19.4	1617
24	Panchmahal	1.0	1.5	1529	1.0	1.7	1682	1.0	1.8	1850
25	Patan	145.0	225.4	1555	160.0	273.6	1710	176.0	331.1	1881
26	Porbandar	55.0	104.1	1892	60.5	125.9	2082	66.6	152.5	2290
27	Rajkot	0.5	0.5	950	1.0	1.0	1045	1.0	1.1	1150
28	Sabarkantha	3.5	4.6	1310	3.9	5.6	1441	4.0	6.3	1585
29	Surat	130.0	196.5	1512	143.0	237.8	1663	157.0	287.2	1829
30	Surendranagar	151.0	233.7	1548	166.0	282.6	1703	182.5	341.8	1873
31	Tapi	150.0	231.8	1546	165.0	280.5	1700	181.5	339.4	1870
32	Vadodara	1.5	1.6	1083	2.0	2.4	1191	2.5	3.3	1310
33	Valsad	3.5	5.3	1509	4.0	6.6	1660	4.5	8.2	1826
	Total	1077	1565	1454	1185	1895	1599	1303	2292	1759

4.1.5.9 Researchable Issues:

- Development of suitable Rabi sorghum genotypes/varieties/hybrids
- Development of suitable Multicut fodder sorghum genotypes/varieties/hybrids
- Screening of germplasm for grain quality/yield/earliness/dual purpose
- Development genotypes/varieties for pop and ponk (huda) purpose
- Development of suitable technology to enhance production under biotic (shootfly, grainmold and mite) and abiotic (draught, toxicity and water logging) stress condition
- Development of Integrated Nutrient Management and Weed Management for higher yield
- Development of technology for value addition in sorghum

4.1.6. SMALL MILLETS:

4.1.6.1 Background:

Small millets comprising the small seeded cereal crops namely Finger millet, Little millet, Kodo millet, Foxtail millet, Banti and Cheena are growing in hilly area of Gujarat. These small millets are the staple food of the tribals in Gujarat. Among them they grow mostly Nagli (Ragi) and Vari (Little millet).

Finger millet (*Eleusine coracana* Gaertn.) is one of the important small millet crops grown for food grain and fodder, especially in tribal predominant areas. The crop is hardy and well suited to upland farming ecosystems, because of its early maturity and quick growing nature. Finger millet also known as ragi in India is one of the important minor millets occupies highest area under cultivation. It is a staple food crop in many hilly regions of the country. It requires small quantity of water, mature early and well suited for cultivation under scarcity conditions. In Gujarat, it is cultivated over an area of 21,700 Ha with total production of about 23,200 Metric tonnes. Major finger millet growing districts are Dangs and Valsad and also grown in some parts of Navsari, Surat and Panchmahal.

In India among millets, ragi stands third only to sorghum and pearl millet. It is a good source of calcium, very rich in protein, minerals and vitamins and should be considered as essential food for nutritional security. It is commonly known as Nagli in the tribal belt of Gujarat. In Gujarat, it is mainly cultivated as rainfed crop in *kharif* in the less fertile hilly soils of Gujarat.

Little millet (*Panicum miliare* L.) is grown in India under varied agro-ecological situations. It is a hardy crop which can withstand drought better than most of the other crops and also water logging to a certain degree. It is a good source of protein, very rich in carbohydrate, fat, minerals and vitamins and should be considered as essential food for nutritional security. It is locally known as Vari and cultivated in hilly tracts of south Gujarat. The area under this crop is mainly concentrated in the districts of Dangs, Valsad and Navsari. In Gujarat, Little millet is cultivated in an area of 9,400 ha with 8,800 tonnes of production having the productivity of 936 kg/ha. It is normally cultivated in marginal and poor soil under rainfed situation. The tribals consume its grains in place of paddy. In urban areas, grains are used during fast-day after removing the seed coat.

Awareness among consumers for **nutrition** and **medicinal** values of millet crops has led great demand in raw as well as value added products in future.

Vision:

To increase the area and production of small millets particularly Nagli (Ragi) and Vari (Little millet) through latest evolved technology and innovations.

Mission:

To augment the area, production and yield of small millets in the state, the yield gap in rain fed without risking natural resources, further develop breeding as well as new technology development process to meet ensuing climatic changes.

4.1.6.2 Crop/Area Issues:

- (i) Need to evolve new appropriate crop varieties which can give higher production while adjusting to the climate change.
- (ii) To deal with new insect, pest and diseases problems in small millets newly released varieties.
- (iii) Need to study changes in agronomical practices as per farmers requirements.
- (iv) Integrated Nutrient Management including micro nutrients for increasing fertilizer use efficiency.
- (v) Market research for increasing the crop area per season due its very less market price.
- (vi) Value addition of different small millets crops according to its nutritional importance.

Agro climatic Zones & Research Network in Gujarat State.

The entire Small Millet growing area in the state is divided into two zones.

- I. South Gujarat small millet Zone *ie.* Gujarat Agro climatic Zone- I and II
- II. Middle Gujarat small millet Zone *ie.* Gujarat Agro climatic Zone-III

4.1.6.3 Priority for Comprehensive Minor Millet Cultivation:**Table- 4.1.140 Priority for Comprehensive Minor Millet Cultivation**

District wise priority setting for comprehensive Minor Millet cultivation.

Sr. No.	Name of the District	Agricultural crops cultivated	Constraints	Priorities
1.	Dang / Valsad/ Navsari /	Paddy, Ragi, Vari, Maize, Sorghum, Pulses,	<ul style="list-style-type: none"> • Non availability of improved variety and quality seed 	<ul style="list-style-type: none"> • Educating and motivating farmers and adoption through demonstrations and trainings. • Multiplication of quality seeds of improved variety by individual farmers, concern

	Panchmahal / Dahod	Niger, Groundnut		departments and seed certification agency
			<ul style="list-style-type: none"> • Lack of knowledge of improved packages of practices • Planting method and less dose of fertilizers 	<ul style="list-style-type: none"> • Scientific method of raising nursery and transplanting techniques. • Awareness regarding use of fertilizer on increasing crop yields through training, demonstration and field days.
			<ul style="list-style-type: none"> • Lack of knowledge about incidence of blast disease and its control measures. 	<ul style="list-style-type: none"> • Awareness created regarding incidence of disease through training and demonstrations.

4.1.6.4 Area, Production and Productivity:

Table- 4.1.141 District wise Area, Production and Productivity of Minor Millet.

Sr. No.	District	Finger millet (Ragi)			Little millet (Vari)		
		2017-18			2017-18		
		Area (ha)	Yield (T/ha)	Productivity (Kg /ha)	Area (ha)	Yield (T/ha)	Productivity (Kg /ha)
1.	<u>Dang</u>	7962	13090	1450	6535	9360	1046
2.	Navsari	180	120	960	--	--	--
3.	Valsad	6535	9456	1110	--	--	--
4.	Panchmahal /Dahod	60	55	740	--	--	--
	Total	14267	22721	--	6535	9360	--

4.1.6.5 Seed production and seed availability at seed farm / research station

(District wise)

At present the seed replacement ratio (SRR) of small millets is 10- 15 per cent. Thus, the scope of SRR is ambient in future to enhance the productivity of these self pollinated crops like finger millet and little millet in the state especially through seed village concept. The projected seed requirement was calculated based on year 2017-18 and is given in Table.

4.1.6.6 Crops and major varieties / hybrids of the state.

Minor Millet	Varieties
Finger Millet (Ragi)	GN-1, GN-2, GN-3, GN-4, GN-5, GNN-6 and GNN-7
Little millet (Vari)	GV-1, GV-2 and GNV-3
Kodo millet (Kodari)	GAK-1, GAK-2 and GAK-3

4.1.6.7 Planning of Agriculture Inputs in the state for Minor Millet crop during 2017-18.

Sr.	Name of the district Districts	Area under Crop (ha)	Present SRR %
1.	Dang		
	Finger Millet (Ragi)	7962	10
	Little millet (Vari)	6535	15
2.	Navsari		
	Finger Millet (Ragi)	180	10
3.	Valsad		
	Finger Millet (Ragi)	6300	10
4.	Panchmahal / Dahod		
	Kodo millet (Kodra)	60	5
	Total	21037	

**Table- 4.1.142 District wise and season wise fertilizer consumption (2017-18)
projection and projected use of fertilizers (in ton).**

Sr. No	Name of the Districts	Fertilizer consumption in MT						Fertilizer consumption in kg/ha		Fertilizer Consumption ratio (N:P:K)
		N		P		K		kharif	Rabi	
		kharif	Rabi	kharif	Rabi	kharif	Rabi			
1.	<u>Dang</u>	300	100	150	50	50	50	-	-	-
2.	Navsari	-	-	-	-	-	-	-	-	-
3.	Valsad	-	-	-	-	-	-	-	-	-
4.	Panchmahal									
	Total	300	100	150	50	50	50	-	-	-

4.1.6.8 Sustainability Issues and Gap Analysis:

Table- 4.1.143 Sustainability Issues and Gap Analysis of Productivity of Different Minor Millet Crops and Resources

Sr. No	Gap	Factors/ constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
1.	DANG (Finger millet and Little millet)					
i.	Adoption of improved variety	Less awareness	To popularize improved varieties	Educating and Motivating farmers and adoption through demonstrations and trainings.	Year wise per cent increase of improved varieties (number of farmers and area) over base line in the entire district	Productivity growth on sustainable basis.
ii	Non availability of improved variety and quality seed	Non availability of quality seeds of high yielding varieties	Multiplication of quality seed of improved varieties	Individual farmers, concerned dept. and seed certification agency should produce and multiply quality seed	Year wise per cent increase in adoption over base line in the entire district 20% growth in area under improved varieties every year	Increase in yield
iii	Planting methods	Rabbing of seed bed, traditional method of transplanting	Scientific method of raising nursery and	Educating and Motivating farmers and adoption through demonstrations and	Year wise per cent increase in adoption over base line in the entire district	Productivity growth on sustainable basis.

			transplanting techniques	trainings.	10% growth in area every year	
iv	Less dose of fertilizer application	Fear of loss, lack of awareness and finance, less productivity	Awareness regarding use of fertilizer on increase in crop yields	Trainings Demonstration, field days	Year wise per cent increase in adoption over base line in the entire district 10% growth in area every year	Increase in productivity
v	Incidence of Blast disease	Lack of knowledge about disease and control measures	Awareness created regarding incidence of diseases and loss due to it in crop yields	Training & Demonstrations	Year wise per cent reduction over base line in the entire district 10% reduction in infestation every year	Increase in productivity
vi	No proper weed management	Lack of mechanization in weed control, no post emergence weedicide available.	Educating farmers on the use of chemicals for the control of weeds	Training & Demonstrations	Year wise per cent increase in adoption over base line in the entire district 10% area cover every year under weed control	Increase in productivity
vii	Lees marketable value of food grains produce	Lack of knowledge about hi valued nutri-cereals like Nagli and vari as well as lack of	Educating peoples and farmers	Training, Demonstrations & set up of small scale	Year wise per cent increase in area over base	Productivity growth on Sustainable basis.

	under Nagli and vari	awareness about value addition of small millets	about health consumption of small millets	value addition industries	line in the entire district	
2	NAVSARI (Finger millet / Ragi)					
	-	-	-	-	-	-
3	VALSAD (Finger millet / Ragi)					
i	Less use of improved varieties	lack of awareness about improved seed materials	Educating farmers on the use of improved seed for the higher productivity	Training and improved seed demonstration, training regarding improved package of practices	Growth in area under small millets due to improved varieties	Increase in productivity and production
ii	Incidence of Blast disease	Lack of knowledge about disease and control measures	Training & Demonstrations	Trainings, Demonstration, Field day	Blast free condition improve the area under crop	Increase in productivity
iii	Less lose of Fertilizer application	Fear of loss, lack of awareness & finance, less productivity	Awareness regarding use of fertilizer on increase in crop yields	Trainings, Demonstration, Field day	Growth in area under fertilizer use	Increase in productivity

iv	No proper weed management	Lack of mechanization in weed control, no post emergence weedicide available.	Educating farmers on the use of chemicals for the control of weeds	Trainings, Demonstration, Field day	Weed free condition improve the area under crop	Increase in productivity
v	No use of chemical fertilizers	lack of awareness, Non availability in required quantity	Educating farmers on the use of organic manure for the soil health	Training and method demonstration, training regarding compost preparation.	Growth in area under organic manure	Increase in productivity
vi	Time of transplanting and methods of sowing	Lack of awareness	Educating farmers	Training and method demonstration	Increase in area and no. of plants per ha.	Increase in productivity
vii	Lees marketable value of food grains produce under Nagli and vari	Lack of knowledge about hi valued nutri-cereals like Nagli and vari as well as lack of awareness about value addition of small millets.	Educating peoples and farmers about health consumption of small millets	Training, Demonstrations & set up of small scale value addition industries	Year wise per cent increase in area over base line in the entire district	Productivity growth on sustainable basis.
4.	Panchmahal / Dahod (Kodo millet / Kodri)					
i.	Lees marketable value of food grains produce	Lack of knowledge about hi valued nutri-cereals like Nagli and vari as well as lack of	Educating peoples and farmers	Training, Demonstrations & set up of small scale value addition industries	Year wise per cent increase in area over base line in the entire district	Productivity growth on sustainable basis.

	under Nagli and vari	awareness about value addition of small millets.	about health consumption of small millets			
ii	Less use of improved varieties	lack of awareness about improved seed materials	Educating farmers on the use of improved seed for the higher productivity	Training and improved seed demonstration, training regarding improved package of practices	Growth in area under small millets due to improved varieties	Increase in productivity and production
iii	No proper weed management	Lack of mechanization in weed control, no post emergence weedicide available.	Educating farmers on the use of chemicals for the control of weeds	Trainings, Demonstration, Field day	Weed free condition improve the area under crop	Increase in productivity
iv	No use of chemical fertilizers	lack of awareness, Non availability in required quantity	Educating farmers on the use of organic manure for the soil health	Training and method demonstration, training regarding compost preparation.	Growth in area under organic manure	Increase in productivity

Table- 4.1.144 Recommended Interventions of Minor Millet for the State.

DANG/ NAVSARI/ VALSAD/ PANCHMAHAL / DAHOD

Activity/ Crop/ Commodity	Activity Output Matrix			
	Issues	Mode of Action	Collaborator/ Target	Cost
Small Millets (Nagli, Vari, Kodra)	<ol style="list-style-type: none"> 1. Quality Seed supply 2. Less use of Improved varieties 3. Seed Treatment 4. Local method of transplanting 5. Management of Disease 6. Management of fertilizers 7. Management of weeds 8. Value addition of small millets 	<ol style="list-style-type: none"> 1. Participatory selection of improved variety at farmers field 2. Motivating the farmers to use as well as produce the seed of improved variety. 3. Seed production at farmers field with farmers participatory approach. 4. Demonstrated the recommended improved technology at farmers field 5. Demonstration of new varieties, timely method of planting and weed as well as blast disease management. 6. Motivating and set up of small industries among the farmers/ NGO/ Foundation and other agencies for value 	<p>Farmers, KVK, DAO as well as Hill millet research station DAO, DDA, Seed agency, KVK, NGO & foundation / Organisations DAO, DDA, Seed agency, KVK, NGO & foundation / Organisations DAO, DDA, Seed agency, KVK, NGO & foundation / Organisations DAO, DDA, Seed agency, KVK, NGO & foundation / Organisations DAO, DDA, Seed agency, KVK, NGO & foundation / Organisations</p>	<p>Demonstrations, trainings, monitoring survey proposed.</p>

4.1.6.9 Detailed Action plan with cost:

Table- 4.1.145 District-wise Training Proposed for Capacity Building of Agricultural Staff for Minor Millet

(Phy - No, Fin - Rs. in Lakh)

District	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy	Fin. (lacks)
Dangs	500	4.5	500	4.5	500	4.5	1500	13.5
Valsad	500	4.5	500	4.5	500	4.5	1500	13.5
Navsari	500	4.5	500	4.5	500	4.5	1500	13.5
Total	1500	13.5	1500	13.5	1500	13.5	4500	40.5

Cost Norms:Rs.900/day /person

Table- 4.1.146 Training Proposed for Capacity Building of Farmers for Minor Millet (District Wise) on different technologies

(Phy - No, Fin - Rs. in Lakh)

Name of technology to be transferred	Year wise Number of farmers to be trained (Phy - No, Fin - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
DANG								
INM	550	3.3	550	3.3	550	3.3	1650	9.9
NRM	500	3	500	3	500	3	1500	9
IPM	550	3.3	550	3.3	550	3.3	1650	9.9
RCTs	550	3.3	550	3.3	550	3.3	1650	9.9

Name of technology to be transferred	Year wise Number of farmers to be trained (Phy - No, Fin - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Water management	500	3	500	3	500	3	1500	9
Post Harvest Management	350	2.1	350	2.1	350	2.1	1050	6.3
Women empowerment	350	2.1	350	2.1	350	2.1	1050	6.3
Credit and marketing	500	3	500	3	500	3	1500	9
Seed Production	1500	9	1500	9	1500	9	4500	27
Farm waste and crop residue	250	1.5	250	1.5	250	1.5	750	4.5
Vermi- composting	100	0.6	100	0.6	100	0.6	300	1.8
Farm Mechanization	500	3	500	3	500	3	1500	9
Renewable energy	100	0.6	100	0.6	100	0.6	300	1.8
Total	5300	31.8	5300	31.8	5300	31.8	15900	95.4
	NAVSARI							
INM	1050	6.3	1050	6.3	1050	6.3	3150	18.9
NRM	700	4.2	700	4.2	700	4.2	2100	12.6
IPM	1050	6.3	1050	6.3	1050	6.3	3150	18.9
RCTs	1050	6.3	1050	6.3	1050	6.3	3150	18.9
Water management	700	4.2	700	4.2	700	4.2	2100	12.6
Post Harvest Management	350	2.1	350	2.1	350	2.1	1050	6.3
Women empowerment	350	2.1	350	2.1	350	2.1	1050	6.3
Credit & marketing	700	4.2	700	4.2	700	4.2	2100	12.6
Seed Production	750	4.5	750	4.5	750	4.5	2250	13.5
Farm waste management	250	1.5	250	1.5	250	1.5	750	4.5
Vermi-composting	100	0.6	100	0.6	100	0.6	300	1.8
Farm Mechanization	700	4.2	700	4.2	700	4.2	2100	12.6
Renewable energy	100	0.6	100	0.6	100	0.6	300	1.8
Total	7800	46.8	7800	46.8	7800	46.8	23400	140.4
	VALSAD							
INM	500	3	500	3	500	3	1500	9

Name of technology to be transferred	Year wise Number of farmers to be trained (Phy - No, Fin - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
NRM	500	3	500	3	500	3	1500	9
IPM	1000	6	1000	6	1000	6	3000	18
RCTs	1000	6	1000	6	1000	6	3000	18
Water management	500	3	500	3	500	3	1500	9
Post Harvest Management	500	3	500	3	500	3	1500	9
Women empowerment	500	3	500	3	500	3	1500	9
Credit & marketing	500	3	500	3	500	3	1500	9
Seed Production	750	4.5	750	4.5	750	4.5	2250	13.5
Farm waste management	250	1.5	250	1.5	250	1.5	750	4.5
Vermi-composting	100	0.6	100	0.6	100	0.6	300	1.8
Farm Mechanization	700	4.2	700	4.2	700	4.2	2100	12.6
Renewable energy	100	0.6	100	0.6	100	0.6	300	1.8
Total	7150	42.9	7150	42.9	7150	42.9	21450	128.7

Table- 4.1.147 Varietal Demonstration for Minor Millet (Phy - No, Fin - Rs. in Lakh)

(Physical and financial - 2017-18 to 2019-20) (Average 0.4 ha. area per Demonstration)

District	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Dang	1500	2.0	1500	2.0	1500	2.0	4500	6.0
Valsad	750	1.0	750	1.0	750	1.0	2250	3.0
Navsari	750	1.0	750	1.0	750	1.0	2250	3.0
Total	3000	4.0	3000	4.0	3000	4.0	9000	12.0

Note: Financial includes only seed per acre cost + seed treatment cost, only)

Table- 4.1.148 INM Demonstration for Minor Millet (Physical and finance - 2017-18 to 2019-20) (Phy - No, Fin - Rs. in Lakh)

Sr No	Name of the Districts	Year wise Varietal Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	<u>Dang</u>	-							
	Ragi- Vari	550	2.20	550	2.20	550	2.20	1650	6.6
2	Navsari								
	Ragi	1050	4.20	1050	4.20	1050	4.20	3150	12.6
3	Valsad								
	Ragi	500	2.0	500	2.0	500	2.0	1500	6

Table- 4.1.149 IPM Demonstration for Minor Millet (Physical and finance- 2017-18 to 2019-20)

Crop	Year wise IPM Demonstrations								
	2017-18		2018-19		2019-20		Total		
	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	Phv.	Fin.	
Dang									
Ragi	550	2.20	550	2.20	550	2.20	1650	6.6	
Navsari									
	1050	4.20	1050	4.20	1050	4.20	3150	12.6	
VALSAD									
	1000	4.00	1000	4.00	1000	4.00	3000	12	
Total	2600	10.4	2600	10.4	2600	10.4	7800	31.2	

Note: Average 0.4 ha. area per demonstration

Table- 4.1.150 Seed Treatment Demonstration for Minor Millet (Phy - No, Fin - Rs. in Lakh)

District	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Dang	1500	2.0	1500	2.0	1500	2.0	4500	6.0
Valsad	750	1.0	750	1.0	750	1.0	2250	3.0
Navsari	750	1.0	750	1.0	750	1.0	2250	3.0
Total	3000	4.0	3000	4.0	3000	4.0	9000	12.0

Table- 4.1.151 Farmers Field School Covering Identified Critical Technologies of Minor Millet (Phy - No, Fin - Rs. in Lakh)

District	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Dangs	6	1.2	6	1.2	6	1.2	18	3.6
Valsad	6	1.2	6	1.2	6	1.2	18	3.6
Navsari	6	1.2	6	1.2	6	1.2	18	3.6
Total	18	3.6	18	3.6	18	3.6	54	10.8

Table- 4.1.152 Group formation/ commodity interest group formation for specific activities of Minor Millet (Phy - No, Fin - Rs. in Lakh)

District	Year wise Group formation							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Seed Production								
Dangs	20	4.0	20	4.0	20	4.0	100	20.0
Valsad	20	4.0	20	4.0	20	4.0	100	20.0
Navsari	20	4.0	20	4.0	20	4.0	100	20.0
Organic Farming								
Dangs	5	1.0	5	1.0	5	1.0	25	5.0
Valsad	2	0.4	2	0.4	2	0.4	10	2.0
Navsari	2	0.4	2	0.4	2	0.4	10	2.0
Value addition								
Dangs	5	1.0	5	1.0	5	1.0	25	5.0
Valsad	5	1.0	5	1.0	5	1.0	25	5.0
Navsari	5	1.0	5	1.0	5	1.0	25	5.0
Total	84	16.8	84	16.8	84	16.8	420	84.0

Cost norms- Rs. 0.20 lacs/ group (for capacity building, input assistance, marketing and for group specific activities)

4.6.1.10 Special Project:

Table- 4.1.153 Physical and financial programme proposed for infrastructure development of under value addition chain of Small millets.

SN	Activity /Projects	1st year (2017-18)		2nd year (2018-19)		3rd year (2019-20)		Total (Rs. in Lakh)	
		Phy. (units)	Fin	Phy. (units)	Fin	Phy. (units)	Fin	Phy	Fin
1	Establishment of value addition chain in the Dangs for Nagli / finger millet	5	100	5	100	5	100	15	300
2	Establishment of value addition chain in the Dangs for vari / moreyo /Little Millet	5	200	5	200	5	200	15	600
	Total	10	300	10	300	10	300	30	900

Table- 4.1.154 Projected Outcome and Growth Rate during the Plan Period Area, Production and Productivity trend of Small Millet Crops

in the state.

Note: Production- Pd and productivity - Pr (Area - ha, Production -Ton, Productivity - Kg/

Sr.	Small Millets	2017-18			2018-19 (Projected)			2019-20 (Projected)		
		A	Pd	Pr	A	Pd	Pr	A	Pd	Pr
1.	Dang									
	Ragi	7962	13090	1450	8350	14500	1550	9500	15500	1650
	Vari	6535	9360	1046	7800	10500	1150	8600	11500	1250
2.	Navsari									
	Ragi	180	120	960	210	140	240	1020	160	1100
3.	Valsad									
	Ragi	6535	9456	1110	7500	10500	1250	8500	12500	1350
4.	Panchmahal									
	Kodo millet	60	55	740	75	65	880	85	75	950

4.2 OILSEED AND PULSE CROPS:

Vision:

To increase the productivity of the oilseed crops (groundnut, castor, mustard, sesame, soyabean, niger) through the promotion of appropriate agro-technological interventions and thereby increasing farmers' income.

Mission:

To augment the production and quality of oilseed crops (groundnut, castor, mustard, sesame, soyabean, niger), narrow the yield gap in irrigated and rainfed without mining natural resources and to accelerate technology development process to meet ensuing climatic changes as also the needs/expectation of all stakeholders.

Crop/Area Issues:

- Lack of irrigation facilities and high pumping cost
- Seed supply: Use of inferior quality seeds, seed replacement rate is very low
- The acute paucity of labour during peak seasons
- The escalating cost of input resources and poor resource use efficiency
- Climate change impact
- Sustainability and reduction in the cost of crop cultivation
- Weed management
- Macro/ micronutrient management
- Development of saline resistant, drought resistant and thermoresilient genotype
- Standardizing the design of storage structures and improving the storage conditions
- Fluctuating market prices

Priorities for crop cultivation:

- Exploitation of useful bio-agents and microorganisms for expanding swathe of natural base
- Exploitation of smart irrigation techniques and frugal tillage for judicious management of water
- Varieties with enhanced yield, WUE and NUE
- Development of extra early varieties with high yield to fit in late sowing conditions
- Contract / corporate farming for versatile value chain of quality wheat from field to fork (shift to agril. marketing)
- Product specific varieties
- Innovate the progressive farmers for seed production at village level
- Standardizing the design of drip irrigation and irrigation scheduling based on soil, water, atmosphere continuum

Ongoing Special Projects/ Programs:

The following special projects are ongoing in the State:

- a) Agriculture Technology Management Agency (ATMA) programme is being implemented since 2009-10 to strengthen the present extension system
- b) Small scheme viz. frontline demonstration other than oilseed & pulses is being implemented through ICAR in Krishi Vigyan Kendra
- c) NFSM – National Food Security Mission is the ongoing programmes in the state.
- d) RKVY – (Rashtriya Krishi Vikash Yojana)
- e) Drip Irrigation by GGRC

4.2.1 Groundnut:

4.2.1.1 Background:

Gujarat plays a prominent role in oilseed production in India. Oilseeds are important next only to food grains in terms of area, production and value in the state. The light and sandy-loam soils are most suitable for cultivation of this crop but it can be profitably cultivated on a variety of soils including light and heavy textured soils. Compared to several other crops, groundnut is able to survive in much less favourable agro-climatic conditions and needs 105-120 days to mature. It requires warm growing season with well-distributed rainfall in the range of 500-1000 mm. In India, groundnut is cultivated mainly in *kharif* season (rain-fed conditions) with low inputs and if available, with few protective irrigations. In *kharif*, the pressure of diseases, insect pests and weeds are high. In India, the two years (2014-15 and 2015-16) averages of area and production of groundnut indicated that 91.5% of the cropped area was distributed across six states, which together contributed 91.4% of total production.

4.2.1.2 Crop/Area Issues:

Groundnut Cultivation:

- High seed rate, high seed cost and low seed multiplication ratio create problems in timely availability of good quality seeds
- Major groundnut area is under *kharif* rain-fed cultivation
- Erratic and unequal distribution of rainfall and frequent draught situations in several pockets

Priority for Comprehensive Groundnut Cultivation:

- Genetic enhancement for yield and quality traits as well as stress tolerance
- Yield stability and narrowing gap in yield level between different districts and rain-fed and irrigated areas
- Micro-irrigation/ water harvesting structure in water deficient areas
- Promotion of farming for organic groundnut cultivation and establishing organic input supply chain and collection center
- Modernization and up-gradation of existing processing/shelling units along with establishing modern quality testing facilities
- Crop residue management for improvement of soil organic carbon/soil health
- Resource-use efficiency in rain-fed and irrigated conditions
- Production of aflatoxin free groundnut for domestic and export purposes
- Product diversification, bio-fortification and value addition and economic use of by-products
- Use of biodegradable polythene mulch for economic use of irrigation water, reduction in disease/weed pressures and enhancing productivity

4.2.1.3 Status of Area, Production and Productivity:

District-wise area under groundnut crop is given in Table 4.2.1 to 4.2.3. The average data in respect of area, production and productivity of 2014-15 to 2015-16 for groundnut is presented in Table 4.2.3.

The groundnut is being more or less, cultivated in almost all the districts of Gujarat. The two year (2014-15 and 2015-16) averages of the area, production and productivity indicated that the crop was grown in an area of 13.98 lakh ha with 23.41 lakh tonnes production and a productivity of 1860 kg/ha. The major groundnut growing districts include Junagadh, Gir Somnath, Dev. Dwarka, Jamnagar, Rajkot, Amreli, Bhavnagar, Kutch, Porbandar and Banaskantha. These ten districts altogether account for about 92.88 % of total area and 91.61 % of the production of groundnut in Gujarat.

Table 4.2.1: Present status of the area, production and productivity of groundnut of the state during 2014-15

Sr. No.	Name of the District	Kharif			Summer			Total		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	0.74	1.50	2028	0.00	0.00	0	0.74	1.50	2028
2	Amreli	693.76	866.58	1249	5.93	8.24	1390	699.69	874.82	1250
3	Anand	0.00	0.00	0	0.31	0.57	1840	0.31	0.57	1840
4	Arvalli	161.00	302.82	1881	28.00	60.39	2157	189.00	363.22	1922
5	Banaskantha	534.86	980.34	1833	65.02	108.36	1667	599.88	1088.70	1815
6	Bharuch	1.25	2.54	2028	4.05	8.40	2074	5.30	10.93	2063
7	Bhavnagar	637.14	1184.32	1859	48.50	83.46	1721	685.64	1267.78	1849
8	Botad	1.08	3.12	2886	0.03	0.06	1840	1.11	3.17	2858
9	Chhotaudepur	4.30	8.72	2028	21.85	35.67	1633	26.15	44.39	1698
10	Dahod	4.39	8.90	2028	9.59	17.64	1840	13.98	26.55	1899
11	Dang	27.24	55.24	2028	1.14	1.14	1003	28.38	56.39	1987
12	Dev. Dwarka	1555.35	2730.57	1756	1.15	2.32	2021	1556.50	2732.90	1756
13	Gandhinagar	32.39	119.23	3681	1.68	3.09	1840	34.07	122.32	3590
14	Gir Somnath	893.42	2667.39	2986	32.80	62.06	1892	926.22	2729.46	2947
15	Jamnagar	1395.25	3086.15	2212	38.62	72.62	1880	1433.87	3158.77	2203
16	Junagadh	2246.94	7018.09	3123	12.90	22.67	1758	2259.84	7040.76	3116
17	Kachchh	261.01	580.46	2224	68.00	142.01	2088	329.01	722.47	2196
18	Kheda	3.25	6.59	2028	3.53	6.49	1840	6.78	13.09	1930
19	Mahisagar	0.77	1.56	2028	15.63	24.94	1596	16.40	26.50	1616
20	Mahesana	77.82	130.23	1674	5.89	10.84	1840	83.71	141.07	1685
21	Morbi	916.84	671.40	732	0.25	0.46	1840	917.09	671.86	733
22	Narmada	0.84	1.70	2028	5.00	8.42	1685	5.84	10.13	1734
23	Navsari	0.14	0.28	2028	1.01	1.86	1840	1.15	2.14	1863

Sr. No.	Name of the District	Kharif			Summer			Total		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
24	Panchmahal	0.54	1.10	2028	7.70	14.05	1825	8.24	15.14	1838
25	Patan	0.45	0.91	2028	0.00	0.00	0	0.45	0.91	2028
26	Porbandar	700.95	993.46	1417	0.05	0.09	1840	701.00	993.55	1417
27	Rajkot	2707.85	2615.78	966	10.90	24.77	2272	2718.75	2640.55	971
28	Sabarkantha	367.35	1335.17	3635	52.35	95.08	1816	419.70	1430.25	3408
29	Surat	4.72	5.76	1219	11.95	17.91	1499	16.67	23.67	1420
30	Surendranagar	66.45	140.40	2113	2.55	4.69	1840	69.00	145.09	2103
31	Tapi	19.68	33.49	1702	56.08	105.50	1881	75.76	138.99	1835
32	Vadodara	0.00	0.00	0	1.18	1.87	1585	1.18	1.87	1585
33	Valsad	2.99	6.06	2028	0.11	0.20	1840	3.10	6.27	2021
	Total	13320.76	25559.88	1919	513.75	945.89	1841	13834.51	26505.77	1916

Source: Directorate of Agriculture, Gandhinagar

Table 4.2.2: Present status of area, production and productivity of groundnut of the state during 2015-16

Sr. No.	Name of the District	Kharif			Summer			Total		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	1.31	1.88	1435	0.00	0.00	0	1.31	1.88	1435
2	Amreli	1011.09	2195.48	2171	3.96	2.70	681	1015.05	2198.18	2166
3	Anand	0.02	0.03	1435	2.68	4.46	1665	2.70	4.49	1663
4	Arvalli	235.70	491.22	2084	27.70	44.69	1613	263.40	535.91	2035
5	Banaskantha	470.16	863.17	1836	136.45	266.13	1950	606.61	1129.30	1862
6	Bharuch	0.00	0.00	0	3.85	7.04	1829	3.85	7.04	1829
7	Bhavnagar	694.24	1326.62	1911	122.84	121.27	987	817.08	1447.89	1772
8	Botad	0.80	1.49	1864	0.00	0.00	0	0.80	1.49	1864

Sr. No.	Name of the District	Kharif			Summer			Total		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
9	Chhotaudepur	3.73	5.35	1435	11.00	18.09	1645	14.73	23.44	1592
10	Dahod	8.33	11.96	1435	5.01	8.34	1665	13.34	20.30	1522
11	Dang	18.16	26.07	1435	0.37	0.37	999	18.53	26.43	1427
12	Dev. Dwarka	1599.00	368.73	231	0.00	0.00	0	1599.00	368.73	231
13	Gandhinagar	26.67	126.34	4737	2.38	3.96	1665	29.05	130.30	4485
14	Gir Somnath	916.21	2441.06	2664	3.40	5.62	1652	919.61	2446.68	2661
15	Jamnagar	1296.03	2048.63	1581	0.85	1.92	2255	1296.88	2050.55	1581
16	Junagadh	2250.24	1694.88	753	1.05	2.18	2080	2251.29	1697.06	754
17	Kachchh	233.35	575.37	2466	76.99	170.70	2217	310.34	746.07	2404
18	Kheda	4.61	6.62	1435	6.12	10.19	1665	10.73	16.81	1566
19	Mahisagar	0.97	1.39	1435	6.70	9.06	1352	7.67	10.45	1363
20	Mahesana	87.11	220.89	2536	34.45	57.36	1665	121.56	278.25	2289
21	Morbi	870.12	1103.05	1268	3.60	5.99	1665	873.72	1109.04	1269
22	Narmada	1.15	1.65	1435	2.39	3.39	1417	3.54	5.04	1423
23	Navsari	0.24	0.34	1435	0.23	0.38	1665	0.47	0.73	1548
24	Panchmahal	0.49	0.70	1435	4.20	7.77	1851	4.69	8.48	1808
25	Patan	0.35	0.50	1435	0.00	0.00	0	0.35	0.50	1435
26	Porbandar	684.80	92.17	135	0.00	0.00	0	684.80	92.17	135
27	Rajkot	2728.62	4648.48	1704	2.90	5.48	1891	2731.52	4653.96	1704
28	Sabarkantha	313.10	840.92	2686	64.60	113.49	1757	377.70	954.41	2527
29	Surat	5.70	9.96	1747	4.62	7.18	1553	10.32	17.13	1660
30	Surendranagar	86.90	232.26	2673	1.00	2.80	2796	87.90	235.05	2674
31	Tapi	5.82	13.92	2391	44.50	74.59	1676	50.32	88.50	1759
32	Vadodara	0.00	0.00	0	0.37	0.62	1665	0.37	0.62	1665

Sr. No.	Name of the District	Kharif			Summer			Total		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
33	Valsad	3.13	4.49	1435	0.00	0.00	0	3.13	4.49	1435
	Total	13558.15	19355.64	1428	574.21	955.76	1664	14132.36	20311.40	1437

Source: Directorate of Agriculture, Gandhinagar

Table 4.2.3: Present status of area ('00 ha), production (00 MT') and productivity (kg/ha) of Groundnut of the state during 2014- 15 and 2015-16

NO	DISTRICT	2014-15			2015-16			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	0.74	1.50	2028	1.31	1.88	1435	1.03	1.69	1649
2	Amreli	699.69	874.82	1250	1015.05	2198.18	2166	857.37	1536.50	1792
3	Anand	0.31	0.57	1840	2.70	4.49	1663	1.51	2.53	1681
4	Arvalli	189.00	363.22	1922	263.40	535.91	2035	226.20	449.56	1987
5	Banaskantha	599.88	1088.70	1815	606.61	1129.30	1862	603.25	1109.00	1838
6	Bharuch	5.30	10.93	2063	3.85	7.04	1829	4.58	8.99	1965
7	Bhavnagar	685.64	1267.78	1849	817.08	1447.89	1772	751.36	1357.83	1807
8	Botad	1.11	3.17	2858	0.80	1.49	1864	0.96	2.33	2442
9	Chhotaudepur	26.15	44.39	1698	14.73	23.44	1592	20.44	33.92	1659
10	Dahod	13.98	26.55	1899	13.34	20.30	1522	13.66	23.42	1715
11	Dang	28.38	56.39	1987	18.53	26.43	1427	23.46	41.41	1766
12	Dev. Dwarka	1556.50	2732.90	1756	1599.00	368.73	231	1577.75	1550.81	983
13	Gandhinagar	34.07	122.32	3590	29.05	130.30	4485	31.56	126.31	4002
14	Gir Somnath	926.22	2729.46	2947	919.61	2446.68	2661	922.92	2588.07	2804
15	Jamnagar	1433.87	3158.77	2203	1296.88	2050.55	1581	1365.38	2604.66	1908
16	Junagadh	2259.84	7040.76	3116	2251.29	1697.06	754	2255.57	4368.91	1937
17	Kachchh	329.01	722.47	2196	310.34	746.07	2404	319.68	734.27	2297
18	Kheda	6.78	13.09	1930	10.73	16.81	1566	8.76	14.95	1707
19	Mahisagar	16.40	26.50	1616	7.67	10.45	1363	12.04	18.48	1535
20	Mahesana	83.71	141.07	1685	121.56	278.25	2289	102.64	209.66	2043

NO	DISTRICT	2014-15			2015-16			AVERAGE		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
21	Morbi	917.09	671.86	733	873.72	1109.04	1269	895.41	890.45	994
22	Narmada	5.84	10.13	1734	3.54	5.04	1423	4.69	7.58	1617
23	Navsari	1.15	2.14	1863	0.47	0.73	1548	0.81	1.43	1771
24	Panchmahal	8.24	15.14	1838	4.69	8.48	1808	6.47	11.81	1827
25	Patan	0.45	0.91	2028	0.35	0.50	1435	0.40	0.71	1769
26	Porbandar	701.00	993.55	1417	684.80	92.17	135	692.90	542.86	783
27	Rajkot	2718.75	2640.55	971	2731.52	4653.96	1704	2725.14	3647.26	1338
28	Sabarkantha	419.70	1430.25	3408	377.70	954.41	2527	398.70	1192.33	2991
29	Surat	16.67	23.67	1420	10.32	17.13	1660	13.50	20.40	1512
30	Surendranagar	69.00	145.09	2103	87.90	235.05	2674	78.45	190.07	2423
31	Tapi	75.76	138.99	1835	50.32	88.50	1759	63.04	113.75	1804
32	Vadodara	1.18	1.87	1585	0.37	0.62	1665	0.78	1.24	1604
33	Valsad	3.10	6.27	2021	3.13	4.49	1435	3.12	5.38	1727
Total		13834.51	26505.77	1916	14132.36	20311.40	1437	13983.44	23408.58	1674

4.2.1.4 Major Groundnut Varieties in the State

In *kharif* season, groundnut is dominant crop having about 65 percent area. The varieties grown in the state are given in Table 4.2.4

Table- 4.2.4 Groundnut Varieties Recommended for the State

Groundnut	Varieties
Kharif	Bunch: GG 2, GG 5, GG 7, GJG 9, TG 26, TG 37A
	Semi-spreading: GG 20, GJG 22
	Spreading : GAUG 10, GG 11, GG 12, GG 13, GJG 17, GJG HPS 1
Summer	Bunch : GG 2, GG 4, GG 6, TPG 41, TG 37A, GJG 31

4.2.1.5 Input Management:

The groundnut is grown mainly as a rain-fed crop during *kharif* season. Hence, the quantity and distribution of rainfall in the season are very important. Depending upon the irrigation facilities, the groundnut is also grown during the summer season. The government agencies assure the supply of quality seeds during each season but the demand for quality seed always remains more than its supply especially through Government agencies. The private sector should be welcomed in this area to ensure timely availability of quality seeds and increased seed replacement rate. The seed replacement rate is very low as 15-18% in groundnut crop might be attained up to the desired level of 40 %. The availability of good quality seed and its enhanced replacement can be ensured by involving farmers in seed production process on a large scale with active help from the public and the private sector. Special projects for production of quality seed of groundnut are required in the plan under seed village programme in the state. The major inputs used in groundnut crop are seed, fertilizer and pesticide.

4.2.1.5.1 Seed:

The area under groundnut is about 14 % of the total cultivable area. At present, the seed replacement ratio (SRR) of groundnut is 15-18 %. Thus, the scope of SRR in future exists to enhance the productivity of groundnut in the state, especially through seed village concept.

**Table- 4.2.5 Planning of Agriculture Inputs in the state – groundnut crop Seed
(2016-17 to 2019-20)**

S N	Groundnut Seed Quantity requirement and SRR							
	District	Area ('00 ha)	See d rate kg/h a	Total Seed quantit y tons	Seed quantity Required (tons)/SRR			
					2016-17 (15%)	2017-18 (16%)	2018-19 (17%)	2019-20 (18%)
1	Ahmedabad	1.31	120	15.72	24	25	27	28
2	Amreli	1015.0	120	12180	18271	19489	20707	21925
3	Anand	2.7	120	32.4	49	52	55	58
4	Arvalli	263.4	120	3160.8	4741	5057	5373	5689
5	Banaskantha	606.61	120	7279.3	10919	11647	12375	13103
6	Bharuch	3.85	120	46.2	69	74	79	83
7	Bhavnagar	817.08	120	9804.9	14707	15688	16668	17649
8	Botad	0.8	120	9.6	14	15	16	17
9	Chhotaudepur	14.73	120	176.76	265	283	300	318
10	Dahod	13.34	120	160.08	240	256	272	288
11	Dang	18.53	120	222.36	334	356	378	400
12	Dev Dwarka	1599	120	19188	28782	30701	32620	34538
13	Gandhinagar	29.05	120	348.6	523	558	593	627
14	Gir Somnath	919.61	120	11035.3	16553	17657	18760	19864
15	Jamnagar	1296.8	120	15562.5	23344	24900	26456	28013
16	Junagadh	2251.2	120	27015.4	40523	43225	45926	48628
17	Kachchh	310.34	120	3724.0	5586	5959	6331	6703
18	Kheda	10.73	120	128.76	193	206	219	232
19	Mahisagar	7.67	120	92.04	138	147	156	166
20	Mahesana	121.56	120	1458.7	2188	2334	2480	2626
21	Morbi	873.72	120	10484.6	15727	16775	17824	18872
22	Narmada	3.54	120	42.48	64	68	72	76
23	Navsari	0.47	120	5.64	8	9	10	10
24	Panchmahal	4.69	120	56.28	84	90	96	101
25	Patan	0.35	120	4.2	6	7	7	8
26	Porbandar	684.8	120	8217.6	12326	13148	13970	14792
27	Rajkot	2731.5	120	32778.2	49167	52445	55723	59001
28	Sabarkantha	377.7	120	4532.4	6799	7252	7705	8158
29	Surat	10.32	120	123.84	186	198	211	223
30	Surendranag	87.9	120	1054.8	1582	1688	1793	1899
31	Tapi	50.32	120	603.84	906	966	1027	1087
32	Vadodara	0.37	120	4.44	7	7	8	8
33	Valsad	3.13	120	37.56	56	60	64	68
TOTAL		14132.36		169588.3	254381	271342	288301	305258

Source: Directorate of Agriculture, Gandhinagar

4.2.1.5.2 Fertilizer:

The farmers are well aware but not educated enough about the balanced use of fertilizer application. They are concentrating mainly on the application of nitrogenous and phosphate fertilizers, whereas the deficiency of micro-nutrients (Iron and Zinc) is also affecting the pod yield and quality of crops in most parts of the state. Farmers need awareness regarding usage of micronutrients for enhanced productivity with quality without affecting soil health. Location-specific integrated nutrient management, bio-fertilizers, FYM and vermicomposting, farm residues management *etc.* are required to be popularized amongst the farmers for wider adoption under the plan. District-wise fertilizer requirements per year in groundnut crop are given in Table 4.2.6 and Table 4.2.7 as per the recommended dose of fertilizers.

Table 4.2.6: District wise NPK consumption and ratio in groundnut crop in**2015-16 (In MT)**

No.	District	N	P	K	Total NPK	N:P Ratio
1	Ahmedabad	1.31	2	3	5	1:1.67:2.67
2	Amreli	1015.05	1269	2538	4060	1:2.0:3.20
3	Anand	2.7	3	7	11	1:2.09:3.27
4	Arvalli	263.4	329	659	1054	1:2.06:3.8
5	Banaskantha	606.61	758	1517	2426	1:2.0:3.2
6	Bharuch	3.85	5	10	15	1:2.0:3.20
7	Bhavnagar	817.08	1021	2043	3268	1:2.0:3.3
8	Botad	0.8	1	2	3	1:1.1:1
9	Chhotaudepur	14.73	18	37	59	1:2.4:3.6
10	Dahod	13.34	17	33	53	1:1.94:3.11
11	Dang	18.53	23	46	74	1:1.7:2.2
12	Dev. Dwarka	1599	1999	3998	6396	1:2.9:4.1
13	Gandhinagar	29.05	36	73	116	1:1.9:3.16
14	Gir Somnath	919.61	1150	2299	3678	1:2.9:3.87
15	Jamnagar	1296.88	1621	3242	5188	1:2.0:3.20
16	Junagadh	2251.29	2814	5628	9005	1:2.0:3.20
17	Kachchh	310.34	388	776	1241	1:2.0:3.2
18	Kheda	10.73	13	27	43	1:2.0:3.14
19	Mahisagar	7.67	10	19	31	1:2:3.1
20	Mahesana	121.56	152	304	486	1:2.0:3.2
21	Morbi	873.72	1092	2184	3495	1:2.1:3
22	Narmada	3.54	4	9	14	1:1.98:3.17
23	Navsari	0.47	1	1	2	1:1.2:1.9
24	Panchmahal	4.69	6	12	19	1:1.99:3.18
25	Patan	0.35	0	1	1	1:1.1:1.8
26	Porbandar	684.8	856	1712	2739	1:2.0:3.20
27	Rajkot	2731.52	3414	6829	10926	1:2.0:3.20
28	Sabarkantha	377.7	472	944	1511	1:2.0:3.20
29	Surat	10.32	13	26	41	1:1.5:2.4
30	Surendranagar	87.9	110	220	352	1:2.0:3.20

31	Tapi	50.32	63	126	201	1:1.90:1.9
32	Vadodara	0.37	0	1	1	1:1.05:1.8
33	Valsad	3.13	4	8	13	1:2.0:3.20
	TOTAL	14132.36	17665	35331	56529	

Table- 4.2.7 Fertilizers requirement in groundnut crop 2015-16

Sr.No.	District	Area (‘00 ha)	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total NPK	Urea	DAP	MoP	FeSO4	ZnSO4
1	Ahmedabad	1.31	2	3	5	10	0.7	7.1	8.7	1.965	1.31
2	Amreli	1015.05	1269	2538	4060	7867	599.7	5516.6	6767.0	1522.575	1015.05
3	Anand	2.7	3	7	11	21	1.9	14.7	18.0	4.05	2.7
4	Arvalli	263.4	329	659	1054	2042	155.5	1431.5	1756.0	395.1	263.4
5	Banaskantha	606.61	758	1517	2426	4701	358.7	3296.8	4044.1	909.915	606.61
6	Bharuch	3.85	5	10	15	30	2.4	20.9	25.7	5.775	3.85
7	Bhavnagar	817.08	1021	2043	3268	6332	482.7	4440.7	5447.2	1225.62	817.08
8	Botad	0.8	1	2	3	6	0.7	4.3	5.3	1.2	0.8
9	Chhotaudepur	14.73	18	37	59	114	9.0	80.1	98.2	22.095	14.73
10	Dahod	13.34	17	33	53	103	7.8	72.5	88.9	20.01	13.34
11	Dang	18.53	23	46	74	143	11.3	100.7	123.5	27.795	18.53
12	Dev. Dwarka	1599	1999	3998	6396	12393	944.7	8690.2	10660.0	2398.5	1599
13	Gandhinagar	29.05	36	73	116	225	17.2	157.9	193.7	43.575	29.05
14	Gir Somnath	919.61	1150	2299	3678	7127	543.5	4997.9	6130.7	1379.415	919.61
15	Jamnagar	1296.88	1621	3242	5188	10051	766.3	7048.3	8645.9	1945.32	1296.88
16	Junagadh	2251.29	2814	5628	9005	17447	1329.9	12235.3	15008.6	3376.935	2251.29
17	Kachchh	310.34	388	776	1241	2405	183.1	1686.6	2068.9	465.51	310.34
18	Kheda	10.73	13	27	43	83	6.6	58.3	71.5	16.095	10.73
19	Mahisagar	7.67	10	19	31	60	4.7	41.7	51.1	11.505	7.67
20	Mahesana	121.56	152	304	486	942	72.1	660.7	810.4	182.34	121.56
21	Morbi	873.72	1092	2184	3495	6771	516.3	4748.5	5824.8	1310.58	873.72
22	Narmada	3.54	4	9	14	27	2.4	19.2	23.6	5.31	3.54
23	Navsari	0.47	1	1	2	4	0.0	2.6	3.1	0.705	0.47
24	Panchmahal	4.69	6	12	19	37	3.1	25.5	31.3	7.035	4.69
25	Patan	0.35	0	1	1	2	0.0	1.9	2.3	0.525	0.35
26	Porbandar	684.8	856	1712	2739	5307	404.8	3721.7	4565.3	1027.2	684.8

Sr.No.	District	Area (‘00 ha)	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total NPK	Urea	DAP	MoP	FeSO4	ZnSO4
27	Rajkot	2731.52	3414	6829	10926	21169	1613.9	14845.2	18210.1	4097.28	2731.52
28	Sabarkantha	377.7	472	944	1511	2927	223.3	2052.7	2518.0	566.55	377.7
29	Surat	10.32	13	26	41	80	5.9	56.1	68.8	15.48	10.32
30	Surendranagar	87.9	110	220	352	682	52.0	477.7	586.0	131.85	87.9
31	Tapi	50.32	63	126	201	390	29.5	273.5	335.5	75.48	50.32
32	Vadodara	0.37	0	1	1	2	0.0	2.0	2.5	0.555	0.37
33	Valsad	3.13	4	8	13	25	1.9	17.0	20.9	4.695	3.13
	TOTAL	14132.36	17665	22081	27601	34501	43126	53908	67385	84231	105289

* As per soil test base Source: Fertilizer Division, Krushi Bhavan, Gandhinagar (2011)

4.2.1.5.3 Pesticides:

The groundnut crop has a low risk of diseases, pests and weeds as compared to other crops in realizing optimum yield in the state except, low to moderate incidence of termite in the sandy and sandy loam soils of the state. The fungicides are required for seed treatment to control soil-borne diseases. Under paucity of labourers, the weedicides are used for efficient weed management. The majority of the farmers are also aware of using talc-based Trichoderma powder to control stem rot of groundnut. The farmers are dependent more and more on chemical control with higher concentration or more doses of chemicals. There is a need for promoting integrated measures for control of pest, disease and weeds that increase sustainability and profitability without enhancing cost. District-wise requirements of pesticides for Termite and weed management are given in Table 4.2.8.

Table-4.2.8 District wise requirement of fungicides/pesticides/weedicides for disease/termite/ weed management (in tonne)

Sr.No.	District	Area ('00 ha)	Seed rate kg/ha	Total Seed quantity tonne	Pesticides quantity Required, tonne			
					Seed treatment		Broad casting	For Weed Pendimethalin
					Thirum or Mancozeb	Emidaclorid	Trichoderma	
1	Ahmedabad	1.31	120	15.72	0.05	0.05	0.3275	0.393
2	Amreli	1015.05	120	12180.6	36.54	36.54	253.7625	304.515
3	Anand	2.7	120	32.4	0.10	0.10	0.675	0.81
4	Arvalli	263.4	120	3160.8	9.48	9.48	65.85	79.02
5	Banaskantha	606.61	120	7279.32	21.84	21.84	151.6525	181.983
6	Bharuch	3.85	120	46.2	0.14	0.14	0.9625	1.155
7	Bhavnagar	817.08	120	9804.96	29.41	29.41	204.27	245.124
8	Botad	0.8	120	9.6	0.03	0.03	0.2	0.24
9	Chhotaudepur	14.73	120	176.76	0.53	0.53	3.6825	4.419
10	Dahod	13.34	120	160.08	0.48	0.48	3.335	4.002
11	Dang	18.53	120	222.36	0.67	0.67	4.6325	5.559
12	Dev. Dwarka	1599	120	19188	57.56	57.56	399.75	479.7
13	Gandhinagar	29.05	120	348.6	1.05	1.05	7.2625	8.715
14	Gir Somnath	919.61	120	11035.32	33.11	33.11	229.9025	275.883
15	Jamnagar	1296.88	120	15562.56	46.69	46.69	324.22	389.064
16	Junagadh	2251.29	120	27015.48	81.05	81.05	562.8225	675.387
17	Kachchh	310.34	120	3724.08	11.17	11.17	77.585	93.102
18	Kheda	10.73	120	128.76	0.39	0.39	2.6825	3.219
19	Mahisagar	7.67	120	92.04	0.28	0.28	1.9175	2.301
20	Mahesana	121.56	120	1458.72	4.38	4.38	30.39	36.468

Sr.No.	District	Area ('00 ha)	Seed rate kg/ha	Total Seed quantity tonne	Pesticides quantity Required, tonne			
					Seed treatment		Broad casting	For Weed Pendimethalin
					Thirum or Mancozeb	Emidaclorid	Trichoderma	
21	Morbi	873.72	120	10484.64	31.45	31.45	218.43	262.116
22	Narmada	3.54	120	42.48	0.13	0.13	0.885	1.062
23	Navsari	0.47	120	5.64	0.02	0.02	0.1175	0.141
24	Panchmahal	4.69	120	56.28	0.17	0.17	1.1725	1.407
25	Patan	0.35	120	4.2	0.01	0.01	0.0875	0.105
26	Porbandar	684.8	120	8217.6	24.65	24.65	171.2	205.44
27	Rajkot	2731.52	120	32778.24	98.33	98.33	682.88	819.456
28	Sabarkantha	377.7	120	4532.4	13.60	13.60	94.425	113.31
29	Surat	10.32	120	123.84	0.37	0.37	2.58	3.096
30	Surendranagar	87.9	120	1054.8	3.16	3.16	21.975	26.37
31	Tapi	50.32	120	603.84	1.81	1.81	12.58	15.096
32	Vadodara	0.37	120	4.44	0.01	0.01	0.0925	0.111
33	Valsad	3.13	120	37.56	0.11	0.11	0.7825	0.939
	Total	14132.36	115	162522.14	487.57	487.57	3533.09	4239.708

Source: Directorate of Agriculture, Gandhinagar

4.2.1.6 Constraints Analysis and Recommended Interventions for Yield Gaps

Analysis of Groundnut:

Table- 4.2.9 Region-wise Constraints for Low Productivity for Irrigated Groundnut

Sr. No.	Region	Constraints
1.	North Gujarat	<ul style="list-style-type: none"> ➤ High weed infestation ➤ Improper plant stands due to a termite problem ➤ Imbalance fertilizer ➤ Termite and white grub's damage in light soils ➤ The high cost of seed ➤ Lack of timely availability of good quality seeds
2.	Middle Gujarat	<ul style="list-style-type: none"> ➤ High weed infestation ➤ Improper plant stands due to a termite problem ➤ Imbalance fertilizer ➤ Termite and white grub's damage in light soils ➤ The high cost of seed ➤ Lack of timely availability of good quality seeds ➤ Lack of proper sowing device particularly in rainfed area ➤ Poor water management in the canal area ➤ Soil salinity/alkalinity
3.	South Gujarat	<ul style="list-style-type: none"> ➤ High weed infestation ➤ Improper plant stand ➤ Imbalance fertilizer ➤ Termite damage in light soils ➤ The high cost of seed ➤ Lack of timely availability of good quality seeds ➤ Difficulty in land preparation ➤ Poor water management in the canal area
4.	Saurashtra	<ul style="list-style-type: none"> ➤ Low and erratic rainfall ➤ The high cost of seed ➤ Lack of timely availability of good quality seeds ➤ Imbalance fertilizer ➤ Stem rot problem ➤ Sporadic white grubs problem

4.2.1.6.1 Yield Gaps Analysis:

Table 4.2.3 reveals that productivity of groundnut of some districts in the state is lower than the state average. Groundnut is considered as an unpredictable legume crop in Gujarat. The groundnut is grown in varied agro-climatic conditions under kharif rain-fed conditions in the state. As a spinoff of this, the production potential of the crop varies over districts. The gap in yield between FLDs and farmers' practices is wide. The yield gap of groundnut worked-out based on state average, FLD mean and potential yield (Table 4.2.10) can be minimized in next five years by adopting scientific technologies of the crop.

Table- 4.2.10 District -wise yield gap analysis (Average of 2014-15 and 2015-16)

Sr No	Name of the Districts	Average yield in kg/ha			Pote .yield	Yield gap % over state mean	Yield gap% over FLD mean	Yield gap %over Potential yield	Reasons for gap
		District	State	FLD					
1	Ahmedabad	1649	1674	1870	3000	-6.9	-7.4	-42.3	Technology & input management
2	Amreli	1792	1674	1870	3000	-8.2	-8.7	-43.1	
3	Anand	1681	1674	1870	3000	-5.8	-6.3	-41.6	
4	Arvalli	1987	1674	1870	3000	6.4	5.8	-34	
5	Banaskantha	1838	1674	1870	3000	-1.1	-1.7	-38.7	
6	Bharuch	1965	1674	1870	3000	4.6	4.1	-35.1	
7	Bhavnagar	1807	1674	1870	3000	-2.6	-3.2	-39.6	
8	Botad	2442	1674	1870	3000	26.9	26.3	-21.3	
9	Chhotaudepur	1659	1674	1870	3000	-11.6	-12	-45.2	
10	Dahod	1715	1674	1870	3000	-8	-8.5	-43	
11	Dang	1766	1674	1870	3000	-8.2	-8.7	-43.1	
12	Dev Dwarka	983	1674	1870	3000	-46.6	-46.8	-66.9	
13	Gandhinagar	4002	1674	1870	3000	117.1	115.9	34.6	
14	Gir Somnath	2804	1674	1870	3000	50.8	49.9	-6.5	
15	Jamnagar	1908	1674	1870	3000	1.7	1.2	-36.9	
16	Junagadh	1937	1674	1870	3000	4	3.5	-35.5	
17	Kachchh	2297	1674	1870	3000	23.7	23	-23.3	
18	Kheda	1707	1674	1870	3000	-6	-6.5	-41.7	
19	Mahisagar	1535	1674	1870	3000	-19.9	-20.3	-50.3	
20	Mahesana	2043	1674	1870	3000	6.8	6.3	-33.8	
21	Morbi	994	1674	1870	3000	-46.2	-46.5	-66.6	
22	Narmada	1617	1674	1870	3000	-15.1	-15.6	-47.4	
23	Navsari	1771	1674	1870	3000	-8.3	-8.8	-43.1	

Sr No	Name of the Districts	Average yield in kg/ha			Pote .yield	Yield gap % over state mean	Yield gap% over FLD mean	Yield gap %over Potential yield	Reasons for gap
		District	State	FLD					
24	Panchmahal	1827	1674	1870	3000	-2	-2.5	-39.2	
25	Patan	1769	1674	1870	3000	-6.9	-7.4	-42.3	
26	Porbandar	783	1674	1870	3000	-58.3	-58.5	-74.1	
27	Rajkot	1338	1674	1870	3000	-28.1	-28.4	-55.4	
28	Sabarkantha	2991	1674	1870	3000	59.6	58.7	-1.1	
29	Surat	1512	1674	1870	3000	-17.2	-17.6	-48.7	
30	Surendranagar	2423	1674	1870	3000	28.4	27.8	-20.4	
31	Tapi	1804	1674	1870	3000	-3.4	-3.9	-40.1	
32	Vadodara	1604	1674	1870	3000	-12.6	-13.1	-45.8	
33	Valsad	1727	1674	1870	3000	-7.1	-7.6	-42.4	
	Average	1674	-	-	-	-	-	-	

The issues related to yield gap and its sustainability and strategies for bridging these gaps for groundnut crop are summarized as under:

Table- 4.2.11 Thrust Areas/ Issues to Bridge the Gaps for Realizing the Vision for Groundnut Crop

No	Program	Activities
1	Increase Availability of Quality Seeds /Seed Production	
	Seed planning and production	Identification of potential areas, Farmers led Participatory seed production of improved varieties of crops
		Motivating farmers to produce the seed of best varieties through Seed village programmes, capacity building of farmers and extension functionaries and exposure visits
	Seed distribution and seed storage	Establishment of seed selling units for timely distribution
		Construction of godowns
2.	Increase in Seed Replacement Rate	
	Production of quality seeds as per area sown	Create awareness about the production of quality seeds of improved varieties
		Strengthen the linkage between supply agencies and the farmers
3.	Soil Health Management	
	Soil testing	Establishment of soil and water testing laboratory and mobile soil testing laboratory
		Create awareness about the importance of soil testing
	Bio-fertilizers	Popularize the use of bio-fertilizer through capacity building and demonstrations
	Green Manuring	Popularize the green manuring practices through capacity building and demonstrations
	Enrichment of FYM	Popularize the methods of preparation of good quality FYM and vermicompost
	Integrated nutrient management	Educating farmers about the use of balanced fertilizer
	Micronutrients	Identification of micronutrient deficient areas and Educating farmers about their importance
	Recycling of crop residues	Converting of crop residue in small pieces through shredders and using it for composting
	Crop-rotation	Suggesting suitable crop rotation for improving soil health
	IWM	Educate the farmers about integrated weed management practices
4.	Water Management	

	Water harvesting	Establishment of rainwater harvesting units and deepening of the well and its recharging Khet talavadi/ village pond
	Water use efficiency	Popularize the micro irrigation systems, scheduling of irrigation and capacity building
		Introduction of the participatory irrigation management approach
		Moisture conservations through the organic and plastic mulch
5.	Plant Health Management	
	Plant health clinic	Establishment of plant health clinic at KVK and mobile health clinic
	IPM/IDM	Educating the farmers about various insect pests and diseases of crop and their IPM/IDM through demonstrations and training
	Proper Use Of Plant Protection Equipments	Educate the farmers about the proper use of plant protection equipment, provide necessary inputs to the farmers
6.	Farm Mechanization	
	Improved hand tools and small implements	Survey for drudgery reduction Educating farmers for use of machines/ implements
	Hand rotary weeder, Power tiller Shredder Farm tractors, Mechanical harvesters, Oil engines, pumps, submersibles, Laser leveler, Bullock cart	Educate the farmers and providing units on a co-operative basis and educate farmers for custom hiring
7.	Value addition	
	Processing Units, the establishment of mini oil extractor/ seed colour sorting equipment, grading and packaging units	Create awareness for value addition and educate farmers, provide units on a co-operative basis, marketing awareness
8.	Marketing	
	Strengthening APMC and construction of warehouses	Establishment of warehouse at cluster and taluka level
	Market linkage	Strengthening market linkage through AGMARK net
	Collection van	Units and monitoring

Table- 4.2.12 Sustainability Issues and Gap Analysis of Productivity of Groundnut Crop and Resources

Sr. No.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
i	Lesser Adoption of seed treatment	Termites, fungal diseases	To popularize the practice of seed treatment for maintaining crop health.	Educating and motivating farmers on its importance and adoption through demonstrations and training.	Entire groundnut growing area with no exception in soil-borne diseases and termite affected areas.	Productivity growth on a sustainable basis.
ii	Sowing of traditional seed	Low awareness about certified seed	Awareness campaign for use of certified seed.	Farmer's field schools, campaigns.	Entire groundnut growing areas.	Improvement in the yield on a sustainable basis
iii	High seed rate	Farmers use excess seed in groundnut for sowing	Application of recommended dose of seed in line sowing	Farmer's participatory approach and demonstration	Entire groundnut growing areas.	Improvement in productivity and reduction in the cost of cultivation
iv	Poor fertilizer management	Farmers apply excess fertilizer and low or no micronutrients and organic manures	Application of recommended dose of fertilizers. Use of organic manure and use of site-specific micro-nutrient	Farmer's participatory approach and demonstration	Entire groundnut growing areas.	Improvement in productivity with sustainable soil health
v	High incidence of weeds	Broad and narrow leaves weeds are seriously affected groundnut yields in the different cropping system.	Improve the efficiency of existing herbicides. Capacity building for spraying techniques.	State level strategic plan for the management of weeds Capacity building of extension agencies and farmers for appropriate spraying techniques. On-farm demonstrations of herbicides	Entire groundnut growing area	Economic benefits are increased profitability and increased food security.
vi	No use of Organic manure and low use of gypsum	Low production and the higher price of organic manures	Awareness campaign for production of organic manures in own farms	Farmer's field schools, campaigns	Entire groundnut growing area	Improvement in productivity with sustainable soil health

Table- 4.2.13 Closing the Gaps for Realizing Groundnut Crop Vision

Activity Output Matrix				
Activity/Crop/Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
1. Water management	Irregular water supply in canal water so farmers use more water. Lack of drainage facility.	Supply of water in the canal as per the crop requirement. Drainage facility is created	Irrigation Department and SAUs have jointly work to solve this problem.	Demonstration proposed
	Salinity stress mitigation at farmers' fields	Green manuring of sun hemp and gypsum use. Tolerant varieties.	Subsidy on gypsum (@ 75 percent) and its availability be ensured.	Demonstration on green manuring and gypsum proposed.
	Water harvesting and recharging	Construction of water harvesting structures near catchment area of the drain, panchayat/farmers land.	DDA/concerned departments in consultation with SAUs scientist	Project on water harvesting proposed.
	Watershed development in rainfed areas	Sprinkler/drip irrigation after creating a facility of community ponds/ water harvesting structures	DDA/concerned departments in consultation with GGRC	Project proposed.
	Groundwater testing for fluoride contamination	Survey of marked sites for nitrate contamination and characterization of nitrate-	DDA will conduct a survey and identify the areas of high fluoride containing waters	Survey for the study of groundwater quality proposed.
2. Management of salinity	Avoid irrigation with brackish water in drought years because it leads to secondary salinity; wherever available make conjunctive use of good quality water. Tolerance of current and improved varieties to salinity needs further investigations.	Cropping pattern will be studied. The yield of Rabi crops will be recorded for farms where farmers have given a variable number of irrigation with brackish water in kharif season.	Dept. of Agriculture / KVK Survey and soil sampling will be done by DDA and KVK. Demonstrations will be laid out by DDA in collaboration with KVK scientist	Survey proposed. Demonstrations proposed in plan.

	Work is also needed to adapt agronomic practices, especially the time and method of sowing and amount of fertilizer and irrigation in order to increase ecological sustainability, profitability and yield.	The reclamation of saline soils and water through gypsum will be done.	Demonstrations will be laid out by DDA in collaboration with SAUs scientist and supply of gypsum may be ensured by DDA	Demonstrations proposed in the plan.
3. RCTs (i) Laser -Levelling	Laser land leveling for water saving, land saving and improve yields of wheat and other crops.	DDA will organize and monitor the distribution of laser leveller especially on custom hire services.	DDA in consultation with KVK.	Demonstrations proposed. The Govt. has to give 60 percent subsidy to purchase Laser land leveller for small and marginal farmers.
(ii) Green Manuring	The improvement in the productivity of crops and also an improvement in the soil health.	DDA will ensure the timely availability of dhaincha seed at 75 percent subsidy. 50 percent area will be covered during the plan period of five years.	DDA Ten percent area will be covered.	Demonstrations will propose. The Govt. has to give 50 percent subsidy to purchase dhaincha seed for small and marginal farmers
4. Seed production	1. Seed planning	1. Selection of improved variety at farmers field. 2. Motivating farmers to produce the seed of the best variety 3. Mandatory testing of new	DDAs in consultation with KVKs.	Project proposed.
	2. Best quality seed	Seed production at farmers' field with farmers participatory approach.	DDA and KVK.	Project proposed.

	3. Seed treatment	1. Motivating farmers to seed treatment 2. Demonstrations will be laid out by DDA in collaboration with KVK scientist	DDA's Data for all activities will be presented in the officer's workshop	Survey proposed.
5. Site-specific nutrient management	Cereals in the cropping rotation	Integrated soil and crop management for rehabilitation of cereal production in the groundnut-wheat cropping system.	DDA will ensure quality seed of important legumes green gram for the summer season	The demonstration may be laid out on wheat
	Crop residue	Surface residue management for improving soil health. Improving the efficiency of nutrient utilization.	Machineries for uniform distribution of residue will be ensured by DDA Residue retention machinery, second-generation machinery, precision and no-till farming for crops and cropping system.	Demonstrations proposed
	Biofertilizers	Integrate chemical fertilizers with bio-fertilizers Improve the efficiency of chemical fertilizers	DDA will ensure the availability of quality bio-fertilizers	Demonstrations proposed under INM, free supply of biofertilizer to the small and marginal farmers.
6. IWM	Spraying techniques for improving the efficiency of herbicides. Monitoring of herbicide resistance.	Demonstration of varieties at farmer's field. Survey & demonstrations	DDA / SAUs / KVK	Survey proposed.

4.2.1.7 Recommended Interventions with Detailed Action Plan with Costs:

The main ingredients of the package are:

- Capacity building and skill up gradation of farmers to broaden their knowledge base
- Propagating resource conservation technologies
- Popularizing new technologies and farm practices through demonstrating-
 - ✓ Area-specific improved varieties
 - ✓ Demonstrations on INM with a shift in focus from fertilizer nutrients usage to judicious application
- Organize training and link farmers to domestic and international markets in PPP framework

The proposed activities are as under...

Table-4.2.14 Training Proposed for Capacity Building of Agriculture Staff for Groundnut

Crop	Training for Agricultural staff (state level)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	475	76	475	76	475	76	1425	228
Cooperative & NGOs	475	76	475	76	475	76	1425	228
PRI Staff & Others	240	38.4	240	38.4	240	38.4	720	115.2
Total	1190	190.4	1190	190.4	1190	190.4	3570	571.2

Cost Norms: 800/Trainee/Day 20 Trainees/Training of one day

Table- 4.2.15 District-wise Training Proposed for Capacity Building of Agriculture Staff for Groundnut

S r No	Name of the Districts	Training for Agricultural staff (District wise)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20	
		Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	50	8	50	8	50	8	50	8	50	8	50	8	25	4	25	4	25	4
3	Anand	5	0.8	5	0.8	5	0.8	5	0.8	5	0.8	5	0.8	3	0.5	3	0.5	3	0.5
4	Arvali	8	1.2	8	1.2	8	1.2	8	1.2	8	1.2	8	1.2	4	0.6	4	0.6	4	0.6
5	Banaskantha	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	10	1.6	10	1.6	10	1.6
6	Bharuch	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8
7	Bhavnagar	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	15	2.4	15	2.4	15	2.4
8	Botad	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	10	1.6	10	1.6	10	1.6
9	Chota	8	1.2	8	1.2	8	1.2	8	1.2	8	1.2	8	1.2	4	0.6	4	0.6	4	0.6
1	Dahod	5	0.8	5	0.8	5	0.8	5	0.8	5	0.8	5	0.8	3	0.5	3	0.5	3	0.5
1	Dang	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8
1	Dev.Dwarka	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	10	1.6	10	1.6	10	1.6
1	Gir Somnath	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	10	1.6	10	1.6	10	1.6
1	Gandhinagar	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8
1	Jamnagar	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	15	2.4	15	2.4	15	2.4
1	Junagadh	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	15	2.4	15	2.4	15	2.4
1	Kheda	3	0.4	3	0.4	3	0.4	3	0.4	3	0.4	3	0.4	1.8	0.3	1.8	0.3	1.8	0.3
1	Kutch	25	4	25	4	25	4	25	4	25	4	25	4	13	2.1	13	2.1	13	2.1
1	Mahisagar	2	0.3	2	0.3	2	0.3	2	0.3	2	0.3	2	0.3	1.2	0.2	1.2	0.2	1.2	0.2
2	Mehsana	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8

S r No	Name of the Districts	Training for Agricultural staff (District wise)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20	
		Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin
2	Morbi	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	10	1.6	10	1.6	10	1.6
2	Narmada	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8
2	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Panchmahal	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8
2	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Porbandar	25	4	25	4	25	4	25	4	25	4	25	4	13	2.1	13	2.1	13	2.1
2	Rajkot	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	30	4.8	15	2.4	15	2.4	15	2.4
2	Sabarkantha	12	1.9	12	1.9	12	1.9	12	1.9	12	1.9	12	1.9	6	0.9	6	0.9	6	0.9
2	Surat	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8
3	Surendranag	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	20	3.2	10	1.6	10	1.6	10	1.6
3	Tapi	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	10	1.6	5	0.8	5	0.8	5	0.8
3	Vadodara	12	1.9	12	1.9	12	1.9	12	1.9	12	1.9	12	1.9	6	0.9	6	0.9	6	0.9
3	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	47	76	47	76	47	76	47	76	47	76	47	76	24	38.	24	38.	24	38.

Cost Norms: 800/Trainee/Day 20 Trainees/Training of one day

Table- 4.2.16 Training Proposed for Capacity Building of Farmers for Groundnut at District Level

Sr	Name of the Districts	Year wise No. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	5200	31.2	5200	31.2	5200	31.2	15600	93.6
3	Anand	1300	7.8	1300	7.8	1300	7.8	3900	23.4
4	Arvalli	1040	6.24	1040	6.24	1040	6.24	3120	18.72
5	Banaskantha	2600	15.6	2600	15.6	2600	15.6	7800	46.8
6	Bharuch	1300	7.8	1300	7.8	1300	7.8	3900	23.4
7	Bhavnagar	3120	18.72	3120	18.72	3120	18.72	9360	56.16
8	Botad	2080	12.48	2080	12.48	2080	12.48	6240	37.44
9	Chota Udaipur	520	3.12	520	3.12	520	3.12	1560	9.36
10	Dahod	1300	7.8	1300	7.8	1300	7.8	3900	23.4
11	Dang	1300	7.8	1300	7.8	1300	7.8	3900	23.4
12	Dev.Dwarka	2080	12.48	2080	12.48	2080	12.48	6240	37.44
13	Gir Somnath	2080	12.48	2080	12.48	2080	12.48	6240	37.44
14	Gandhinagar	1300	7.8	1300	7.8	1300	7.8	3900	23.4
15	Jamnagar	3120	18.72	3120	18.72	3120	18.72	9360	56.16
16	Junagadh	3120	18.72	3120	18.72	3120	18.72	9360	56.16
17	Kheda	780	4.68	780	4.68	780	4.68	2340	14.04
18	Kutch	2600	15.6	2600	15.6	2600	15.6	7800	46.8
19	Mahisagar	520	3.12	520	3.12	520	3.12	1560	9.36
20	Mehsana	1300	7.8	1300	7.8	1300	7.8	3900	23.4

Sr	Name of the Districts	Year wise No. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Morbi	2080	12.48	2080	12.48	2080	12.48	6240	37.44
22	Narmada	1300	7.8	1300	7.8	1300	7.8	3900	23.4
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	1300	7.8	1300	7.8	1300	7.8	3900	23.4
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2600	15.6	2600	15.6	2600	15.6	7800	46.8
27	Rajkot	3120	18.72	3120	18.72	3120	18.72	9360	56.16
28	Sabarkantha	1560	9.36	1560	9.36	1560	9.36	4680	28.08
29	Surat	1300	7.8	1300	7.8	1300	7.8	3900	23.4
30	Surendranagar	2600	15.6	2600	15.6	2600	15.6	7800	46.8
31	Tapi	1300	7.8	1300	7.8	1300	7.8	3900	23.4
32	Vadodara	780	4.68	780	4.68	780	4.68	2340	14.04
33	Valsad	0	0	0	0	0	0	0	0
	Total	54600	327.6	54600	327.6	54600	327.6	163800	982.8

Cost Norms: 600/Trainee/Day 20 Trainees/Training of one day

Table-4.2.17 Training Proposed for Capacity Building of Farmers for Groundnut at State Level on Different Technologies

Name of technology to be transferred	Year wise no. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		TOTAL	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
INM	4200	25.2	4200	25.2	4200	25.2	12600	75.6
NRM	4200	25.2	4200	25.2	4200	25.2	12600	75.6

Name of technology to be transferred	Year wise no. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		TOTAL	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
IPM	4200	25.2	4200	25.2	4200	25.2	12600	75.6
RCTs	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Water management	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Post-Harvest Management	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Women empowerment	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Credit & marketing	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Seed Production	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Farm waste managt.	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Vermicomposting	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Farm Mechanization	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Renewable energy	4200	25.2	4200	25.2	4200	25.2	12600	75.6
Total	54600	327.6	54600	327.6	54600	327.6	163800	982.8

Cost Norms: 600/Trainee/day 20 Trainees/Training of one day

Table- 4.2.18 District-wise Training Proposed for Capacity Building of Farmers at District Level for Groundnut on Different Technologies

Sr No	Name of the Districts	INM								NRM							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	20	2.4	20	2.4	20	2.4	60	7.2	20	2.4	20	2.4	20	2.4	60	7.2
3	Anand	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
4	Arvali	4	0.48	4	0.48	4	0.48	12	1.44	4	0.48	4	0.48	4	0.48	12	1.44
5	Banaskantha	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
6	Bharuch	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
7	Bhavnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
8	Botad	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
9	Chota Udaipur	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
10	Dahod	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
11	Dang	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
12	Dev.Dwarka	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
13	Gir Somnath	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
14	Gandhinagar	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
15	Jamnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
16	Junagadh	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
17	Kheda	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
18	Kutch	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
19	Mahisagar	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
20	Mehsana	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
21	Morbi	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
22	Narmada	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sr No	Name of the Districts	INM								NRM							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Panchmahal	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
27	Rajkot	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
28	Sabarkantha	6	0.72	6	0.72	6	0.72	18	2.16	6	0.72	6	0.72	6	0.72	18	2.16
29	Surat	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
30	Surendranagar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
31	Tapi	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
32	Vadodara	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		210	25.2	210	25.2	210	25.2	630	75.6	210	25.2	210	25.2	210	25.2	630	75.6

Cost Norms: 600/Trainee/day 20 Trainees/Training of one day

Table 4.2.18 District wise Training Proposed for Capacity Building of Farmers at District level on different technologies

(Continue table...)

Sr No	Name of the Districts	IPM								RCTs							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	20	2.4	20	2.4	20	2.4	60	7.2	20	2.4	20	2.4	20	2.4	60	7.2
3	Anand	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
4	Arvali	4	0.48	4	0.48	4	0.48	12	1.44	4	0.48	4	0.48	4	0.48	12	1.44
5	Banaskantha	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
6	Bharuch	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8

Sr No	Name of the Districts	IPM								RCTs							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
7	Bhavnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
8	Botad	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
9	Chota Udaipur	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
10	Dahod	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
11	Dang	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
12	Dev.Dwarka	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
13	Gir Somnath	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
14	Gandhinagar	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
15	Jamnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
16	Junagadh	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
17	Kheda	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
18	Kutch	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
19	Mahisagar	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
20	Mehsana	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
21	Morbi	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
22	Narmada	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
27	Rajkot	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
28	Sabarkantha	6	0.72	6	0.72	6	0.72	18	2.16	6	0.72	6	0.72	6	0.72	18	2.16
29	Surat	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
30	Surendranagar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
31	Tapi	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8

Sr No	Name of the Districts	IPM								RCTs							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
32	Vadodara	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	210	25.2	210	25.2	210	25.2	630	75.6	210	25.2	210	25.2	210	25.2	630	75.6

Table- 4.2.18 District-wise Training Proposed for Capacity Building of Farmers at District level for Groundnut on Different Technologiescontinue

Sr N	Name of the Districts	Water management								Post-Harvest Management							
		2017-18		2018-19		2019-2020		Total		2017-18		2018-19		2019-20		Total	
		Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	20	2.4	20	2.4	20	2.4	60	7.2	20	2.4	20	2.4	20	2.4	60	7.2
3	Anand	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
4	Arvalli	4	0.48	4	0.48	4	0.48	12	1.44	4	0.48	4	0.48	4	0.48	12	1.44
5	Banaskantha	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
6	Bharuch	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
7	Bhavnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
8	Botad	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
9	Chota	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
10	Dahod	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
11	Dang	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
12	Dev.Dwarka	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
13	Gir Somnath	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
14	Gandhinagar	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8

Sr N	Name of the Districts	Water management								Post-Harvest Management							
		2017-18		2018-19		2019-2020		Total		2017-18		2018-19		2019-20		Total	
		Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin
15	Jamnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
16	Junagadh	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
17	Kheda	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
18	Kutch	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
19	Mahisagar	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
20	Mehsana	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
21	Morbi	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
22	Narmada	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
27	Rajkot	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
28	Sabarkantha	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
29	Surat	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
30	Surendranaga	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
31	Tapi	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
32	Vadodara	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	216	25.9	216	25.9	216	25.9	648	77.7	216	25.9	216	25.9	216	25.9	648	77.7

Cost Norms: 600/Trainee/day 20 Trainees/Training of one day

Table- 4.2.18 District-wise Training Proposed for Capacity Building of Farmers at District level for Groundnut on Different Technologiescontinue

Sr No	Name of the Districts	Women empowerment							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	2.4	20	2.4	20	2.4	60	7.2
3	Anand	5	0.6	5	0.6	5	0.6	15	1.8
4	Arvali	4	0.48	4	0.48	4	0.48	12	1.44
5	Banaskantha	10	1.2	10	1.2	10	1.2	30	3.6
6	Bharuch	5	0.6	5	0.6	5	0.6	15	1.8
7	Bhavnagar	12	1.44	12	1.44	12	1.44	36	4.32
8	Botad	8	0.96	8	0.96	8	0.96	24	2.88
9	Chota Udaipur	2	0.24	2	0.24	2	0.24	6	0.72
10	Dahod	5	0.6	5	0.6	5	0.6	15	1.8
11	Dang	5	0.6	5	0.6	5	0.6	15	1.8
12	Dev.Dwarka	8	0.96	8	0.96	8	0.96	24	2.88
13	Gir Somnath	8	0.96	8	0.96	8	0.96	24	2.88
14	Gandhinagar	5	0.6	5	0.6	5	0.6	15	1.8
15	Jamnagar	12	1.44	12	1.44	12	1.44	36	4.32
16	Junagadh	12	1.44	12	1.44	12	1.44	36	4.32
17	Kheda	3	0.36	3	0.36	3	0.36	9	1.08
18	Kutch	10	1.2	10	1.2	10	1.2	30	3.6
19	Mahisagar	2	0.24	2	0.24	2	0.24	6	0.72
20	Mehsana	5	0.6	5	0.6	5	0.6	15	1.8
21	Morbi	8	0.96	8	0.96	8	0.96	24	2.88
22	Narmada	5	0.6	5	0.6	5	0.6	15	1.8

Sr No	Name of the Districts	Women empowerment							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	5	0.6	5	0.6	5	0.6	15	1.8
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	10	1.2	10	1.2	10	1.2	30	3.6
27	Rajkot	12	1.44	12	1.44	12	1.44	36	4.32
28	Sabarkantha	10	1.2	10	1.2	10	1.2	30	3.6
29	Surat	5	0.6	5	0.6	5	0.6	15	1.8
30	Surendranagar	10	1.2	10	1.2	10	1.2	30	3.6
31	Tapi	5	0.6	5	0.6	5	0.6	15	1.8
32	Vadodara	5	0.6	5	0.6	5	0.6	15	1.8
33	Valsad	0	0	0	0	0	0	0	0
	Total	216	25.92	216	25.92	216	25.92	648	77.76

Cost Norms: 600/Trainee/day 20 Trainees/Training of one day

Table- 4.2.18 District-wise Training Proposed for Capacity Building of Farmers District level for Groundnut on Different Technologiescontinue

Sr No	Name of the Districts	Credit & marketing								Seed Production							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	20	2.4	20	2.4	20	2.4	60	7.2	20	2.4	20	2.4	20	2.4	60	7.2
3	Anand	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
4	Arvalli	4	0.48	4	0.48	4	0.48	12	1.44	4	0.48	4	0.48	4	0.48	12	1.44

Sr No	Name of the Districts	Credit & marketing								Seed Production							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
5	Banaskantha	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
6	Bharuch	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
7	Bhavnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
8	Botad	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
9	Chota Udaipur	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
10	Dahod	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
11	Dang	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
12	Dev.Dwarka	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
13	Gir Somnath	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
14	Gandhinagar	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
15	Jamnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
16	Junagadh	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
17	Kheda	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
18	Kutch	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
19	Mahisagar	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
20	Mehsana	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
21	Morbi	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
22	Narmada	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
27	Rajkot	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32

Sr No	Name of the Districts	Credit & marketing								Seed Production							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
28	Sabarkantha	6	0.72	6	0.72	6	0.72	18	2.16	6	0.72	6	0.72	6	0.72	18	2.16
29	Surat	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
30	Surendranagar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
31	Tapi	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
32	Vadodara	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	210	25.2	210	25.2	210	25.2	630	75.6	210	25.2	210	25.2	210	25.2	630	75.6

Cost Norms: 600/Trainee/day 20 Trainees/Training of one day

Table- 4.2.18 Districtwise Training Proposed for Capacity Building of Farmers District level on different technologies (Conti.)

SN	Name of the Districts	Farm waste managt.								Vermi composting							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	20	2.4	20	2.4	20	2.4	60	7.2	20	2.4	20	2.4	20	2.4	60	7.2
3	Anand	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
4	Arvalli	4	0.48	4	0.48	4	0.48	12	1.44	4	0.48	4	0.48	4	0.48	12	1.44
5	Banaskantha	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
6	Bharuch	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
7	Bhavnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
8	Botad	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88

SN	Name of the Districts	Farm waste managt.								Vermi composting							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
9	Chota Udaipur	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
10	Dahod	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
11	Dang	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
12	Dev.Dwarka	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
13	Gir Somnath	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
14	Gandhinagar	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
15	Jamnagar	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
16	Junagadh	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
17	Kheda	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
18	Kutch	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
19	Mahisagar	2	0.24	2	0.24	2	0.24	6	0.72	2	0.24	2	0.24	2	0.24	6	0.72
20	Mehsana	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
21	Morbi	8	0.96	8	0.96	8	0.96	24	2.88	8	0.96	8	0.96	8	0.96	24	2.88
22	Narmada	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
27	Rajkot	12	1.44	12	1.44	12	1.44	36	4.32	12	1.44	12	1.44	12	1.44	36	4.32
28	Sabarkantha	6	0.72	6	0.72	6	0.72	18	2.16	6	0.72	6	0.72	6	0.72	18	2.16
29	Surat	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8
30	Surendranagar	10	1.2	10	1.2	10	1.2	30	3.6	10	1.2	10	1.2	10	1.2	30	3.6
31	Tapi	5	0.6	5	0.6	5	0.6	15	1.8	5	0.6	5	0.6	5	0.6	15	1.8

SN	Name of the Districts	Farm waste managt.								Vermi composting							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
32	Vadodara	3	0.36	3	0.36	3	0.36	9	1.08	3	0.36	3	0.36	3	0.36	9	1.08
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	210	25.2	210	25.2	210	25.2	630	75.6	210	25.2	210	25.2	210	25.2	630	75.6

Cost Norms: 600/Trainee/day 20 Trainees/Training of one day

Table- 4.2.19 Districtwise Varietal Demonstration of Groundnut in Next Three Years

Sr	Name of the	Year wise Varietal Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1	20	1	20	1	60	3
3	Anand	10	0.5	10	0.5	10	0.5	30	1.5
4	Arvalli	8	0.4	8	0.4	8	0.4	24	1.2
5	Banaskantha	20	1	20	1	20	20	60	22
6	Bharuch	10	0.5	10	0.5	10	10	30	11
7	Bhavnagar	18	0.9	18	0.9	18	18	54	19.8
8	Botad	12	0.6	12	0.6	12	12	36	13.2
9	Chota Udaipur	8	0.4	8	0.4	8	0.4	24	1.2
10	Dahod	10	0.5	10	0.5	10	0.5	30	1.5
11	Dang	5	0.3	5	0.3	5	0.3	15	0.9
12	Dev Dwarka	20	1	20	1	20	1	60	3
13	Gir Somnath	20	1	20	1	20	1	60	3
14	Gandhinagar	5	0.3	5	0.3	5	0.3	15	0.9
15	Jamnagar	30	1.5	30	1.5	30	1.5	90	4.5

Sr	Name of the	Year wise Varietal Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
16	Junagadh	30	1.5	30	1.5	30	1.5	90	4.5
17	Kheda	3	0.18	3	0.18	3	0.18	9	0.54
18	Kutch	30	1.5	30	1.5	30	1.5	90	4.5
19	Mahisagar	2	0.12	2	0.12	2	0.12	6	0.36
20	Mehsana	3	0.2	3	0.2	3	0.2	9	0.6
21	Morbi	20	1	20	1	20	1	60	3
22	Narmada	10	0.5	10	0.5	10	0.5	30	1.5
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	10	0.5	10	0.5	10	0.5	30	1.5
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	20	1	20	1	20	1	60	3
27	Rajkot	30	1.5	30	1.5	30	1.5	90	4.5
28	Sabarkantha	12	0.6	12	0.6	12	0.6	36	1.8
29	Surat	10	0.5	10	0.5	10	0.5	30	1.5
30	Surendranagar	20	1	20	1	20	1	60	3
31	Tapi	10	0.5	10	0.5	10	0.5	30	1.5
32	Vadodara	12	0.6	12	0.6	12	0.6	36	1.8
33	Valsad	0	0	0	0	0	0	0	0
	Total	418	21.1	418	21.1	418	78.1	1254	120.3

Cost Norms: Rs 5000/acre/demonstration

Table- 4.2.20 Groundnut Seed Planning/Seed Village Program (Seed Production Enhancement) (Phy-No. Fin- Rs. In Lakh)

Sr. No.	District	No. of Taluka	No. of Villages/	Seed rate kg/ha	Groundnut Seed village programme (Seed production)							
					2017-18		2018-19		2019-20		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	120	0	0	0	0	0	0	0	0
2	Amreli	5	20	120	200	12	200	12	200	12	600	36
3	Anand	2	5	120	50	3	50	3	50	3	150	9
4	Arvalli	2	4	120	40	2.4	40	2.4	40	2.4	120	7.2
5	Banaskantha	5	15	120	150	9	150	9	150	9	450	27
6	Bharuch	2	3	120	30	1.8	30	1.8	30	1.8	90	5.4
7	Bhavnagar	3	6	120	60	3.6	60	3.6	60	3.6	180	10.8
8	Botad	2	4	120	40	2.4	40	2.4	40	2.4	120	7.2
9	Chota Udaipur	1	2	120	24	1.44	24	1.44	24	1.44	72	4.32
10	Dahod	2	3	120	30	1.8	30	1.8	30	1.8	90	5.4
11	Dang	2	3	120	30	1.8	30	1.8	30	1.8	90	5.4
12	Dev.Dwarka	2	8	120	80	4.8	80	4.8	80	4.8	240	14.4
13	Gir Somnath	2	8	120	80	4.8	80	4.8	80	4.8	240	14.4
14	Gandhinagar	2	4	120	40	2.4	40	2.4	40	2.4	120	7.2
15	Jamnagar	3	12	120	120	7.2	120	7.2	120	7.2	360	21.6
16	Junagadh	3	12	120	120	7.2	120	7.2	120	7.2	360	21.6
17	Kheda	1	1	120	12	0.72	12	0.72	12	0.72	36	2.16
18	Kutch	5	20	120	200	12	200	12	200	12	600	36
19	Mahisagar	1	1	120	8	0.48	8	0.48	8	0.48	24	1.44
20	Mehsana	2	3	120	30	1.8	30	1.8	30	1.8	90	5.4
21	Morbi	2	8	120	80	4.8	80	4.8	80	4.8	240	14.4
22	Narmada	2	3	120	30	1.8	30	1.8	30	1.8	90	5.4
23	Navsari	0	0	120	0	0	0	0	0	0	0	0
24	Panchmahal	2	5	120	50	3	50	3	50	3	150	9

Sr. No.	District	No. of Taluka	No. of Villages/	Seed rate kg/ha	Groundnut Seed village programme (Seed production							
					2017-18		2018-19		2019-20		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	0	0	120	0	0	0	0	0	0	0	0
26	Porbandar	3	20	120	200	12	200	12	200	12	600	36
27	Rajkot	3	12	72	120	7.2	120	7.2	120	7.2	360	21.6
28	Sabarkantha	3	6	120	60	3.6	60	3.6	60	3.6	180	10.8
29	Surat	2	5	120	50	3	50	3	50	3	150	9
30	Surendranagar	5	10	120	100	6	100	6	100	6	300	18
31	Tapi	2	5	120	50	3	50	3	50	3	150	9
32	Vadodara	2	4	120	36	2.16	36	2.16	36	2.16	108	6.48
33	Valsad	0	0	120	0	0	0	0	0	0	0	0
	Total	73	212	120	2120	127.2	2120	127.2	2120	127.2	6360	381.6

Cost Norms: Rs 6000/ha 10 Demonstrations of 1 ha per Seed Village

Table- 4.2.21 Districtwise INM Demonstrations of Groundnut

(Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise INM Demonstration						Total	
		2017-18		2018-19		2019-20			
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	8	1	8	1	8	1	24	3
3	Anand	4	0.5	4	0.5	4	0.5	12	1.5
4	Arvalli	3.2	0.4	3.2	0.4	3.2	0.4	9.6	1.2
5	Banaskantha	8	1	8	1	8	1	24	3
6	Bharuch	4	0.5	4	0.5	4	0.5	12	1.5
7	Bhavnagar	7.2	0.9	7.2	0.9	7.2	0.9	21.6	2.7
8	Botad	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
9	Chota Udaipur	3.2	0.4	3.2	0.4	3.2	0.4	9.6	1.2
10	Dahod	4	0.5	4	0.5	4	0.5	12	1.5
11	Dang	2	0.25	2	0.25	2	0.25	6	0.75
12	Dev.Dwarka	8	1	8	1	8	1	24	3
13	Gir Somnath	8	1	8	1	8	1	24	3
14	Gandhinagar	2	0.25	2	0.25	2	0.25	6	0.75
15	Jamnagar	12	1.5	12	1.5	12	1.5	36	4.5
16	Junagadh	12	1.5	12	1.5	12	1.5	36	4.5
17	Kheda	1.2	0.15	1.2	0.15	1.2	0.15	3.6	0.45
18	Kutch	12	1.5	12	1.5	12	1.5	36	4.5
19	Mahisagar	0.8	0.1	0.8	0.1	0.8	0.1	2.4	0.3
20	Mehsana	1.2	0.15	1.2	0.15	1.2	0.15	3.6	0.45
21	Morbi	8	1	8	1	8	1	24	3
22	Narmada	4	0.5	4	0.5	4	0.5	12	1.5
23	Navsari	0	0	0	0	0	0	0	0

24	Panchmahal	4	0.5	4	0.5	4	0.5	12	1.5
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	8	1	8	1	8	1	24	3
27	Rajkot	12	1.5	12	1.5	12	1.5	36	4.5
28	Sabarkantha	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
29	Surat	4	0.5	4	0.5	4	0.5	12	1.5
30	Surendranagar	8	1	8	1	8	1	24	3
31	Tapi	4	0.5	4	0.5	4	0.5	12	1.5
32	Vadodara	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
33	Valsad	0	0	0	0	0	0	0	0
Total		167.2	20.9	167.2	20.9	167.2	20.9	501.6	62.7

Cost Norms: Rs 5000/demonstration of 0.40 ha

Table-4.2.22 Districtwise Demonstrations of Groundnut on Resource Conservation Technologies

Sr No	Name of the Districts	Laser levelling (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	8	1	8	1	8	1	24	3
3	Anand	4	0.5	4	0.5	4	0.5	12	1.5
4	Arvalli	3.2	0.4	3.2	0.4	3.2	0.4	9.6	1.2
5	Banaskantha	8	1	8	1	8	1	24	3
6	Bharuch	4	0.5	4	0.5	4	0.5	12	1.5
7	Bhavnagar	7.2	0.9	7.2	0.9	7.2	0.9	21.6	2.7
8	Botad	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
9	Chota Udaipur	3.2	0.4	3.2	0.4	3.2	0.4	9.6	1.2
10	Dahod	4	0.5	4	0.5	4	0.5	12	1.5
11	Dang	2	0.25	2	0.25	2	0.25	6	0.75

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12	Dev.Dwarka	8	1	8	1	8	1	24	3
13	Gir Somnath	8	1	8	1	8	1	24	3
14	Gandhinagar	2	0.25	2	0.25	2	0.25	6	0.75
15	Jamnagar	12	1.5	12	1.5	12	1.5	36	4.5
16	Junagadh	12	1.5	12	1.5	12	1.5	36	4.5
17	Kheda	1.2	0.15	1.2	0.15	1.2	0.15	3.6	0.45
18	Kutch	12	1.5	12	1.5	12	1.5	36	4.5
19	Mahisagar	0.8	0.1	0.8	0.1	0.8	0.1	2.4	0.3
20	Mehsana	1.2	0.15	1.2	0.15	1.2	0.15	3.6	0.45
21	Morbi	8	1	8	1	8	1	24	3
22	Narmada	4	0.5	4	0.5	4	0.5	12	1.5
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	4	0.5	4	0.5	4	0.5	12	1.5
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	8	1	8	1	8	1	24	3
27	Rajkot	12	1.5	12	1.5	12	1.5	36	4.5
28	Sabarkantha	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
29	Surat	4	0.5	4	0.5	4	0.5	12	1.5
30	Surendranagar	8	1	8	1	8	1	24	3
31	Tapi	4	0.5	4	0.5	4	0.5	12	1.5
32	Vadodara	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
33	Valsad	0	0	0	0	0	0	0	0
	Total	167.2	20.9	167.2	20.9	167.2	20.9	501.6	62.7

Cost Norms: Rs 5000/demonstration of 0.40 ha

Table-4.2.22 Districtwise Demonstrations of Groundnut on Resource Conservation Technologies

.....continue

SN	Name of the Districts	Green manuring (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	8	1	8	1	8	1	24	3
3	Anand	4	0.5	4	0.5	4	0.5	12	1.5
4	Arvalli	3.2	0.4	3.2	0.4	3.2	0.4	9.6	1.2
5	Banaskantha	8	1	8	1	8	1	24	3
6	Bharuch	4	0.5	4	0.5	4	0.5	12	1.5
7	Bhavnagar	7.2	0.9	7.2	0.9	7.2	0.9	21.6	2.7
8	Botad	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
9	Chota Udaipur	3.2	0.4	3.2	0.4	3.2	0.4	9.6	1.2
10	Dahod	4	0.5	4	0.5	4	0.5	12	1.5
11	Dang	2	0.25	2	0.25	2	0.25	6	0.75
12	Dev.Dwarka	8	1	8	1	8	1	24	3
13	Gir Somnath	8	1	8	1	8	1	24	3
14	Gandhinagar	2	0.25	2	0.25	2	0.25	6	0.75
15	Jamnagar	12	1.5	12	1.5	12	1.5	36	4.5
16	Junagadh	12	1.5	12	1.5	12	1.5	36	4.5
17	Kheda	1.2	0.15	1.2	0.15	1.2	0.15	3.6	0.45
18	Kutch	12	1.5	12	1.5	12	1.5	36	4.5
19	Mahisagar	0.8	0.1	0.8	0.1	0.8	0.1	2.4	0.3
20	Mehsana	1.2	0.15	1.2	0.15	1.2	0.15	3.6	0.45
21	Morbi	8	1	8	1	8	1	24	3
22	Narmada	4	0.5	4	0.5	4	0.5	12	1.5
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	4	0.5	4	0.5	4	0.5	12	1.5

SN	Name of the Districts	Green manuring (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	8	1	8	1	8	1	24	3
27	Rajkot	12	1.5	12	1.5	12	1.5	36	4.5
28	Sabarkantha	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
29	Surat	4	0.5	4	0.5	4	0.5	12	1.5
30	Surendranagar	8	1	8	1	8	1	24	3
31	Tapi	4	0.5	4	0.5	4	0.5	12	1.5
32	Vadodara	4.8	0.6	4.8	0.6	4.8	0.6	14.4	1.8
33	Valsad	0	0	0	0	0	0	0	0
	Total	167.2	20.9	167.2	20.9	167.2	20.9	501.6	62.7

Cost norms – Rs 5000/demonstration of 0.40 ha

Table- 4.2.23 District-wise Seed Treatment Demonstrations of Groundnut in Next Three Years (State)

Sr No	Name of the Districts	Year wise Seed Treatment Demonstrations (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1	20	1	20	1	60	3
3	Anand	10	0.5	10	0.5	10	0.5	30	1.5
4	Arvalli	8	0.4	8	0.4	8	0.4	24	1.2
5	Banaskantha	20	1	20	1	20	1	60	3
6	Bharuch	10	0.5	10	0.5	10	0.5	30	1.5
7	Bhavnagar	18	0.9	18	0.9	18	0.9	54	2.7
8	Botad	12	0.6	12	0.6	12	0.6	36	1.8
9	Chota Udaipur	8	0.4	8	0.4	8	0.4	24	1.2
10	Dahod	10	0.5	10	0.5	10	0.5	30	1.5

Sr No	Name of the Districts	Year wise Seed Treatment Demonstrations (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Dang	5	0.25	5	0.25	5	0.25	15	0.75
12	Dev.Dwarka	20	1	20	1	20	1	60	3
13	Gir Somnath	20	1	20	1	20	1	60	3
14	Gandhinagar	5	0.25	5	0.25	5	0.25	15	0.75
15	Jamnagar	30	1.5	30	1.5	30	1.5	90	4.5
16	Junagadh	30	1.5	30	1.5	30	1.5	90	4.5
17	Kheda	3	0.15	3	0.15	3	0.15	9	0.45
18	Kutch	30	1.5	30	1.5	30	1.5	90	4.5
19	Mahisagar	2	0.1	2	0.1	2	0.1	6	0.3
20	Mehsana	3	0.15	3	0.15	3	0.15	9	0.45
21	Morbi	20	1	20	1	20	1	60	3
22	Narmada	10	0.5	10	0.5	10	0.5	30	1.5
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	10	0.5	10	0.5	10	0.5	30	1.5
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	20	1	20	1	20	1	60	3
27	Rajkot	30	1.5	30	1.5	30	1.5	90	4.5
28	Sabarkantha	12	0.6	12	0.6	12	0.6	36	1.8
29	Surat	10	0.5	10	0.5	10	0.5	30	1.5
30	Surendranagar	20	1	20	1	20	1	60	3
31	Tapi	10	0.5	10	0.5	10	0.5	30	1.5
32	Vadodara	12	0.6	12	0.6	12	0.6	36	1.8
33	Valsad	0	0	0	0	0	0	0	0
	Total	418	20.9	418	20.9	418	20.9	1254	62.7

Cost norms – Rs 5000/demonstration of 0.40 ha

Table-4.2.24 District-wise Farmer Field Schools Covering Identified Critical Technologies of Groundnut in Next Three Years

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	5	1	5	1	5	1	15	3
3	Anand	1	0.2	1	0.2	1	0.2	3	0.6
4	Arvali	0.8	0.16	0.8	0.16	0.8	0.16	2.4	0.48
5	Banaskantha	2	0.4	2	0.4	2	0.4	6	1.2
6	Bharuch	1	0.2	1	0.2	1	0.2	3	0.6
7	Bhavnagar	1.8	0.36	1.8	0.36	1.8	0.36	5.4	1.08
8	Botad	1.2	0.24	1.2	0.24	1.2	0.24	3.6	0.72
9	Chota Udaipur	0.8	0.16	0.8	0.16	0.8	0.16	2.4	0.48
10	Dahod	1	0.2	1	0.2	1	0.2	3	0.6
11	Dang	1	0.2	1	0.2	1	0.2	3	0.6
12	Dev.Dwarka	2	0.4	2	0.4	2	0.4	6	1.2
13	Gir somnath	2	0.4	2	0.4	2	0.4	6	1.2
14	Gandhinagar	1	0.2	1	0.2	1	0.2	3	0.6
15	Jamnagar	3	0.6	3	0.6	3	0.6	9	1.8
16	Junagadh	3	0.6	3	0.6	3	0.6	9	1.8
17	Kheda	0.6	0.12	0.6	0.12	0.6	0.12	1.8	0.36
18	Kutch	3	0.6	3	0.6	3	0.6	9	1.8
19	Mahisagar	0.4	0.08	0.4	0.08	0.4	0.08	1.2	0.24
20	Mehsana	1	0.2	1	0.2	1	0.2	3	0.6
21	Morbi	2	0.4	2	0.4	2	0.4	6	1.2
22	Narmada	2	0.4	2	0.4	2	0.4	6	1.2
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	1	0.2	1	0.2	1	0.2	3	0.6

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.4	2	0.4	2	0.4	6	1.2
27	Rajkot	3	0.6	3	0.6	3	0.6	9	1.8
28	Sabarkantha	1.2	0.24	1.2	0.24	1.2	0.24	3.6	0.72
29	Surat	1	0.2	1	0.2	1	0.2	3	0.6
30	Surendranagar	2	0.4	2	0.4	2	0.4	6	1.2
31	Tapi	1	0.2	1	0.2	1	0.2	3	0.6
32	Vadodara	1.2	0.24	1.2	0.24	1.2	0.24	3.6	0.72
33	Valsad	0	0	0	0	0	0	0	0
	Total	48	9.6	48	9.6	48	9.6	144	28.8

Cost norms Rs. 20,000/- per School

Table- 4.2.25 Group Formation /Commodity Interest Groups Formation for Specific Activities of Groundnut (State)

Interest Group	Year wise no. of Group formation (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Seed production	86	17.2	86	17.2	86	17.2	258	51.6
Organic Farming	86	17.2	86	17.2	86	17.2	258	51.6
Value addition	86	17.2	86	17.2	86	17.2	258	51.6
Specific Crop group	86	17.2	86	17.2	86	17.2	258	51.6
Total	344	68.8	344	68.8	344	68.8	1032	206.4

Cost norms- Rs.20,000/group (for capacity building, input assistance, marketing and for group-specific activities)

Table 4.2.26 Districtwise Group formation / Commodity interest groups formation for specific activities (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Seed Production								Organic Farming							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	10	2	10	2	10	2	30	6	10	2	10	2	10	2	30	6
3	Anand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Arvalli	1.2	0.24	1.2	0.24	1.2	0.24	3.6	0.72	1.2	0.24	1.2	0.24	1.2	0.24	3.6	0.72
5	Banaskantha	2	0.4	2	0.4	2	0.4	6	1.2	2	0.4	2	0.4	2	0.4	6	1.2
6	Bharuch	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
7	Bhavnagar	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
8	Botad	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
9	Chota Udaipur	0.8	0.16	0.8	0.16	0.8	0.16	2.4	0.48	0.8	0.16	0.8	0.16	0.8	0.16	2.4	0.48
10	Dahod	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
11	Dang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Dev.Dwarka	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
13	Gir Somnath	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
14	Gandhinagar	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
15	Jamnagar	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
16	Junagadh	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
17	Kheda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Kutch	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
19	Mahisagar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Mehsana	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
21	Morbi	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
22	Narmada	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6

Sr No	Name of the Districts	Seed Production								Organic Farming							
		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	10	2	10	2	10	2	30	6	10	2	10	2	10	2	30	6
27	Rajkot	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
28	Sabarkantha	1.8	0.36	1.8	0.36	1.8	0.36	5.4	1.08	1.8	0.36	1.8	0.36	1.8	0.36	5.4	1.08
29	Surat	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
30	Surendranagar	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
31	Tapi	2	0.4	2	0.4	2	0.4	6	1.2	2	0.4	2	0.4	2	0.4	6	1.2
32	Vadodara	1.2	0.24	1.2	0.24	1.2	0.24	3.6	0.72	1.2	0.24	1.2	0.24	1.2	0.24	3.6	0.72
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	86	17.2	86	17.2	86	17.2	258	51.6	86	17.2	86	17.2	86	17.2	258	51.6

Table 4.2.26 Districtwise Group formation / Commodity interest groups formation for specific activities (Continue...)

Sr N	Name of the Districts	Value addition								Specific Crop group									
		2017-18		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	10	2	10	2	10	2	10	2	30	6	10	2	10	2	10	2	30	6
3	Anand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Arvali	1.2	0.2	1.2	0.2	1.2	0.2	1.2	0.2	3.6	0.7	1.2	0.2	1.2	0.2	1.2	0.2	3.6	0.7
5	Banaskantha	2	0.4	2	0.4	2	0.4	2	0.4	6	1.2	2	0.4	2	0.4	2	0.4	6	1.2
6	Bharuch	1	0.2	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
7	Bhavnagar	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
8	Botad	4	0.8	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
9	Chota	0.8	0.1	0.8	0.1	0.8	0.1	0.8	0.1	2.4	0.4	0.8	0.1	0.8	0.1	0.8	0.1	2.4	0.4

Sr N	Name of the Districts	Value addition								Specific Crop group									
		2017-18		2017-18		2018-19		2019-20		Total		2017-18		2018-19		2019-20		Total	
		Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin	Ph	Fin
10	Dahod	1	0.2	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
11	Dang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Dev.Dwarka	4	0.8	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
13	Gir Somnath	4	0.8	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
14	Gandhinagar	1	0.2	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
15	Jamnagar	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
16	Junagadh	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
17	Kheda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Kutch	5	1	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
19	Mahisagar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Mehsana	1	0.2	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
21	Morbi	4	0.8	4	0.8	4	0.8	4	0.8	12	2.4	4	0.8	4	0.8	4	0.8	12	2.4
22	Narmada	1	0.2	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
23	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Panchmahal	1	0.2	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	10	2	10	2	10	2	10	2	30	6	10	2	10	2	10	2	30	6
27	Rajkot	6	1.2	6	1.2	6	1.2	6	1.2	18	3.6	6	1.2	6	1.2	6	1.2	18	3.6
28	Sabarkantha	1.8	0.3	1.8	0.3	1.8	0.3	1.8	0.3	5.4	1.0	1.8	0.3	1.8	0.3	1.8	0.3	5.4	1.0
29	Surat	1	0.2	1	0.2	1	0.2	1	0.2	3	0.6	1	0.2	1	0.2	1	0.2	3	0.6
30	Surendranag	5	1	5	1	5	1	5	1	15	3	5	1	5	1	5	1	15	3
31	Tapi	2	0.4	2	0.4	2	0.4	2	0.4	6	1.2	2	0.4	2	0.4	2	0.4	6	1.2
32	Vadodara	1.2	0.2	1.2	0.2	1.2	0.2	1.2	0.2	3.6	0.7	1.2	0.2	1.2	0.2	1.2	0.2	3.6	0.7
33	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	86	17.	86	17.	86	17.	86	17.	25	51.	86	17.	86	17.	86	17.	25	51.

Table- 4.2.27 Projected Outcome and Growth during the Plan Period Area, Production and Productivity Trend of Groundnut

S N	District	Based on 2015-16			2016-17			2017-18			2018-19			2019-20		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Ahmedaba	1.31	2	152	1.31	2	152	1.31	2	152	1.31	2	152	1.31	2	152
2	Amreli	1015.0	219	216	1015.0	219	216	1015.0	233	229	1015.0	249	245	1015.0	271	267
3	Anand	2.70	4	148	2.70	4	148	2.70	4	148	2.70	5	185	2.70	5	185
4	Arvalli	263.40	536	203	263.40	536	203	263.40	568	215	263.40	608	230	263.40	663	251
5	Banaskanth	606.61	112	186	606.61	112	186	606.61	119	197	606.61	128	211	606.61	139	230
6	Bharuch	3.85	7	181	3.85	7	181	3.85	7	181	3.85	8	207	3.85	9	233
7	Bhavnagar	817.08	144	177	817.08	144	177	817.08	153	187	817.08	164	201	817.08	179	219
8	Botad	0.80	1	125	0.80	1	125	0.80	1	125	0.80	1	125	0.80	1	125
9	Chhotaude	14.73	23	156	14.73	23	156	14.73	24	162	14.73	26	176	14.73	28	190
10	Dahod	13.34	20	149	13.34	20	149	13.34	21	157	13.34	23	172	13.34	25	187
11	Dang	18.53	26	140	18.53	26	140	18.53	28	151	18.53	29	156	18.53	32	172
12	Dev.	1599.0	369	231	1599.0	369	231	1599.0	391	245	1599.0	419	262	1599.0	457	286
13	Gandhinag	29.05	130	447	29.05	130	447	29.05	138	475	29.05	147	506	29.05	160	550
14	Gir	919.61	244	266	919.61	244	266	919.61	259	282	919.61	277	301	919.61	302	328
15	Jamnagar	1296.8	205	158	1296.8	205	158	1296.8	217	167	1296.8	232	179	1296.8	253	195
16	Junagadh	2251.2	169	754	2251.2	169	754	2251.2	179	799	2251.2	192	855	2251.2	209	932
17	Kachchh	310.34	746	240	310.34	746	240	310.34	791	254	310.34	846	272	310.34	922	297
18	Kheda	10.73	17	158	10.73	17	158	10.73	18	167	10.73	19	177	10.73	21	195
19	Mahisagar	7.67	10	130	7.67	10	130	7.67	11	143	7.67	11	143	7.67	12	156
20	Mahesana	121.56	278	228	121.56	278	228	121.56	295	242	121.56	315	259	121.56	343	282
21	Morbi	873.72	110	126	873.72	110	126	873.72	117	134	873.72	125	144	873.72	137	156
22	Narmada	3.54	5	141	3.54	5	141	3.54	5	141	3.54	6	169	3.54	7	197
23	Navsari	0.47	1	212	0.47	1	212	0.47	1	212	0.47	1	212	0.47	1	212

OILSEED AND PULSE CROPS

S N	District	Based on 2015-16			2016-17			2017-18			2018-19			2019-20		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
24	Panchmah	4.69	8	170	4.69	8	170	4.69	8	170	4.69	9	191	4.69	10	213
25	Patan	0.35	1	285	0.35	1	285	0.35	1	285	0.35	1	285	0.35	1	285
26	Porbandar	684.80	92	134	684.80	92	134	684.80	98	143	684.80	104	152	684.80	113	165
27	Rajkot	2731.5	465	170	2731.5	465	170	2731.5	493	180	2731.5	527	193	2731.5	575	210
28	Sabarkanth	377.70	954	252	377.70	954	252	377.70	101	267	377.70	108	286	377.70	117	312
29	Surat	10.32	17	164	10.32	17	164	10.32	18	174	10.32	19	184	10.32	21	203
30	Surendrana	87.90	235	267	87.90	235	267	87.90	249	283	87.90	267	303	87.90	291	331
31	Tapi	50.32	89	176	50.32	89	176	50.32	94	186	50.32	101	200	50.32	110	218
32	Vadodara	0.37	1	270	0.37	1	270	0.37	1	270	0.37	1	270	0.37	1	270
33	Valsad	3.13	4	127	3.13	4	127	3.13	4	127	3.13	5	159	3.13	5	159
	Total	14132.	203	143	14132.	203	143	14132.	215	152	14132.	230	163	14132.	251	177

4.2.1.8 Researchable Issues:

1. Development of varieties resistant to abiotic stress (drought and thermo-insensitive)
2. Development of early maturing, high yielding varieties suitable for various cropping systems and rainfed conditions
3. Identification of sources of resistance to biotic stresses (disease & pests) and development of tolerant varieties
4. Development of bold seeded high yielding varieties as well as the development of the technology of organic groundnut production for export purposes
5. Production of Aflatoxin free groundnut
6. Development of varieties for specific end uses; high oil varieties for crushing, low oil varieties for direct consumption, high protein varieties for functional foods etc.
7. Product diversification, bio-fortification and value addition and economic use of by-products
8. Growth regulators to bring changes in crop physiology so as to adjust with the climatic variations.
9. Scheduling of micronutrients for increasing fertilizer use efficiency while reducing cost
10. The popularization of plastic mulch technology to boost-up production

4.2.2 Sesame:

4.2.2.1 Background:

Sesame productivity in Gujarat (4.15 Q/ha) is close to the productivity at the national level (4.29 Q/ha), which is very low as compare to the sesame productivity of Egypt (13.32 Q/ha). One of the reasons for low productivity is rainfall dependent on growing conditions with low input management. If this crop is grown in better management, higher yield could be realized in India too.

Vision:

To enhance the state contribution of sesame to national vegetable oils economy and to help in maintaining supremacy in export

Mission:

- Development of high yielding varieties/hybrids with tolerance to major biotic and abiotic stresses
- Development of suitable production and protection technologies with enhanced input use efficiency and profitability
- Maintenance and quality seed production of a released variety of sesame
- To conduct Front Line Demonstration (FLD) with new varieties and better production technologies.

4.2.2.2 Crop/Area Issues:

- Breeding new varieties/hybrids with disease and insect pest resistant genes by changing the existing genetic makeup
- Soil-water management technologies for efficient use of resources/inputs and to further reduce the cost of production
- Intensification of integrated pest and disease management programmes to make the recommendations more eco-friendly
- Shifting of sesame cultivation from *Kharif* to summer for exploiting its yield potential
- Harnessing newer cropping niches/opportunities through reorientation of prevailing cropping pattern
- Generation of technologies for quality seed production
- Research on post-harvest technology and value addition
- Frontline Demonstration programmes in order to demonstrate increased benefit by the adoption of improved technologies
- Dissemination of technologies through vibrant training programmes, publication and mass media
- Developing suitable marketing strategies to ensure maximum shares of price to the farmers
- Development of package on organic farming of sesame for export

4.2.2.3 Current Status of Area, Production and Productivity:

Table- 4.2.28 Sesame Productivity in Gujarat and India (2011 to 2015)

Year	Gujarat			India		
	Area ('00ha)	Production ('00 T)	Productivity (Q/ha)	Area ('00ha)	Production ('00 T)	Productivity (Q/ha)
2011	2465	1160	471	19020	8100	426
2012	1294	439	339	17060	6850	402
2013	1653	450	514	16782	7150	426
2014	1905	1056	554	17780	8280	466
2015	1633	605	371	20000	8500	425
Average	1790	742	415	18128	7776	429

Source: FAO stat

The impact of summer sesame frontline demonstrations under real farm conditions conducted by KVK, Amreli indicated that Indian sesame varieties have good potential to attain about two and one-half fold increase of the present productivity level by sowing under summer irrigated conditions. This implies that for increasing sesame production, besides generating new technologies, concerted efforts are needed to insist farmers for summer cultivation where irrigation facility is available. A gradual shift of the sesame crop from *kharif* to summer is desirable.

Table- 4.2.29 District-wise Area, Production and Productivity of Sesame in the State during 2014-15 to 2015-16

(Area in '00 hectare, Production in 00 T and Yield in q/ha)

Sr. No.	District	2014-15			2015-16			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	6.42	3.67	5.72	14.27	5.09	3.56	10.35	4.38	4.23
2	Amreli	100.89	60.46	5.99	73.90	35.18	4.76	87.40	47.82	5.47
3	Anand	4.26	2.46	5.78	2.74	1.06	3.86	3.50	1.76	5.03
4	Arvalli	9.25	5.29	5.72	9.40	3.59	3.82	9.33	4.44	4.76
5	Banaskantha	120.33	69.02	5.74	60.80	6.76	1.11	90.57	37.89	4.18
6	Bharuch	1.50	0.21	1.37	2.60	0.21	0.80	2.05	0.21	1.01
7	Bhavnagar	84.74	69.40	8.19	59.75	19.32	3.23	72.24	44.36	6.14
8	Botad	62.16	53.89	8.67	171.59	112.0	6.53	116.88	82.96	7.10
9	Chhotaudepur	5.25	2.59	4.94	3.17	1.43	4.52	4.21	2.01	4.78
10	Dahod	2.62	1.36	5.21	3.59	1.38	3.85	3.11	1.37	4.42
11	Dang	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Devbhumi	76.49	35.52	4.64	74.40	19.74	2.65	75.45	27.63	3.66
13	Gandhinagar	4.31	1.73	4.03	3.94	1.55	3.94	4.13	1.64	3.99
14	Gir Somnath	5.10	2.69	5.27	1.28	0.49	3.84	3.19	1.59	4.99
15	Jamnagar	135.81	80.21	5.91	90.35	27.94	3.09	113.08	54.07	4.78
16	Junagadh	211.93	111.72	5.27	13.60	6.39	4.70	112.77	59.06	5.24
17	Kachchh	316.65	163.98	5.18	549.08	130.2	2.37	432.87	147.1	3.40

Sr. No.	District	2014-15			2015-16			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
18	Kheda	11.00	5.87	5.34	11.63	4.88	4.20	11.32	5.38	4.75
19	Mahisagar	16.23	9.18	5.66	9.32	3.58	3.84	12.78	6.38	4.99
20	Mahesana	31.08	10.49	3.37	29.61	5.51	1.86	30.35	8.00	2.64
21	Morbi	218.59	119.25	5.46	179.26	132.3	7.38	198.93	125.7	6.32
22	Narmada	2.79	1.20	4.31	2.26	0.91	4.05	2.53	1.06	4.19
23	Navsari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Panchmahal	14.10	7.62	5.41	7.54	3.18	4.21	10.82	5.40	4.99
25	Patan	14.23	4.23	2.97	4.25	0.99	2.33	9.24	2.61	2.82
26	Porbandar	11.17	5.70	5.10	0.70	0.27	3.84	5.94	2.98	5.03
27	Rajkot	18.48	8.17	4.42	7.68	2.24	2.91	13.08	5.20	3.98
28	Sabarkantha	8.70	4.17	4.79	11.43	4.31	3.77	10.07	4.24	4.21
29	Surat	2.32	1.48	6.36	3.02	1.88	6.22	2.67	1.68	6.28
30	Surendranag	407.33	213.94	5.25	230.55	72.03	3.12	318.94	142.9	4.48
31	Tapi	0.00	0.00	0.00	0.21	0.08	3.84	0.11	0.04	3.84
32	Vadodara	1.73	0.95	5.48	0.87	0.40	4.60	1.30	0.67	5.19
33	Valsad	0.02	0.01	5.78	0.04	0.02	3.84	0.03	0.01	4.49
Total		1905.4	1056.4	5.54	1632.8	604.9	3.71	1769.2	830.7	4.70

Source: Directorate of Agriculture, Gandhinagar

Besides this, there is a wide scope of export outside the country because of the good reputation of our country as sesame exporter in the world market. By increasing its productivity per hectare, sesame seeds can be made available at competitive price and this is possible by insisting farmers of Surendranagar and Kutch district, especially for organic summer sesame cultivation, where the Narmada canal irrigation facility to be made available.

4.2.2.4 Major Sesame Varieties under Cultivation in the Gujarat State:

Table- 4.2.30 Sesame Varieties Released and Their Salient Features

Variety	Yield (kg/ha)	Days of Maturity	Area of Cultivation	Growing Season	Salient Features
G.Till 1	630	87	Gujarat State	<i>Kharif</i>	Creamy white seeded, medium and glabrous capsules
G.Till 2	651	85	Gujarat State	<i>Kharif</i>	White-seeded, short and hairy capsules
G.Till 3	695	86	Saurashtra region except for Vallabhipur area	<i>Kharif & summer</i>	White & bold seeded, Long and glabrous capsules
G.Till 4	770	81	North Saurashtra Agro climatic Zone-VI	<i>Kharif</i>	White-seeded, early maturing, medium and glabrous capsules
GJT 5	1241	91	Saurashtra region of Gujarat	Summer	White & bold seeded, Medium and glabrous capsules

G.Till 10	807	92	Gujarat State	<i>Kharif</i>	Black seeded, short and glabrous capsules
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Cropping Pattern with Respect to Sesame Crop:

1. Cotton- Kharif sesame
2. Groundnut- Kharif sesame
3. Cotton- summer sesame
4. Groundnut- summer sesame

Intercropping System with Respect to Sesame as Inter-crop

- 1 Cotton+ Sesame (1:3, 1:2 or 1:1)
- 2 Bunch Groundnut + Sesame (3:3)
- 3 Green Gram + Sesame ((3:3)
- 4 Castor (1:3)
- 5 spreading Groundnut + Sesame (1:3 or 1:2)

4.2.2.5 Input Management:

4.2.2.5.1 Seeds Requirement:

The seed replacement ratio (SRR) of sesame is 85 percent. Increase in sesame area having less scope but due to summer cultivation, we consider area increase by 1 percent and seed replacement ratio (SRR) by 85 percent, the projected seed requirement during next three years is given in Table 4.2.35. Due to high productivity in summer, total production will be increased sufficiently to meet consumers demand. Thus, there is a scope to enhance the productivity of self-pollinated crops like sesame in the state, especially through seed village concept.

Table- 4.2.31 Sesame Seed Requirement in the State (Base year- 2015-16)

Sr.	District	Area	Seed Rate	Total Seed Quantity
1	Ahmedabad	14.27	3	43
2	Amreli	73.9	3	222
3	Anand	2.74	3	8
4	Arvalli	9.4	3	28
5	Banaskantha	60.8	3	182
6	Bharuch	2.6	3	8
7	Bhavnagar	59.75	3	179
8	Botad	171.59	3	515
9	Chhotaudepur	3.17	3	10

Sr.	District	Area	Seed Rate	Total Seed Quantity
10	Dahod	3.59	3	11
11	Dang	0	3	0
12	Devbhumi Dwarka	74.4	3	223
13	Gandhinagar	3.94	3	12
14	Gir Somnath	1.28	3	4
15	Jamnagar	90.35	3	271
16	Junagadh	13.6	3	41
17	Kachchh	549.08	3	1647
18	Kheda	11.63	3	35
19	Mahisagar	9.32	3	28
20	Mahesana	29.61	3	89
21	Morbi	179.26	3	538
22	Narmada	2.26	3	7
23	Navsari	0	3	0
24	Panchmahal	7.54	3	23
25	Patan	4.25	3	13
26	Porbandar	0.7	3	2
27	Rajkot	7.68	3	23
28	Sabarkantha	11.43	3	34
29	Surat	3.02	3	9
30	Surendranagar	230.55	3	692
31	Tapi	0.21	3	1
32	Vadodara	0.87	3	3
33	Valsad	0.04	3	0
Total		1632.83	3.0	4898

Table- 4.2.32 Planning of Sesame Seed Input in the State (Projection for Three Years)

Sr N	District	Seed Quantity (Q) for the Year	SRR	Seed Quantity Required,		
				2017-18	2018-19	2019-20
1	Ahmedabad	43	85	37	37	38
2	Amreli	222	85	192	194	196
3	Anand	8	85	7	7	7
4	Arvalli	28	85	24	25	25
5	Banaskantha	182	85	158	160	161
6	Bharuch	8	85	7	7	7
7	Bhavnagar	179	85	155	157	158
8	Botad	515	85	446	451	455
9	Chhotaudepur	10	85	8	8	8
10	Dahod	11	85	9	9	10
11	Dang	0	85	0	0	0
12	Devbhumi	223	85	194	195	197
13	Gandhinagar	12	85	10	10	10

Sr N	District	Seed Quantity (Q) for the Year	SRR	Seed Quantity Required,		
				2017-18	2018-19	2019-20
14	Gir Somnath	4	85	3	3	3
15	Jamnagar	271	85	235	237	240
16	Junagadh	41	85	35	36	36
17	Kachchh	1647	85	1428	1442	1456
18	Kheda	35	85	30	31	31
19	Mahisagar	28	85	24	24	25
20	Mahesana	89	85	77	78	79
21	Morbi	538	85	466	471	475
22	Narmada	7	85	6	6	6
23	Navsari	0	85	0	0	0
24	Panchmahal	23	85	20	20	20
25	Patan	13	85	11	11	11
26	Porbandar	2	85	2	2	2
27	Rajkot	23	85	20	20	20
28	Sabarkantha	34	85	30	30	30
29	Surat	9	85	8	8	8
30	Surendranagar	692	85	600	606	611
31	Tapi	1	85	1	1	1
32	Vadodara	3	85	2	2	2
33	Valsad	0	85	0	0	0
Total		4898	85	4247	4289	4330

4.2.2.5.2 Fertilizer:

District-wise present consumption of fertilizers and their requirement in next three for sesame crop is given in Table- 4.2.33.

Table- 4.2.33 Fertilizers Requirement in the State for Sesame Crop (Base year- 2015-16)

Sr. N	District	Area (‘00	As per				Total Fertilizer Requirement				
			D	A	M	Ur	DA	AS	Mo	Ure	Tota
1	Ahmedabad	14.2	54	7	67	54	771	108	956	771	3582
2	Amreli	73.9	54	7	67	54	399	561	495	399	1854
3	Anand	2.74	54	7	67	54	148	208	184	148	688
4	Arvalli	9.4	54	7	67	54	508	714	630	508	2359
5	Banaskantha	60.8	54	7	67	54	328	462	407	328	1526
6	Bharuch	2.6	54	7	67	54	140	198	174	140	653
7	Bhavnagar	59.7	54	7	67	54	322	454	400	322	1499
8	Botad	171.	54	7	67	54	926	130	114	926	4306
9	Chhotaudep	3.17	54	7	67	54	171	241	212	171	796
1	Dahod	3.59	54	7	67	54	194	273	241	194	901
1	Dang	0	0	0	0	0	0	0	0	0	0
1	Devbhumi	74.4	54	7	67	54	401	565	498	401	1867

Sr. No	District	Area ('00	As per				Total Fertilizer Requirement				
			D	A	M	Ur	DA	AS	Mo	Ure	Tota
1	Gandhinagar	3.94	54	7	67	54	213	299	264	213	989
1	Gir Somnath	1.28	54	7	67	54	69	97	86	69	321
1	Jamnagar	90.3	54	7	67	54	487	686	605	487	2267
1	Junagadh	13.6	54	7	67	54	734	103	911	734	3414
1	Kachchh	549.	54	7	67	54	296	417	367	296	1378
1	Kheda	11.6	54	7	67	54	628	884	779	628	2919
1	Mahisagar	9.32	54	7	67	54	503	708	624	503	2339
2	Mahesana	29.6	54	7	67	54	159	225	198	159	7432
2	Morbi	179.	54	7	67	54	968	136	120	968	4499
2	Narmada	2.26	54	7	67	54	122	172	151	122	567
2	Navsari	0	0	0	0	0	0	0	0	0	0
2	Panchmahal	7.54	54	7	67	54	407	573	505	407	1893
2	Patan	4.25	54	7	67	54	230	323	285	230	1067
2	Porbandar	0.7	54	7	67	54	38	53	47	38	176
2	Rajkot	7.68	54	7	67	54	415	584	515	415	1928
2	Sabarkantha	11.4	54	7	67	54	617	869	766	617	2869
2	Surat	3.02	54	7	67	54	163	230	202	163	758
3	Surendranag	230.	54	7	67	54	124	175	154	124	5786
3	Tapi	0.21	54	7	67	54	11	16	14	11	53
3	Vadodara	0.87	54	7	67	54	47	66	58	47	218
3	Valsad	0.04	0	0	0	0	0	0	0	0	0
Total		1632.8	54	76	67	54	8817	12409	10939	8817	40983

DAP= Diammonium Phosphate, AS=Ammonium Sulphate and MoP= Murat of Potash

Table- 4.2.34 Planning of Fertilizers Input for Sesame Crop in the State

Sr. No	District	Fertilizers Quantity(Q) for the Year 2015-16	Fertilizers Quantity Required, quintals		
			2017-18	2018-19	2019-20
1	Ahmedabad	3582	3653	3689	3725
2	Amreli	18549	18920	19105	19291
3	Anand	688	701	708	715
4	Arvalli	2359	2407	2430	2454
5	Banaskantha	15261	15566	15719	15871
6	Bharuch	653	666	672	679
7	Bhavnagar	14997	15297	15447	15597
8	Botad	43069	43930	44361	44792
9	Chhotaudepur	796	812	820	827
10	Dahod	901	919	928	937
11	Dang	0	0	0	0
12	Devbhumi Dwarka	18674	19048	19235	19421
13	Gandhinagar	989	1009	1019	1028
14	Gir Somnath	321	328	331	334

Sr. No	District	Fertilizers Quantity(Q) for the Year 2015-16	Fertilizers Quantity Required, quintals		
			2017-18	2018-19	2019-20
15	Jamnagar	22678	23131	23358	23585
16	Junagadh	3414	3482	3516	3550
17	Kachchh	137819	140575	141954	143332
18	Kheda	2919	2978	3007	3036
19	Mahisagar	2339	2386	2409	2433
20	Maheana	7432	7581	7655	7729
21	Morbi	44994	45894	46344	46794
22	Narmada	567	579	584	590
23	Navsari	0	0	0	0
24	Panchmahal	1893	1930	1949	1968
25	Patan	1067	1088	1099	1109
26	Porbandar	176	179	181	183
27	Rajkot	1928	1966	1986	2005
28	Sabarkantha	2869	2926	2955	2984
29	Surat	758	773	781	788
30	Surendranagar	57868	59025	59604	60183
31	Tapi	53	54	54	55
32	Vadodara	218	223	225	227
33	Valsad	0	0	0	0
	Total	409830	418027	422125	426224

4.2.2.5.3 Pesticides/ Fungicides

Sesame is very risky crop because many diseases and pests are occurring and negligence in controlling pests and diseases sometimes causes failure of the crop. Improper uses of chemical pesticides/fungicides restrict the export of sesame seed to great extent. There is an urgent need of promoting integrated pest and disease management through updating knowledge of farmers by training and conducting demonstrations that increase sustainability and profitability. District-wise consumption of pesticides/fungicides and its projection for next three years is given in Table- 4.2.35 and 4.2.36, respectively.

Table-4.2.35 Pesticides/ Fungicides Requirements for Sesame Crops in the State
(Base year- 2015-16)

Sr.No	District	Area ('00 ha)	Pesticides Consumption on Liquid ('000 Liter)	Fungicides Consumption			Grand Total ('000 Lit/kg)
				Liquid ('000 Liter)	Powder ('000 kg)	Total	
1	Ahmedabad	14.27	42.81	42.81	42.81	85.62	128.43
2	Amreli	73.9	221.70	221.7	221.70	443.4	665.10
3	Anand	2.74	8.22	8.22	8.22	16.44	24.66
4	Arvalli	9.4	28.20	28.20	28.20	56.40	84.60
5	Banaskantha	60.8	182.40	182.4	182.40	364.8	547.20
6	Bharuch	2.6	7.80	7.80	7.80	15.60	23.40
7	Bhavnagar	59.75	179.25	179.2	179.25	358.5	537.75
8	Botad	171.5	514.77	514.7	514.77	1029.5	1544.3
9	Chhotaudepur	3.17	9.51	9.51	9.51	19.02	28.53
10	Dahod	3.59	10.77	10.77	10.77	21.54	32.31
11	Dang	0	0.00	0.00	0.00	0.00	0.00
12	Devbhumi	74.4	223.20	223.2	223.20	446.4	669.60
13	Gandhinagar	3.94	11.82	11.82	11.82	23.64	35.46
14	Gir Somnath	1.28	3.84	3.84	3.84	7.68	11.52
15	Jamnagar	90.35	271.05	271.0	271.05	542.1	813.15
16	Junagadh	13.6	40.80	40.80	40.80	81.60	122.40
17	Kachchh	549.0	1647.24	1647.2	1647.2	3294.4	4941.7
18	Kheda	11.63	34.89	34.89	34.89	69.78	104.67
19	Mahisagar	9.32	27.96	27.96	27.96	55.92	83.88
20	Mahesana	29.61	88.83	88.83	88.83	177.6	266.49
21	Morbi	179.2	537.78	537.7	537.78	1075.5	1613.3
22	Narmada	2.26	6.78	6.78	6.78	13.56	20.34
23	Navsari	0	0.00	0.00	0.00	0.00	0.00
24	Panchmahal	7.54	22.62	22.62	22.62	45.24	67.86
25	Patan	4.25	12.75	12.75	12.75	25.50	38.25
26	Porbandar	0.7	2.10	2.10	2.10	4.20	6.30
27	Rajkot	7.68	23.04	23.04	23.04	46.08	69.12
28	Sabarkantha	11.43	34.29	34.29	34.29	68.58	102.87
29	Surat	3.02	9.06	9.06	9.06	18.12	27.18
30	Surendranagar	230.5	691.65	691.6	691.65	1383.3	2074.9
31	Tapi	0.21	0.63	0.63	0.63	1.26	1.89
32	Vadodara	0.87	2.61	2.61	2.61	5.22	7.83
33	Valsad	0.04	0.12	0.12	0.12	0.24	0.36
	Total	1632.8	4898.49	4898.4	4898.4	9796.9	14695.4
		3		9	9	8	7

Estimated based on crop area and pest and disease status

Table- 4.2.36 Planning of Pesticides/Fungicides Input for Sesame Crop in the State (Projection for Three Years)

Sr. No	District	Pesticides/ Fungicides Quantity ('000 Lit/kg) for the Year 2015-16	Pesticides/Fungicides Quantity Required (000 Lit/kg)		
			2017-18	2018-19	2019-20
1	Ahmedabad	128.43	131.00	132.28	133.57
2	Amreli	665.10	678.40	685.05	691.70
3	Anand	24.66	25.15	25.40	25.65
4	Arvalli	84.60	86.29	87.14	87.98
5	Banaskantha	547.20	558.14	563.62	569.09
6	Bharuch	23.40	23.87	24.10	24.34
7	Bhavnagar	537.75	548.51	553.88	559.26
8	Botad	1544.31	1575.20	1590.64	1606.08
9	Chhotaudepur	28.53	29.10	29.39	29.67
10	Dahod	32.31	32.96	33.28	33.60
11	Dang	0.00	0.00	0.00	0.00
12	Devbhumi	669.60	682.99	689.69	696.38
13	Gandhinagar	35.46	36.17	36.52	36.88
14	Gir Somnath	11.52	11.75	11.87	11.98
15	Jamnagar	813.15	829.41	837.54	845.68
16	Junagadh	122.40	124.85	126.07	127.30
17	Kachchh	4941.72	5040.55	5089.97	5139.39
18	Kheda	104.67	106.76	107.81	108.86
19	Mahisagar	83.88	85.56	86.40	87.24
20	Mahesana	266.49	271.82	274.48	277.15
21	Morbi	1613.34	1645.61	1661.74	1677.87
22	Narmada	20.34	20.75	20.95	21.15
23	Navsari	0.00	0.00	0.00	0.00
24	Panchmahal	67.86	69.22	69.90	70.57
25	Patan	38.25	39.02	39.40	39.78
26	Porbandar	6.30	6.43	6.49	6.55
27	Rajkot	69.12	70.50	71.19	71.88
28	Sabarkantha	102.87	104.93	105.96	106.98
29	Surat	27.18	27.72	28.00	28.27
30	Surendranagar	2074.95	2116.45	2137.20	2157.95
31	Tapi	1.89	1.93	1.95	1.97
32	Vadodara	7.83	7.99	8.06	8.14
33	Valsad	0.36	0.37	0.37	0.37
	Total	14695.47	14989.38	15136.33	15283.29

4.2.2.6 Constraints Analysis and Recommended Interventions for Yield Gaps

Analysis of Sesame:

Yield gap based on variety yield was quite higher as compared to that on state average. This indicates that gap may be due to non-adoption of technologies developed by SAUs. The constraints associated with low productivity may be enumerated as under

- Rainfall dependent growing conditions
- Low input management.
- Poor plant stands due to low germination
- Poor weed management
- Poor insect and disease management
- Low use of organic matter due to poor awareness regarding soil health

4.2.2.7 Gap analysis:

Table - 4.2.37 District –wise Yield Gap of Sesame Crop (Base Mean of Year-2014-15 and 2015-16)

Sr No	Name of the Districts	District Yield(q/ha)	State Yield* (q/ha)	Variety (G Til 4) Yield (q/ha)	Yield Gap (%) over	
					State Average	Variety Yield
1	Ahmedabad	4.23	4.70	7.70	-10.00	-45.06
2	Amreli	5.47	4.70	7.70	16.38	-28.96
3	Anand	5.03	4.70	7.70	7.02	-34.68
4	Arvali	4.76	4.70	7.70	1.28	-38.18
5	Banaskantha	4.18	4.70	7.70	-11.06	-45.71
6	Bharuch	1.01	4.70	7.70	-78.51	-86.88
7	Bhavnagar	6.14	4.70	7.70	30.64	-20.26
8	Botad	7.10	4.70	7.70	51.06	-7.79
9	Chhotaudepur	4.78	4.70	7.70	1.70	-37.92
10	Dahod	4.42	4.70	7.70	-5.96	-42.60
11	Dang	0.00	4.70	7.70	-100.00	-100.00
12	Devbhumi	3.66	4.70	7.70	-22.13	-52.47
13	Gandhinagar	3.99	4.70	7.70	-15.11	-48.18
14	Gir Somnath	4.99	4.70	7.70	6.17	-35.19
15	Jamnagar	4.78	4.70	7.70	1.70	-37.92
16	Junagadh	5.24	4.70	7.70	11.49	-31.95
17	Kachchh	3.40	4.70	7.70	-27.66	-55.84
18	Kheda	4.75	4.70	7.70	1.06	-38.31
19	Mahisagar	4.99	4.70	7.70	6.17	-35.19
20	Mahesana	2.64	4.70	7.70	-43.83	-65.71
21	Morbi	6.32	4.70	7.70	34.47	-17.92
22	Narmada	4.19	4.70	7.70	-10.85	-45.58
23	Navsari	0.00	4.70	7.70	-100.00	-100.00

Sr No	Name of the Districts	District Yield(q/ha)	State Yield* (q/ha)	Variety (G Til 4) Yield (q/ha)	Yield Gap (%) over	
					State Average	Variety Yield
24	Panchmahal	4.99	4.70	7.70	6.17	-35.19
25	Patan	2.82	4.70	7.70	-40.00	-63.38
26	Porbandar	5.03	4.70	7.70	7.02	-34.68
27	Rajkot	3.98	4.70	7.70	-15.32	-48.31
28	Sabarkantha	4.21	4.70	7.70	-10.43	-45.32
29	Surat	6.28	4.70	7.70	33.62	-18.44
30	Surendranagar	4.48	4.70	7.70	-4.68	-41.82
31	Tapi	3.84	4.70	7.70	-18.30	-50.13
32	Vadodara	5.19	4.70	7.70	10.43	-32.60
33	Valsad	4.49	4.70	7.70	-4.47	-41.69
	Average	4.70	4.70	7.70	0.00	-38.96

*state average of two years (2014-15 to 2015-16)

Table- 4.2.38 Issues Related to Yield Gap and Its Sustainability and Strategies for Bridging These Gaps for Sesame Crop

Sr. No	Factors/ Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators/ Outputs
a	Low germination due to improper placement of seed and lack of knowledge that of	To popularize scientific package of practices	Creating awareness through demonstrations, trainings, <i>shibir</i> , literatures etc.	Increased yield (5-8%)
b	Low adoption of improved package practices due to lack of awareness	To popularize scientific package of practices	Creating awareness and adoption of a scientific package of practices through demonstrations, training, field days, <i>shibir</i> , literature etc.	Increase in the production (10-12%)
c	Insect pests and diseases problems due to lack of knowledge of their management options	Integrated Pest and disease management	Creating awareness and adoption of IPM through demonstrations, training, <i>shibir</i> , literature etc.	Pests- diseases management leads to yield increment (15-20%)
d	Maintain plant population and land configuration and line sowing in flat land	Line sowing and proper thinning	Creating awareness of sowing by automatic seed drill and thinning at proper time and distance through demonstrations, training,	Increase in yield (5-10 %)

			field days, <i>shibir</i> , literature etc.	
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Table- 4.2.39 Recommended Interventions for Bridging the Gaps for Sesame Crop

No	Program	Activities
1	Increase Availability of Quality Seeds /Seed Production	
	Seed planning and production	Identification of potential areas, Farmers led Participatory seed production of improved varieties of crops
		Motivating farmers to produce the seed of best varieties through Seed village programmes, capacity building of farmers and extension functionaries and exposure visits
	Seed distribution and seed storage	Establishment of seed selling units for timely distribution
		Construction of godowns
2.	Increase in Seed Replacement Rate	
	Production of quality seeds as per area to be sown	Create awareness about the production of quality seeds of improved varieties
		Strengthen the linkage between supply agencies and the farmers
3.	Soil Health Management	
	Soil testing	Establishment of soil and water testing laboratory as well as mobile soil testing laboratory
		Create awareness about the importance of soil testing
	Biofertilizer	Popularize the use of bio-fertilizers through capacity building and demonstrations
	Green Manuring	Popularize the green manuring practices through capacity building and demonstrations
	Enrichment of FYM	Popularize the methods of preparation of good quality FYM and vermicompost
	I N M	Educating farmers about the use of balanced fertilizer
	Micronutrient	Identification of micronutrient deficient areas and educating farmers about their importance
	Recycling of crop residues	Converting of crop residue in small pieces through shredders and using it for composting
	Crop-rotation	Suggesting suitable crop rotation for improving soil health

	IWM	Weeds absorb a huge quantity of nutrients so educating the farmers about integrated weed management practices is necessary.
4.	Water Management	
	Water harvesting	Establishment of rainwater harvesting units and deepening of the well and its recharging through Khet talavadi/village ponds
	Water use efficiency	Popularize the micro irrigation systems and irrigation schedule through capacity building
		Introduction of the participatory irrigation management approach
		Moisture conservations through the organic and plastic mulch
5.	Lifesaving irrigation/ irrigation at critical stages of the crops	The popularization of critical stages of sesame through on farm and village level training
6.	Plant Health Management	
	Plant health clinic	Establishment of plant health clinics at KVK and mobile health clinics
	IPM/IDM	Educating the farmers about various insect pests and diseases of sesame and their IPM/IDM through demonstrations and training
	Proper use of plant protection equipment	Educate the farmers about the proper use of plant protection equipment, provide necessary inputs to the farmers
7.	Farm Mechanization	
	Improved hand tools and small implements	Survey for drudgery reduction Educating farmers for use of machines/ implements.
	Hand rotary weeder, power tiller, shredder, farm tractors, mechanical harvesters, oil engines, pumps, submersibles, laser leveller, bullock cart.	Educating the farmers and providing units on co-operative basis and educate farmers for custom hiring.
8.	Value Addition	
	Processing Units, establishment of mini oil extractor/ seed colour sorting equipment, grading and packaging units.	Create awareness for value addition and educate farmers, provide units on a co-operative basis, marketing awareness

9.	Marketing	
	Strengthening APMC and construction of warehouses	Establishment of the warehouse at cluster and taluka level
	Market linkage	Strengthening market linkage through AGMARK net
	Collection van	Units and monitoring

4.2.2.8 Strategies for Bridging the Gaps:

- 1 Seed production enhancement through seed village programme
- 2 Demonstration on IPM
- 3 Demonstration on INM
- 4 Demonstration on an improved variety
- 5 Demonstration on Biofertilizers
- 6 Demonstration on vermicompost
- 7 Demonstration on thinning
- 8 Demonstration on irrigation at critical stages
- 9 Training to staff and extension functionaries-state level
- 10 Training to farmers on following topics
 - i. Soil health management
 - ii. Integrated pests and diseases management
 - iii. Plant health management
 - iv. Organic farming
 - v. Installation and maintenance of drip Irrigation system
 - vi. Production technology of *Kharif* sesame
 - vii. Production technology of summer sesame
 - viii. Biological Control for Pests and Diseases Management
 - ix. Bio-compost of farm waste
 - x. Post-harvest technology and value addition
 - xi. Effect of thinning and lifesaving irrigation/irrigation
 - xii. Production technology for export of sesame

4.2.2.9 Detailed Action Plan with Costs:

Table - 4.2.40 Sesame Seed Planning/Seed Village Program (Seed Production Enhancement)

Sr. No.	District	Sesame Seed Village Program (Phy-Area in ha, Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	60	4.5	60	4.5	60	4.5	180	13.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	30	2.25	30	2.25	30	2.25	90	6.75
6	Bharuch	0	0	0	0	0	0	0	0
7	Bhavnagar	30	2.25	30	2.25	30	2.25	90	6.75
8	Botad	110	8.25	110	8.25	110	8.25	330	24.75
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	60	4.5	60	4.5	60	4.5	180	13.5
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	0	0	0	0	0	0	0	0
15	Jamnagar	60	4.5	60	4.5	60	4.5	180	13.5
16	Junagadh	0	0	0	0	0	0	0	0
17	Kachchh	300	22.5	300	22.5	300	22.5	900	67.5
18	Kheda	0	0	0	0	0	0	0	0
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	20	1.5	20	1.5	20	1.5	60	4.5
21	Morbi	130	9.75	130	9.75	130	9.75	390	29.25
22	Narmada	0	0	0	0	0	0	0	0
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	0	0	0	0
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	200	15	200	15	200	15	600	45
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	1000	75	1000	75	100	75	3000	225

Cost Norms Rs. 7500/hectare Seed Rate: 3 kg/ha

Table- 4.2.41 District-wise Demonstration Proposed on Integrated Pests Management

Sr.No	District	Year-wise Demonstration on IPM							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1.5	20	1.5	20	1.5	60	4.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	12	0.9	12	0.9	12	0.9	36	2.7
6	Bharuch	1	0.08	1	0.08	1	0.08	3	0.23
7	Bhavnagar	15	1.13	15	1.13	15	1.13	45	3.38
8	Botad	40	3	40	3	40	3	120	9
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	15	1.13	15	1.13	15	1.13	45	3.38
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	2	0.15	2	0.15	2	0.15	6	0.45
15	Jamnagar	20	1.5	20	1.5	20	1.5	60	4.5
16	Junagadh	2	0.15	2	0.15	2	0.15	6	0.45
17	Kachchh	120	9	120	9	120	9	360	27
18	Kheda	2	0.15	2	0.15	2	0.15	6	0.45
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	2	0.15	2	0.15	2	0.15	6	0.45
21	Morbi	40	3	40	3	40	3	120	9
22	Narmada	1	0.08	1	0.08	1	0.08	3	0.23
23	Navsari	1	0.08	1	0.08	1	0.08	3	0.23
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.15	2	0.15	2	0.15	6	0.45
27	Rajkot	5	0.38	5	0.38	5	0.38	15	1.13
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	50	3.75	50	3.75	50	3.75	150	11.25
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	350	26.25	350	26.25	350	26.25	1050	78.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table - 4.2.42 District-wise Demonstration Proposed on Integrated Nutrient Management for Sesame Crop

Sr.No	District	Year-wise Demonstration on IPM							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1.5	20	1.5	20	1.5	60	4.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	12	0.9	12	0.9	12	0.9	36	2.7
6	Bharuch	1	0.08	1	0.08	1	0.08	3	0.23
7	Bhavnagar	15	1.13	15	1.13	15	1.13	45	3.38
8	Botad	40	3	40	3	40	3	120	9
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	15	1.13	15	1.13	15	1.13	45	3.38
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	2	0.15	2	0.15	2	0.15	6	0.45
15	Jamnagar	20	1.5	20	1.5	20	1.5	60	4.5
16	Junagadh	2	0.15	2	0.15	2	0.15	6	0.45
17	Kachchh	120	9	120	9	120	9	360	27
18	Kheda	2	0.15	2	0.15	2	0.15	6	0.45
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	2	0.15	2	0.15	2	0.15	6	0.45
21	Morbi	40	3	40	3	40	3	120	9
22	Narmada	1	0.08	1	0.08	1	0.08	3	0.23
23	Navsari	1	0.08	1	0.08	1	0.08	3	0.23
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.15	2	0.15	2	0.15	6	0.45
27	Rajkot	5	0.38	5	0.38	5	0.38	15	1.13
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	50	3.75	50	3.75	50	3.75	150	11.25
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	350	26.25	350	26.25	350	26.25	1050	78.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.43 District-wise Demonstration Proposed on Improved Varieties of Sesame

Sr.No	District	Year-wise Demonstration on IPM							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1.5	20	1.5	20	1.5	60	4.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	12	0.9	12	0.9	12	0.9	36	2.7
6	Bharuch	1	0.08	1	0.08	1	0.08	3	0.23
7	Bhavnagar	15	1.13	15	1.13	15	1.13	45	3.38
8	Botad	40	3	40	3	40	3	120	9
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	15	1.13	15	1.13	15	1.13	45	3.38
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	2	0.15	2	0.15	2	0.15	6	0.45
15	Jamnagar	20	1.5	20	1.5	20	1.5	60	4.5
16	Junagadh	2	0.15	2	0.15	2	0.15	6	0.45
17	Kachchh	120	9	120	9	120	9	360	27
18	Kheda	2	0.15	2	0.15	2	0.15	6	0.45
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	2	0.15	2	0.15	2	0.15	6	0.45
21	Morbi	40	3	40	3	40	3	120	9
22	Narmada	1	0.08	1	0.08	1	0.08	3	0.23
23	Navsari	1	0.08	1	0.08	1	0.08	3	0.23
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.15	2	0.15	2	0.15	6	0.45
27	Rajkot	5	0.38	5	0.38	5	0.38	15	1.13
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	50	3.75	50	3.75	50	3.75	150	11.25
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	350	26.25	350	26.25	350	26.25	1050	78.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.44 District-wise Demonstration Proposed on Effect of Biofertilizer in Sesame

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1.5	20	1.5	20	1.5	60	4.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvali	0	0	0	0	0	0	0	0
5	Banaskantha	12	0.9	12	0.9	12	0.9	36	2.7
6	Bharuch	1	0.08	1	0.08	1	0.08	3	0.23
7	Bhavnagar	15	1.13	15	1.13	15	1.13	45	3.38
8	Botad	40	3	40	3	40	3	120	9
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	15	1.13	15	1.13	15	1.13	45	3.38
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	2	0.15	2	0.15	2	0.15	6	0.45
15	Jamnagar	20	1.5	20	1.5	20	1.5	60	4.5
16	Junagadh	2	0.15	2	0.15	2	0.15	6	0.45
17	Kachchh	120	9	120	9	120	9	360	27
18	Kheda	2	0.15	2	0.15	2	0.15	6	0.45
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	2	0.15	2	0.15	2	0.15	6	0.45
21	Morbi	40	3	40	3	40	3	120	9
22	Narmada	1	0.08	1	0.08	1	0.08	3	0.23
23	Navsari	1	0.08	1	0.08	1	0.08	3	0.23
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.15	2	0.15	2	0.15	6	0.45
27	Rajkot	5	0.38	5	0.38	5	0.38	15	1.13
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	50	3.75	50	3.75	50	3.75	150	11.25
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	350	26.25	350	26.25	350	26.25	1050	78.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.45 District-wise Demonstration Proposed on Effect of Vermicompost in Sesame

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1.5	20	1.5	20	1.5	60	4.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvali	0	0	0	0	0	0	0	0
5	Banaskantha	12	0.9	12	0.9	12	0.9	36	2.7
6	Bharuch	1	0.08	1	0.08	1	0.08	3	0.23
7	Bhavnagar	15	1.13	15	1.13	15	1.13	45	3.38
8	Botad	40	3	40	3	40	3	120	9
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	15	1.13	15	1.13	15	1.13	45	3.38
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	2	0.15	2	0.15	2	0.15	6	0.45
15	Jamnagar	20	1.5	20	1.5	20	1.5	60	4.5
16	Junagadh	2	0.15	2	0.15	2	0.15	6	0.45
17	Kachchh	120	9	120	9	120	9	360	27
18	Kheda	2	0.15	2	0.15	2	0.15	6	0.45
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	2	0.15	2	0.15	2	0.15	6	0.45
21	Morbi	40	3	40	3	40	3	120	9
22	Narmada	1	0.08	1	0.08	1	0.08	3	0.23
23	Navsari	1	0.08	1	0.08	1	0.08	3	0.23
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.15	2	0.15	2	0.15	6	0.45
27	Rajkot	5	0.38	5	0.38	5	0.38	15	1.13
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	50	3.75	50	3.75	50	3.75	150	11.25
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	350	26.25	350	26.25	350	26.25	1050	78.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.46 District-wise Demonstration Proposed on Effect of thinning in Sesame

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1.5	20	1.5	20	1.5	60	4.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvali	0	0	0	0	0	0	0	0
5	Banaskantha	12	0.9	12	0.9	12	0.9	36	2.7
6	Bharuch	1	0.08	1	0.08	1	0.08	3	0.23
7	Bhavnagar	15	1.13	15	1.13	15	1.13	45	3.38
8	Botad	40	3	40	3	40	3	120	9
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	15	1.13	15	1.13	15	1.13	45	3.38
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	2	0.15	2	0.15	2	0.15	6	0.45
15	Jamnagar	20	1.5	20	1.5	20	1.5	60	4.5
16	Junagadh	2	0.15	2	0.15	2	0.15	6	0.45
17	Kachchh	120	9	120	9	120	9	360	27
18	Kheda	2	0.15	2	0.15	2	0.15	6	0.45
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	2	0.15	2	0.15	2	0.15	6	0.45
21	Morbi	40	3	40	3	40	3	120	9
22	Narmada	1	0.08	1	0.08	1	0.08	3	0.23
23	Navsari	1	0.08	1	0.08	1	0.08	3	0.23
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.15	2	0.15	2	0.15	6	0.45
27	Rajkot	5	0.38	5	0.38	5	0.38	15	1.13
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	50	3.75	50	3.75	50	3.75	150	11.25
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	350	26.25	350	26.25	350	26.25	1050	78.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.47 District-wise Demonstration Proposed on Effect of irrigation at critical stage of the crop in Sesame

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	20	1.5	20	1.5	20	1.5	60	4.5
3	Anand	0	0	0	0	0	0	0	0
4	Arvali	0	0	0	0	0	0	0	0
5	Banaskantha	12	0.9	12	0.9	12	0.9	36	2.7
6	Bharuch	1	0.08	1	0.08	1	0.08	3	0.23
7	Bhavnagar	15	1.13	15	1.13	15	1.13	45	3.38
8	Botad	40	3	40	3	40	3	120	9
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	15	1.13	15	1.13	15	1.13	45	3.38
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	2	0.15	2	0.15	2	0.15	6	0.45
15	Jamnagar	20	1.5	20	1.5	20	1.5	60	4.5
16	Junagadh	2	0.15	2	0.15	2	0.15	6	0.45
17	Kachchh	120	9	120	9	120	9	360	27
18	Kheda	2	0.15	2	0.15	2	0.15	6	0.45
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	2	0.15	2	0.15	2	0.15	6	0.45
21	Morbi	40	3	40	3	40	3	120	9
22	Narmada	1	0.08	1	0.08	1	0.08	3	0.23
23	Navsari	1	0.08	1	0.08	1	0.08	3	0.23
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	2	0.15	2	0.15	2	0.15	6	0.45
27	Rajkot	5	0.38	5	0.38	5	0.38	15	1.13
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	50	3.75	50	3.75	50	3.75	150	11.25
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	350	26.25	350	26.25	350	26.25	1050	78.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.48 Training Proposed for Capacity Building for Staff of Extension Functionaries for Sesame Crop (State Level)

Category	Year-wise Training to Staffs (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	1500	15.0	1500	15.0	1500	15.0	7500	45.0
Cooperative & NGOs	750	7.5	750	7.5	750	7.5	3750	22.5
PRI Staff & Others	750	7.5	750	7.5	750	7.5	3750	22.5
Total	3000	30	3000	30	3000	30	9000	90

Cost Norms: 1000/trainee/day, 30 staff/ training

Table- 4.2.49 Training Proposed for Capacity Building of Farmers on Soil Health Management for Sesame Crop at District Level

Sr. No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0

Sr. No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

800/trainee/day, 30 Farmers/ training

Table- 4.2.50 Training Proposed for Capacity Building of Farmers on Integrated Pests and Diseases Management for Sesame Crop at District Level

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.51 Training Proposed for Capacity Building of Farmers on Plant Health Management at District Level for Sesame Crop

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: Rs. 800/trainee/day, 30 Farmers/ training

Table- 4.2.52 Training Proposed for Capacity Building of Farmers on Organic Farming at District Level for Sesame Crop

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: Rs. 800/trainee/day, 30 Farmers/ training

Table- 4.2.53 Training Proposed for Capacity Building of Farmers on Installation and Maintenance of Drip Irrigation system at District Level for Sesame Crop

Sr. No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvali	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0

Sr. No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.54 Training Proposed for Capacity Building of Farmers on Production Technology of *Kharif* Sesame at District Level for Sesame Crop

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.55 Training Proposed for Capacity Building of Farmers on Production Technology of Summer Sesame at District Level

Sr.No	District	(Phy-No., Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2

Sr.No	District	(Phy-No., Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: Rs. 800/trainee/day 30 Farmers/ training

Table- 4.2.56 Training Proposed for Capacity Building of Farmers on Biological Control for Pests and Diseases Management at District Level for Sesame Crop

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.57 Training Proposed for Capacity Building of Farmers on Bio-Compost of Farm Waste at District Level for Sesame Crop

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.58 Training Proposed for Capacity Building of Farmers on Post Harvest Technology and Value Addition at District Level for Sesame Crop

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.59 Special Training Proposed for Capacity Building of Farmers on effect of thinning and lifesaving irrigation/irrigation at critical stage at District Level for Sesame Crop

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44

OILSEED AND PULSE CROPS

Sr.No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.60 Special Training Proposed for Capacity Building of Farmers on Production technology for export of sesame at District Level

Sr. No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	600	4.8	600	4.8	600	4.8	1800	14.4
3	Anand	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0
5	Banaskantha	360	2.88	360	2.88	360	2.88	1080	8.64
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	300	2.4	300	2.4	300	2.4	900	7.2
8	Botad	900	7.2	900	7.2	900	7.2	2700	21.6
9	Chhotaudepur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi	450	3.6	450	3.6	450	3.6	1350	10.8

OILSEED AND PULSE CROPS

Sr. No	District	(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	60	0.48	60	0.48	60	0.48	180	1.44
15	Jamnagar	600	4.8	600	4.8	600	4.8	1800	14.4
16	Junagadh	60	0.48	60	0.48	60	0.48	180	1.44
17	Kachchh	3000	24	3000	24	3000	24	9000	72
18	Kheda	60	0.48	60	0.48	60	0.48	180	1.44
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mahesana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	1050	8.4	1050	8.4	1050	8.4	3150	25.2
22	Narmada	30	0.24	30	0.24	30	0.24	90	0.72
23	Navsari	30	0.24	30	0.24	30	0.24	90	0.72
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	60	0.48	60	0.48	60	0.48	180	1.44
27	Rajkot	150	1.2	150	1.2	150	1.2	450	3.6
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	1200	9.6	1200	9.6	1200	9.6	3600	28.8
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	9000	72	9000	72	9000	72	27000	216

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.61 Projected Outcome and Growth during the Plan Period for Sesame Crop in the State

(Area: '00 ha, Production: '00 T, Productivity: q/ha).

SN.	District	Base Year 2015-16			2017-18			2018-19			2019-20		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Ahmedabad	10.35	4.38	4.23	10.56	4.75	4.50	10.66	5.33	5.00	10.76	5.92	5.50
2	Amreli	87.40	47.82	5.47	89.15	49.03	5.50	90.02	54.01	6.00	90.90	59.08	6.50
3	Anand	3.50	1.76	5.03	3.57	1.96	5.50	3.61	2.16	6.00	3.64	2.37	6.50
4	Arvalli	9.33	4.44	4.76	9.52	4.76	5.00	9.61	5.29	5.50	9.70	5.82	6.00
5	Banaskantha	90.57	37.89	4.18	92.38	41.57	4.50	93.29	46.64	5.00	94.19	51.81	5.50
6	Bharuch	2.05	0.21	1.01	2.09	0.94	4.50	2.11	1.06	5.00	2.13	1.17	5.50
7	Bhavnagar	72.24	44.36	6.14	73.68	47.90	6.50	74.41	52.09	7.00	75.13	56.35	7.50
8	Botad	116.88	82.96	7.10	119.22	89.41	7.50	120.39	96.31	8.00	121.56	103.32	8.50
9	Chhotaudepur	4.21	2.01	4.78	4.29	2.15	5.00	4.34	2.38	5.50	4.38	2.63	6.00
10	Dahod	3.11	1.37	4.42	3.17	1.43	4.50	3.20	1.60	5.00	3.23	1.78	5.50
11	Dang	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	1.00
12	Devbhumi	75.45	27.63	3.66	76.96	34.63	4.50	77.71	38.86	5.00	78.47	43.16	5.50
13	Gandhinagar	4.13	1.64	3.99	4.21	1.90	4.50	4.25	2.13	5.00	4.30	2.36	5.50
14	Gir Somnath	3.19	1.59	4.99	3.25	1.79	5.50	3.29	1.97	6.00	3.32	2.16	6.50
15	Jamnagar	113.08	54.07	4.78	115.34	57.67	5.00	116.47	64.06	5.50	117.60	70.56	6.00
16	Junagadh	112.77	59.06	5.24	115.03	63.26	5.50	116.15	69.69	6.00	117.28	76.23	6.50
17	Kachchh	432.87	147.11	3.40	441.53	198.69	4.50	445.86	222.93	5.00	450.18	247.60	5.50
18	Kheda	11.32	5.38	4.75	11.55	5.77	5.00	11.66	6.41	5.50	11.77	7.06	6.00
19	Mahisagar	12.78	6.38	4.99	13.04	7.17	5.50	13.16	7.90	6.00	13.29	8.64	6.50
20	Mahesana	30.35	8.00	2.64	30.96	13.93	4.50	31.26	15.63	5.00	31.56	17.36	5.50
21	Morbi	198.93	125.78	6.32	202.91	131.89	6.50	204.90	143.43	7.00	206.89	155.17	7.50
22	Narmada	2.53	1.06	4.19	2.58	1.16	4.50	2.61	1.30	5.00	2.63	1.45	5.50
23	Navsari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	1.00

SN.	District	Base Year 2015-16			2017-18			2018-19			2019-20		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
24	Panchmahal	10.82	5.40	4.99	11.04	6.07	5.50	11.14	6.69	6.00	11.25	7.31	6.50
25	Patan	9.24	2.61	2.82	9.42	4.24	4.50	9.52	4.76	5.00	9.61	5.29	5.50
26	Porbandar	5.94	2.98	5.03	6.06	3.33	5.50	6.12	3.67	6.00	6.18	4.02	6.50
27	Rajkot	13.08	5.20	3.98	13.34	6.00	4.50	13.47	6.74	5.00	13.60	7.48	5.50
28	Sabarkantha	10.07	4.24	4.21	10.27	4.62	4.50	10.37	5.19	5.00	10.47	5.76	5.50
29	Surat	2.67	1.68	6.28	2.72	1.77	6.50	2.75	1.93	7.00	2.78	2.08	7.50
30	Surendranagar	318.94	142.99	4.48	325.32	162.66	5.00	328.51	180.68	5.50	331.70	199.02	6.00
31	Tapi	0.11	0.04	3.84	0.11	0.05	4.50	0.11	0.06	5.00	0.11	0.06	5.50
32	Vadodara	1.30	0.67	5.19	1.33	0.73	5.50	1.34	0.80	6.00	1.35	0.88	6.50
33	Valsad	0.03	0.01	4.49	0.03	0.02	5.00	0.03	0.02	5.50	0.03	0.02	6.00
Gujarat State		1769.24	830.72	4.70	1804.62	951.26	5.27	1822.32	1051.70	5.77	1840.01	1153.91	6.27

A=Area in '00 ha, P= Production in '00 T and Y= Productivity in q/h

4.2.2.10 Researchable Issues:

1. Development of varieties resistant to abiotic stress (drought and thermo-insensitive)
2. Development of early maturing, high yielding varieties suitable for various cropping systems and rain fed conditions.
3. Identification of sources resistance to biotic stresses (disease & pests) and development of tolerant varieties.
4. Development of white & bold seeded high yielding varieties as well as the development of the technology of organic sesame production for export purposes.
5. Development of hybrid varieties and their production technologies for boosting yield potential of sesame.
6. Development of package of practices for summer sesame cultivation.
7. Development of black seeded high yielding varieties with early maturity.

4.2.3 Soybean:

4.2.3.1 Background:

The soybean, as a new crop in the state, has been introduced in the recent past. Now the crop is under cultivation in selected pockets of south Gujarat and middle Gujarat. The area under soybean in the year 2015-16 was 0.803 lakh hectares accounting total production of 0.635 lakh tones with the productivity of 790 kg/ha. The area under this crop is increasing day by day and became almost double as compared to the year 2011-12 (0.421 lakh hectares) but productivity is low as compared to that of national level. There is a scope of improving soybean productivity in Gujarat by proper knowledge of cultivation and research support. Besides this, as an export-oriented crop, there is a great possibility of exporting crude seed or value-added various products.

Vision:

To enhance the state contribution to national vegetable oils economy and export.

Mission:

- Development of high yielding varieties/hybrids with tolerance to major biotic and abiotic stresses
- Development of suitable production and protection technologies with enhanced input use efficiency and profitability
- Maintenance and quality seed production of a released variety of soybean
- To conduct Front Line Demonstration (FLD) with new varieties and better production technologies.

4.2.3.2 Crop/Area Issues:

- Breeding new varieties/hybrids with disease and insect pest resistant genes by changing the existing genetic makeup
- Soil-water management technologies for efficient use of resources/inputs and to further reduce the cost of production
- Intensification of integrated pest and disease management programmes to make the recommendations more eco-friendly
- Harnessing newer cropping niches/opportunities through reorientation of prevailing cropping pattern
- Generation of technologies for quality seed production
- Research on post-harvest technology and value addition
- Frontline Demonstration programmes in order to demonstrate increased benefit by the adoption of this crop
- Dissemination of technologies through vibrant training programmes, publication and mass media.
- Developing suitable marketing strategies to ensure maximum shares of price to the farmers
- Development of package on organic farming of soybean for export

4.2.3.3 Current Status of Area, Production and Productivity:

Table- 4.2.62 Soybean Productivity in Gujarat and India (2011-12 to 2015-16)

Year	Gujarat			India		
	Area ('00ha)	Production ('00 T)	Productivity (Q/ha)	Area (m ha)	Production (m T)	Productivity (Q/ha)
2011-12	421	334	7.93	101800	122140	11.99
2012-13	466	363	7.79	108400	146660	13.53
2013-14	600	477	7.96	117164	118610	10.12
2014-15	580	451	7.77	110860	103740	9.36
2015-16	804	635	7.90	116700	85700	7.34
Average	574	452	7.87	110985	115370	10.40

Source: Directorate of Agriculture, Gandhinagar

Table- 4.2.63 Area, Production and Productivity of Soybean in the State during 2014-15 to 2015-16

(Area in'00 hectare, production in 00 T and yield in q/ha)

S. N	District	2014-15			2015-16			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	0.00	0.00	0.00	0.10	0.08	7.65	0.05	0.04	7.65
2	Amreli	0.00	0.00	0.00	3.57	2.73	7.65	1.79	1.37	7.65
3	Anand	0.00	0.00	0.00	0.02	0.02	7.65	0.01	0.01	7.65
4	Arvalli	91.30	72.89	7.98	102.97	83.44	8.10	97.14	78.17	8.05
5	Banaskantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Bharuch	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Bhavnagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Botad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Chhotaudepur	2.82	2.40	8.51	57.25	49.47	8.64	30.04	25.94	8.64
10	Dahod	306.38	239.92	7.83	350.77	278.80	7.95	328.58	259.36	7.89
11	Dang	0.00	0.00	0.00	22.77	17.42	7.65	11.39	8.71	7.65

S. N	District	2014-15			2015-16			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
12	Devbhumi Dwarka	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Gandhinagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	Gir Somnath	2.10	1.57	7.49	24.31	18.48	7.60	13.21	10.03	7.59
15	Jamnagar	0.48	0.18	3.72	3.15	1.19	3.78	1.82	0.68	3.77
16	Junagadh	1.30	0.97	7.49	2.35	1.79	7.60	1.83	1.38	7.56
17	Kachchh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Kheda	0.05	0.04	7.79	2.34	1.85	7.91	1.20	0.94	7.90
19	Mahisagar	14.06	10.77	7.66	15.44	12.00	7.77	14.75	11.38	7.72
20	Mahesana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Morbi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Narmada	41.27	33.39	8.09	27.21	22.34	8.21	34.24	27.87	8.14
23	Navsari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Panchmahal	9.91	7.46	7.52	8.97	6.85	7.64	9.44	7.15	7.58
25	Patan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Porbandar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Rajkot	1.42	0.53	3.72	4.80	1.81	3.78	3.11	1.17	3.76
28	Sabarkantha	10.43	8.33	7.98	0.00	0.00	0.00	5.22	4.16	7.98
29	Surat	49.97	31.79	6.36	63.16	40.79	6.46	56.57	36.29	6.42
30	Surendranagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	Tapi	22.14	17.86	8.07	70.31	57.58	8.19	46.23	37.72	8.16
32	Vadodara	26.84	22.85	8.51	44.05	38.07	8.64	35.45	30.46	8.59
33	Valsad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gujarat State	580.47	450.95	7.77	803.54	634.71	7.90	692.01	542.83	7.84

Source: Directorate of Agriculture, Gandhinagar

Besides this, there is a wide scope of export by increasing its production in the State. This is possible by insisting farmers, especially for organic cultivation and by increasing awareness through training and conducting the demonstration.

4.2.3.4 Major Soybean Varieties under Cultivation in the State:

Table- 4.2.64 Soybean Varieties Released in Gujarat

Variety	Year of Release	Yield (kg/ha)	Plant Height (cm)	Maturity Days	Oil Content (%)	Area of Cultivation	Salient Features
G Soy 1	1983	1490	67	105	18.6	Gujarat	Suitable for low rainfall area
G Soy 2	1983	1277	107	106	19.0	Gujarat	Suitable for high rainfall area
JS 335	1994	1560	48	102	19.2	Central Zone	Semi-shattering determinate type
GJS 3	2011	1860	47	101	19.1	Saurashtra	Semi-shattering determinate type

4.2.3.5 Cropping Pattern with Respect to Soybean Crop:

Since soybean in Gujarat is cultivated as a non-traditional crop, cropping pattern is not yet developed. Mostly it is grown in kharif season.

Intercropping System with Respect to Soybean as Inter-crop:

Due to its compact plant type and short duration, soybean fits well in an intercropping system with major crops of the region.

1. Cotton (180cm distance) + soybean (2:2)
2. Pearl millet (60cm distance) + soybean (1:1)
or
Pearl millet (90cm distance) + soybean (1:2)
3. Pigeon pea (60cm distance) + soybean (1:1)
or
Pigeon pea (90cm distance) + soybean (1:2)
4. Hybrid sorghum (60cm distance) + soybean (1:1)
or
Hybrid sorghum (90cm distance) + soybean (1:2)
5. Castor (90cm distance) + Soybean (1:1)

4.2.3.6 Input Management:

4.2.3.6.1 Seeds Requirement

The area under soybean is in scattered and certain pocket area of the state covering 0.803 lakh hectares. The seed requirement for the year 2015-16 is given in Table 4.2.63. There is a scope of increasing area of this crop in three years plan. If we consider area increase by 5 percent and seed replacement ratio (SRR) by 50 percent, the projected seed requirement during next three years is given in Table 4.2.64.

Table- 4.2.65 Soybean Seed Requirement in the State (Base Year- 2015-16)

Sr. No.	District	Area ('00 ha)	Seed Rate kg/ha	Total Seed Quantity (Q)
1	Ahmedabad	0.10	60.00	6.00
2	Amreli	3.57	60.00	214.00
3	Anand	0.02	60.00	1.00
4	Arvalli	102.97	60.00	6178.00
5	Chhotaudepur	57.25	60.00	3435.00
6	Dahod	350.77	60.00	21046.00
7	Dang	22.77	60.00	1366.00
8	Gir Somnath	24.31	60.00	1459.00
9	Jamnagar	3.15	60.00	189.00
10	Junagadh	2.35	60.00	141.00
11	Kheda	2.34	60.00	140.00
12	Mahisagar	15.44	60.00	926.00
13	Narmada	27.21	60.00	1633.00
14	Panchmahal	8.97	60.00	538.00
15	Rajkot	4.80	60.00	288.00
16	Surat	63.16	60.00	3790.00
17	Tapi	70.31	60.00	4219.00
18	Vadodara	44.05	60.00	2643.00
Total		803.54	60	48212

Table- 4.2.66 Planning of Soybean Seed Input in the State (Projection for Three Years)

Sr. No.	District	Seed Quantity (Q) for the Year 2015-16	SRR	Seed Quantity Required (Q)		
				2017-18	2018-19	2019-20
1	Ahmedabad	6.00	50.00	3.00	3.00	4.00
2	Amreli	214.00	50.00	118.00	123.00	128.00
3	Anand	1.00	50.00	1.00	1.00	1.00
4	Arvalli	6178.00	50.00	3398.00	3552.00	3707.00
5	Chhotaudepur	3435.00	50.00	1889.00	1975.00	2061.00
6	Dahod	21046.00	50.00	11575.00	12101.00	12628.00
7	Dang	1366.00	50.00	751.00	785.00	820.00
8	Gir Somnath	1459.00	50.00	802.00	839.00	875.00
9	Jamnagar	189.00	50.00	104.00	109.00	113.00
10	Junagadh	141.00	50.00	78.00	81.00	85.00
11	Kheda	140.00	50.00	77.00	81.00	84.00
12	Mahisagar	926.00	50.00	509.00	532.00	556.00
13	Narmada	1633.00	50.00	898.00	939.00	980.00
14	Panchmahal	538.00	50.00	296.00	309.00	323.00
15	Rajkot	288.00	50.00	158.00	166.00	173.00
16	Surat	3790.00	50.00	2085.00	2179.00	2274.00
17	Tapi	4219.00	50.00	2320.00	2426.00	2531.00
18	Vadodara	2643.00	50.00	1454.00	1520.00	1586.00
Total		48212	50	26516	27721	28929

4.2.3.6.2 Fertilizer Requirement:

District-wise present consumption of fertilizers and their requirement in next three years for soybean crop is given in Table- 4.2.67 and 4.2.68, respectively.

Table- 4.2.67 Fertilizers Requirement in the State for Soybean Crop (Base Year- 2015-16)

Sr.No.	District	Area ('00 ha)	As per Recommended Dose (30-30-00) kg/ha		Total Fertilizer Requirement (Q)		Total (Q)
			DAP	AS	DAP	AS	
1	Ahmedabad	0.10	65.00	91.50	7.00	9.00	16.00
2	Amreli	3.57	65.00	91.50	232.00	327.00	559.00
3	Anand	0.02	65.00	91.50	1.00	2.00	3.00
4	Arvalli	102.97	65.00	91.50	6693.00	9422.00	16115.00
5	Chhotaudepur	57.25	65.00	91.50	3721.00	5238.00	8960.00
6	Dahod	350.77	65.00	91.50	22800.00	32095.00	54896.00
7	Dang	22.77	65.00	91.50	1480.00	2083.00	3564.00
8	Gir Somnath	24.31	65.00	91.50	1580.00	2224.00	3805.00
9	Jamnagar	3.15	65.00	91.50	205.00	288.00	493.00
10	Junagadh	2.35	65.00	91.50	153.00	215.00	368.00
11	Kheda	2.34	65.00	91.50	152.00	214.00	366.00
12	Mahisagar	15.44	65.00	91.50	1004.00	1413.00	2416.00
13	Narmada	27.21	65.00	91.50	1769.00	2490.00	4258.00
14	Panchmahal	8.97	65.00	91.50	583.00	821.00	1404.00
15	Rajkot	4.80	65.00	91.50	312.00	439.00	751.00
16	Surat	63.16	65.00	91.50	4105.00	5779.00	9885.00
17	Tapi	70.31	65.00	91.50	4570.00	6433.00	11004.00
18	Vadodara	44.05	65.00	91.50	2863.00	4031.00	6894.00
Total		803.54	65	91.5	52230	73524	125754

DAP= Diammonium Phosphate, AS=Ammonium Sulphate

Table- 4.2.68 Planning of Fertilizers Input for Soyabean in the State (Projection for Three Years)

Sr No.	District	Fertilizers Quantity (Q) for the Year 2015- 16	Fertilizers Quantity Required, quintals		
			2017-18	2018-19	2019-20
1	Ahmedabad	16.00	18.00	18.00	19.00
2	Amreli	559.00	615.00	643.00	671.00
3	Anand	3.00	3.00	3.00	4.00
4	Arvalli	16115.00	17727.00	18532.00	19338.00
5	Chhotaudepu r	8960.00	9856.00	10304.00	10752.00
6	Dahod	54896.00	60386.00	63130.00	65875.00
7	Dang	3564.00	3920.00	4099.00	4277.00
8	Gir Somnath	3805.00	4186.00	4376.00	4566.00
9	Jamnagar	493.00	542.00	567.00	592.00
10	Junagadh	368.00	405.00	423.00	442.00
11	Kheda	366.00	403.00	421.00	439.00
12	Mahisagar	2416.00	2658.00	2778.00	2899.00
13	Narmada	4258.00	4684.00	4897.00	5110.00
14	Panchmahal	1404.00	1544.00	1615.00	1685.00
15	Rajkot	751.00	826.00	864.00	901.00
16	Surat	9885.00	10874.00	11368.00	11862.00
17	Tapi	11004.00	12104.00	12655.00	13205.00
18	Vadodara	6894.00	7583.00	7928.00	8273.00
Total		125754	138333	144621	150908

4.2.3.6.3 Pesticides/ Fungicides:

Many pests and diseases are attacking soybean crop. Improper uses of chemical pesticides/fungicides will restrict the export of soybean seed and its product to great extent. There is a need for promoting integrated pest and disease management through updating knowledge of farmers by training and conducting demonstrations that will increase sustainability and profitability. District-wise consumption of Pesticides/ Fungicides and its

projection for next three years are given in Table 4.2.69 and 4.2.70, respectively.

**Table- 4.2.69 Pesticides/ Fungicides Requirement in the State for Soybean Crop
(Base Year- 2015-16)**

Sr.No.	District	Area (^{'00} ha)	Pesticides Consumption		Fungicides Consumption	
			Liquid (^{'000} Litre)	Powder (^{'000} kg)	Liquid (^{'000} Litre)	Powder (^{'000} kg)
1	Ahmedabad	0.10	0.03	0.00	0.01	0.02
2	Amreli	3.57	1.07	0.00	0.36	0.71
3	Anand	0.02	0.01	0.00	0.00	0.00
4	Arvalli	102.97	30.89	0.00	10.30	20.59
5	Chhotaudepur	57.25	17.18	0.00	5.73	11.45
6	Dahod	350.77	105.23	0.00	35.08	70.15
7	Dang	22.77	6.83	0.00	2.28	4.55
8	Gir Somnath	24.31	7.29	0.00	2.43	4.86
9	Jamnagar	3.15	0.95	0.00	0.32	0.63
10	Junagadh	2.35	0.71	0.00	0.24	0.47
11	Kheda	2.34	0.70	0.00	0.23	0.47
12	Mahisagar	15.44	4.63	0.00	1.54	3.09
13	Narmada	27.21	8.16	0.00	2.72	5.44
14	Panchmahal	8.97	2.69	0.00	0.90	1.79
15	Rajkot	4.80	1.44	0.00	0.48	0.96
16	Surat	63.16	18.95	0.00	6.32	12.63
17	Tapi	70.31	21.09	0.00	7.03	14.06
18	Vadodara	44.05	13.22	0.00	4.41	8.81
Total		803.54	241.06	0.00	80.35	160.71

**Table- 4.2.70 Planning of Pesticides/Fungicides Input for Soyabean in the State
(Projection for Three Years)**

Sr. No	District	Pesticides/ Fungicides Quantity ('000 Lit/kg) for the Year 2015-16	Pesticides/ Fungicides Quantity Required (000 Lit/kg)		
			2017-18	2018-19	2019-20
1	Ahmedabad	0.06	0.07	0.07	0.07
2	Amreli	2.14	2.35	2.46	2.57
3	Anand	0.01	0.01	0.01	0.01
4	Arvalli	61.78	67.96	71.05	74.14
5	Chhotaudepur	34.35	37.79	39.50	41.22
6	Dahod	210.46	231.51	242.03	252.55
7	Dang	13.66	15.03	15.71	16.39
8	Gir Somnath	14.59	16.05	16.78	17.51
9	Jamnagar	1.89	2.08	2.17	2.27
10	Junagadh	1.41	1.55	1.62	1.69
11	Kheda	1.40	1.54	1.61	1.68
12	Mahisagar	9.26	10.19	10.65	11.11
13	Narmada	16.33	17.96	18.78	19.60
14	Panchmahal	5.38	5.92	6.19	6.46
15	Rajkot	2.88	3.17	3.31	3.46
16	Surat	37.90	41.69	43.59	45.48
17	Tapi	42.19	46.41	48.52	50.63
18	Vadodara	26.43	29.07	30.39	31.72
Total		482.12	530.33	554.44	578.54

4.2.3.7 Constraints Analysis and Recommended Interventions for Yield Gap

Analysis of Soyabean:

4.2.3.7.1 Gap Analysis

Table- 4.2.71 District -wise Yield Gap of Soyabean (Base Year- 2015-16)

Sr No	Name of the Districts	District Yield(q/ha)	State Yield* (q/ha)	Variety (GJS 3) Yield (q/ha)	Yield Gap (%) over	
					State Average	Variety Yield
1	Ahmedabad	7.65	7.84	18.60	-2.42	-58.87
2	Amreli	7.65	7.84	18.60	-2.42	-58.87
3	Anand	7.65	7.84	18.60	-2.42	-58.87
4	Arvalli	8.10	7.84	18.60	3.32	-56.45
5	Chhotaudepur	8.64	7.84	18.60	10.20	-53.55
6	Dahod	7.95	7.84	18.60	1.40	-57.26
7	Dang	7.65	7.84	18.60	-2.42	-58.87
8	Gir Somnath	7.60	7.84	18.60	-3.06	-59.14
9	Jamnagar	3.78	7.84	18.60	-51.79	-79.68
10	Junagadh	7.60	7.84	18.60	-3.06	-59.14
11	Kheda	7.91	7.84	18.60	0.89	-57.47
12	Mahisagar	7.77	7.84	18.60	-0.89	-58.23
13	Narmada	8.21	7.84	18.60	4.72	-55.86
14	Panchmahal	7.64	7.84	18.60	-2.55	-58.92
15	Rajkot	3.78	7.84	18.60	-51.79	-79.68
16	Surat	6.46	7.84	18.60	-17.60	-65.27
17	Tapi	8.19	7.84	18.60	4.46	-55.97
18	Vadodara	8.64	7.84	18.60	10.20	-53.55
Average		7.90	7.84	18.6	0.77	-57.53

*state average of two years (2014-15 to 2015-16)

The constraints associated with low productivity are enumerated as under:

- Rainfall dependent growing conditions
- Low input management.
- Poor plant stands due to low germination
- Poor weed management
- Poor insect and disease management
- Low use of organic matter due to poor awareness regarding soil health

Table- 4.2.72 Issues Related to Yield Gap, its Sustainability and Strategies for Bridging Gaps for Soybean Crop

Sr. No	Factors/ Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators/Outputs
a	Low adoption of improved package practices due to lack of awareness	To popularize the crop and scientific package of practices	Creating awareness through demonstrations, training, field days, <i>shibir</i> , literature etc.	Increase in the production (10-15%)
b	Nonavailability of seeds of improved varieties	Establishment of seed selling centers	Creating awareness for quality seeds	Timely sowing, quality seeds and better harvest (10-15%)
c	Inadequate plant population	Line sowing and proper thinning	Creating awareness of sowing by automatic seed drill and thinning at proper time and distance through demonstrations, training, field days, <i>shibir</i> , literature etc.	Increase yield (10-15%)
d	Insect-pest and disease problem due to lack of knowledge of their management.	Integrated pest and disease management	Creating awareness of IPM through demonstrations, training, field days, <i>shibir</i> , literature etc.	Increase yield (15-20%)

Table- 4.2.73 Recommended Interventions for Bridging the Gaps of Soyabean

No	Program	Activities
1	Increase in availability of quality seeds /seed production	
	Seed planning and production	Identification of potential areas, farmers led participatory seed production of improved varieties of crops
		Motivating farmers to produce the seed of best varieties through seed village programmes, capacity building of farmers and extension functionaries and exposure visits
	Seed distribution and seed storage	Establishment of seed selling units for timely distribution
		Construction of godowns
2.	Increase in seed replacement rate	
	Production of quality seeds as per area to be sown	Create awareness about the production of quality seeds of improved varieties
		Strengthen the linkage between supply agencies and the farmers
3.	Soil health management	
	Soil testing	Establishment of soil and water testing laboratories and mobile soil testing laboratories
		Create awareness about the importance of soil testing
	Biofertilizer	Popularize the use of bio-fertilizer through capacity building and demonstrations
	Green Manuring	Popularize the green manuring practices through capacity building and demonstrations
	Enrichment of FYM	Popularize the methods of preparation of good quality FYM and vermicompost
	Integrated Nutrient Management	Educating farmers about the use of balanced fertilizer
	Micronutrient	Identification of micronutrient deficient areas and educating farmers about their importance
	Crop-rotation	Suggesting suitable crop rotation for improving soil health
	IWM	Weeds absorb a huge quantity of nutrients so educating the farmers about integrated weed management practices is necessary.
4.	Water management	
	Water harvesting	Establishment of rain water harvesting units and deepening of wells and its recharging through khet talavadi/ village ponds

	Water use efficiency	Popularize the micro irrigation systems and irrigation schedule through capacity building Moisture conservations through the organic and plastic mulch Introduction of the participatory irrigation management approach
	Irrigation at critical stages	Popularization of critical stages of soybean through on farm and village level training
5.	Plant health management	
	Plant health clinic	Establishment of plant health clinic at KVK and mobile health clinic
	IPM/IDM	Educating the farmers about various insect pests and diseases of crop and their IPM/IDM through demonstrations and training
	Proper use of plant protection equipment	Educate the farmers about the proper use of plant protection equipment, provide necessary inputs to the farmers
6.	Farm mechanization	
	Improved hand tools and small implements	Survey for drudgery reduction Educating farmers for use of machines/ implements
	Hand rotary weeder, Power Tiller, Farm tractors, Mechanical harvesters	Educating the farmers and providing units on a co-operative basis and educate farmers for custom hiring
7.	Value addition	
	Processing Units, the establishment of mini oil extractor/ seed colour separator, grading and packaging units	Create awareness for value addition and educate farmers, provide units on a co-operative basis, marketing awareness
8.	Marketing	
	Strengthening APMC and construction of warehouses	Establishment of warehouse at cluster and taluka level
	Market linkage	Strengthening market linkage through AGMARK net
	Collection van	Units and monitoring

4.2.3.7.2 Strategies for Bridging the Gaps:

- 1 Seed production enhancement through seed village programme
- 2 Demonstration on IPM
- 3 Demonstration on INM
- 4 Demonstration on an Improved variety
- 5 Demonstration on Biofertilizer

- 6 Demonstration on vermicompost
- 7 Training to farmers on following topics
 - i. Soil health management
 - ii. Integrated pests management
 - iii. Plant health management
 - iv. Organic farming
 - v. Production technology of soybean
 - vi. Biological control for pests management
 - vii. Bio-compost of farm waste
 - viii. Post-harvest technology and value addition

4.2.3.8 Detailed Action Plan with costs:

Proposed activities for bridging the gaps are as under:

Table- 4.2.74 Soybean Seed Planning/Seed Village Program (Seed Production Enhancement)

Sr. No	District	Seed Rate kg/ha	Soybean seed village program (Phy-No. Fin- Rs. In Lakh)							
			2017-18		2018-19		2019-20		Total	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Arvalli	60	800	60	800	60	800	60	2400	180
2	Chhotaudepur	60	200	15	250	18.75	300	22.50	750	56.25
3	Dahod	60	1200	90	1250	93.75	1300	97.50	3750	281.25
4	Gir Somnath	60	100	7.50	150	11.25	150	11.25	400	30.00
5	Mahisagar	60	100	7.50	100	7.50	100	7.50	300	22.50
6	Surat	60	300	22.50	325	24.38	350	26.25	975	73.13
7	Tapi	60	300	22.50	325	24.38	350	26.25	975	73.13
8	Vadodara	60	200	15	200	15.00	250	18.75	650	48.75
	Total	60	3200	240	3400	255.00	3600	270.00	10200	765

Cost Norms: 7500 Rs./ha.

Table- 4.2.75 District-wise Demonstration Proposed on Integrated Pests Management for Soyabean

Sr. No	District	Year-wise Demonstration on IPM (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Arvalli	25.0	1.88	25.0	1.88	25.0	1.8	75.00	5.63
2	Bharuch	25.0	1.88	25.0	1.88	25.0	1.8	75.00	5.63
3	Chhotaudepu	20.0	1.50	20.0	1.50	20.0	1.5	60.00	4.50
4	Dahod	75.0	5.63	75.0	5.63	75.0	5.6	225.0	16.8
5	Dang	10.0	0.75	10.0	0.75	10.0	0.7	30.00	2.25
6	Gir Somnath	10.0	0.75	10.0	0.75	10.0	0.7	30.00	2.25
7	Mahisagar	25.0	1.88	25.0	1.88	25.0	1.8	75.00	5.63
8	Narmada	25.0	1.88	25.0	1.88	25.0	1.8	75.00	5.63
9	Sabarkantha	20.0	1.50	20.0	1.50	20.0	1.5	60.00	4.50
10	Surat	30.0	2.25	30.0	2.25	30.0	2.2	90.00	6.75
11	Tapi	10.0	0.75	10.0	0.75	10.0	0.7	30.00	2.25
12	Vadodara	25.0	1.88	25.0	1.88	25.0	1.8	75.00	5.63
	Total	300	22.5	300	22.5	300	22.	900	67.5

Cost Norms: 7500 Rs./ demonstration of 0.4 ha

Table - 4.2.76 District-wise Demonstration Proposed on Integrated Nutrient Management for Soyabean

Sr. No	District	Year-wise Demonstration on INM (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Arvalli	25.00	1.88	25.00	1.88	25.00	1.88	75.00	5.63
2	Bharuch	25.00	1.88	25.00	1.88	25.00	1.88	75.00	5.63
3	Chhotaudepur	20.00	1.50	20.00	1.50	20.00	1.50	60.00	4.50
4	Dahod	75.00	5.63	75.00	5.63	75.00	5.63	225.00	16.88
5	Dang	10.00	0.75	10.00	0.75	10.00	0.75	30.00	2.25
6	Gir Somnath	10.00	0.75	10.00	0.75	10.00	0.75	30.00	2.25
7	Mahisagar	25.00	1.88	25.00	1.88	25.00	1.88	75.00	5.63
8	Narmada	25.00	1.88	25.00	1.88	25.00	1.88	75.00	5.63
9	Sabarkantha	20.00	1.50	20.00	1.50	20.00	1.50	60.00	4.50
10	Surat	30.00	2.25	30.00	2.25	30.00	2.25	90.00	6.75
11	Tapi	10.00	0.75	10.00	0.75	10.00	0.75	30.00	2.25
12	Vadodara	25.00	1.88	25.00	1.88	25.00	1.88	75.00	5.63
	Total	300	22.50	300	22.50	300	22.5	900	67.50

Cost Norms: 7500 Rs./ demonstration of 0.4 ha

Table - 4.2.77 District-wise Demonstration Proposed on Improved Varieties of Soyabean

Sr. No	District	Year-wise Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Arvali	30.0	2.25	30.0	2.25	30.0	2.25	90.00	6.75
2	Bharuch	30.0	2.25	30.0	2.25	30.0	2.25	90.00	6.75
3	Chhotaudepu	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
4	Dahod	75.0	5.63	75.0	5.63	75.0	5.63	225.0	16.8
5	Dang	20.0	1.50	20.0	1.50	20.0	1.50	60.00	4.50
6	Gir Somnath	10.0	0.75	10.0	0.75	10.0	0.75	30.00	2.25
7	Mahisagar	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
8	Narmada	30.0	2.25	30.0	2.25	30.0	2.25	90.00	6.75
9	Sabarkantha	20.0	1.50	20.0	1.50	20.0	1.50	60.00	4.50
10	Surat	40.0	3.00	40.0	3.00	40.0	3.00	120.0	9.00
11	Tapi	20.0	1.50	20.0	1.50	20.0	1.50	60.00	4.50
12	Vadodara	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
	Total	350	26.2	350	26.2	350	26.2	1050	78.7

Cost Norms: 7500 Rs./ demonstration of 0.4 ha

Table- 4.2.78 District-wise Demonstration Proposed on Bio fertilisers for Soyabean

Sr. No	District	Year-wise Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Arvali	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
2	Bharuch	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
3	Chhotaudepu	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
4	Dahod	80.0	6.00	80.0	6.00	80.0	6.00	240.0	18.0
5	Dang	15.0	1.13	15.0	1.13	15.0	1.13	45.00	3.38
6	Gir Somnath	10.0	0.75	10.0	0.75	10.0	0.75	30.00	2.25
7	Mahisagar	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
8	Narmada	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
9	Sabarkantha	20.0	1.50	20.0	1.50	20.0	1.50	60.00	4.50
10	Surat	30.0	2.25	30.0	2.25	30.0	2.25	90.00	6.75
11	Tapi	15.0	1.13	15.0	1.13	15.0	1.13	45.00	3.38
12	Vadodara	30.0	2.25	30.0	2.25	30.0	2.25	90.00	6.75
	Total	325	24.3	325	24.3	325	24.3	975	73.1

Cost Norms: 7500 Rs./ demonstration of 0.4 ha

Table- 4.2.79 District-wise Demonstration Proposed on Vermicompost for Soyabean

Sr. No	District	Year-wise Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Arvalli	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
2	Bharuch	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
3	Chhotaudepu	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
4	Dahod	80.0	6.00	80.0	6.00	80.0	6.00	240.0	18.0
5	Dang	15.0	1.13	15.0	1.13	15.0	1.13	45.00	3.38
6	Gir Somnath	10.0	0.75	10.0	0.75	10.0	0.75	30.00	2.25
7	Mahisagar	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
8	Narmada	25.0	1.88	25.0	1.88	25.0	1.88	75.00	5.63
9	Sabarkantha	20.0	1.50	20.0	1.50	20.0	1.50	60.00	4.50
10	Surat	30.0	2.25	30.0	2.25	30.0	2.25	90.00	6.75
11	Tapi	15.0	1.13	15.0	1.13	15.0	1.13	45.00	3.38
12	Vadodara	30.0	2.25	30.0	2.25	30.0	2.25	90.00	6.75
	Total	325	24.3	325	24.3	325	24.3	975	73.1

Cost Norms: 7500 Rs./ demonstration of 0.4 ha

Table- 4.2.80 Training Proposed for Capacity Building for Staff of Extension Functionaries for Soyabean (State Level)

Category	Year-wise Training to Staff (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	750	7.50	750	7.50	750	7.50	3000	30.00
Cooperative & NGOs	450	4.50	450	4.50	450	4.50	1500	15.00
PRI Staff & Others	300	3.00	300	3.00	300	3.00	1500	15.00
Total	1500	15.00	1500	15.00	1500	15.00	6000	60.00

Cost Norms: Rs. 1000/trainee/day, 30staff/ training

Table- 4.2.81 Training Proposed for Capacity Building of Farmers on Soil Health Management at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvalli	900	7.20	900	7.20	900	7.20	2700	21.60
4	Bharuch	300	2.40	300	2.40	300	2.40	900	7.20
5	Chhotaudepu	600	4.80	600	4.80	600	4.80	1800	14.40
6	Dahod	210	16.8	210	16.8	210	16.8	6300	50.40
7	Dang	450	3.60	450	3.60	450	3.60	1350	10.80
8	Gir Somnath	300	2.40	300	2.40	300	2.40	900	7.20
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	300	2.40	300	2.40	300	2.40	900	7.20
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	900	7.20	900	7.20	900	7.20	2700	21.60
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	150	1.20	150	1.20	150	1.20	450	3.60
	Total	900	72.0	900	72.0	900	72.0	2700	216.0

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.82 Training Proposed for Capacity Building of Farmers on Integrated Pests Management at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvalli	900	7.20	900	7.20	900	7.20	2700	21.60
4	Bharuch	150	1.20	150	1.20	150	1.20	450	3.60
5	Chhotaudepu	450	3.60	450	3.60	450	3.60	1350	10.80
6	Dahod	210	16.8	210	16.8	210	16.8	6300	50.40

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
7	Dang	300	2.40	300	2.40	300	2.40	900	7.20
8	Gir Somnath	300	2.40	300	2.40	300	2.40	900	7.20
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	150	1.20	150	1.20	150	1.20	450	3.60
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	900	7.20	900	7.20	900	7.20	2700	21.60
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	150	1.20	150	1.20	150	1.20	450	3.60
	Total	840	67.2	840	67.2	840	67.2	2520	201.6

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.83 Training Proposed for Capacity Building of Farmers on Plant Health Management at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvali	900	7.20	900	7.20	900	7.20	2700	21.60
4	Bharuch	150	1.20	150	1.20	150	1.20	450	3.60
5	Chhotaudepu	450	3.60	450	3.60	450	3.60	1350	10.80
6	Dahod	210	16.8	210	16.8	210	16.8	6300	50.40
7	Dang	300	2.40	300	2.40	300	2.40	900	7.20
8	Gir Somnath	300	2.40	300	2.40	300	2.40	900	7.20
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	150	1.20	150	1.20	150	1.20	450	3.60
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	900	7.20	900	7.20	900	7.20	2700	21.60

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	150	1.20	150	1.20	150	1.20	450	3.60
	Total	840	67.2	840	67.2	840	67.2	2520	201.6

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.84 Training Proposed for Capacity Building of Farmers on Agro Processing at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvalli	900	7.20	900	7.20	900	7.20	2700	21.60
4	Bharuch	300	2.40	300	2.40	300	2.40	900	7.20
5	Chhotaudepu	600	4.80	600	4.80	600	4.80	1800	14.40
6	Dahod	210	16.8	210	16.8	210	16.8	6300	50.40
7	Dang	450	3.60	450	3.60	450	3.60	1350	10.80
8	Gir Somnath	300	2.40	300	2.40	300	2.40	900	7.20
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	300	2.40	300	2.40	300	2.40	900	7.20
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	900	7.20	900	7.20	900	7.20	2700	21.60
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	150	1.20	150	1.20	150	1.20	450	3.60
	Total	900	72.0	900	72.0	900	72.0	2700	216.0

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.85 Training Proposed for Capacity Building of Farmers on Organic Farming at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvalli	900	7.20	900	7.20	900	7.20	2700	21.60
4	Bharuch	300	2.40	300	2.40	300	2.40	900	7.20
5	Chhotaudepur	600	4.80	600	4.80	600	4.80	1800	14.40
6	Dahod	210	16.8	210	16.8	210	16.8	6300	50.40
7	Dang	450	3.60	450	3.60	450	3.60	1350	10.80
8	Gir Somnath	300	2.40	300	2.40	300	2.40	900	7.20
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	300	2.40	300	2.40	300	2.40	900	7.20
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	900	7.20	900	7.20	900	7.20	2700	21.60
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	150	1.20	150	1.20	150	1.20	450	3.60
	Total	900	72.0	900	72.0	900	72.0	2700	216.0

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.86 Training Proposed for Capacity Building of Farmers on Production Technology of Soybean at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvalli	105	8.40	105	8.40	105	8.40	3150	25.20
4	Bharuch	300	2.40	300	2.40	300	2.40	900	7.20
5	Chhotaudepur	750	6.00	750	6.00	750	6.00	2250	18.00
6	Dahod	225	18.0	225	18.0	225	18.0	6750	54.00
7	Dang	450	3.60	450	3.60	450	3.60	1350	10.80
8	Gir Somnath	450	3.60	450	3.60	450	3.60	1350	10.80

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	300	2.40	300	2.40	300	2.40	900	7.20
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	105	8.40	105	8.40	105	8.40	3150	25.20
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	300	2.40	300	2.40	300	2.40	900	7.20
	Total	990	79.2	990	79.2	990	79.2	2970	237.6

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.87 Training Proposed for Capacity Building of Farmers on Biological Control for Pests Management at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvali	900	7.20	900	7.20	900	7.20	2700	21.60
4	Bharuch	150	1.20	150	1.20	150	1.20	450	3.60
5	Chhotaudepur	450	3.60	450	3.60	450	3.60	1350	10.80
6	Dahod	210	16.8	210	16.8	210	16.8	6300	50.40
7	Dang	300	2.40	300	2.40	300	2.40	900	7.20
8	Gir Somnath	300	2.40	300	2.40	300	2.40	900	7.20
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	150	1.20	150	1.20	150	1.20	450	3.60
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	900	7.20	900	7.20	900	7.20	2700	21.60
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	150	1.20	150	1.20	150	1.20	450	3.60
	Total	840	67.2	840	67.2	840	67.2	2520	201.6

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.88 Training Proposed for Capacity Building of Farmers on Bio-Compost of Farm Waste at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvalli	900	7.20	900	7.20	900	7.20	2700	21.60
4	Bharuch	150	1.20	150	1.20	150	1.20	450	3.60
5	Chhotaudepur	450	3.60	450	3.60	450	3.60	1350	10.80
6	Dahod	210	16.8	210	16.8	210	16.8	6300	50.40
7	Dang	300	2.40	300	2.40	300	2.40	900	7.20
8	Gir Somnath	300	2.40	300	2.40	300	2.40	900	7.20
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	150	1.20	150	1.20	150	1.20	450	3.60
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	900	7.20	900	7.20	900	7.20	2700	21.60
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	150	1.20	150	1.20	150	1.20	450	3.60
	Total	840	67.2	840	67.2	840	67.2	2520	201.6

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.89 Training Proposed for Capacity Building of Farmers on Post Harvest Technology and Value Addition at District Level for Soyabean

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	Amreli	150	1.20	150	1.20	150	1.20	450	3.60
2	Anand	150	1.20	150	1.20	150	1.20	450	3.60
3	Arvalli	105	8.40	105	8.40	105	8.40	3150	25.20
4	Bharuch	300	2.40	300	2.40	300	2.40	900	7.20
5	Chhotaudepur	750	6.00	750	6.00	750	6.00	2250	18.00
6	Dahod	225	18.0	225	18.0	225	18.0	6750	54.00
7	Dang	450	3.60	450	3.60	450	3.60	1350	10.80
8	Gir Somnath	450	3.60	450	3.60	450	3.60	1350	10.80

Sr. No	Districts	Year-wise Training to Farmers							
		(Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
9	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
10	Mahisagar	300	2.40	300	2.40	300	2.40	900	7.20
11	Narmada	450	3.60	450	3.60	450	3.60	1350	10.80
12	Panchmahal	300	2.40	300	2.40	300	2.40	900	7.20
13	Rajkot	150	1.20	150	1.20	150	1.20	450	3.60
14	Sabarkantha	300	2.40	300	2.40	300	2.40	900	7.20
15	Surat	750	6.00	750	6.00	750	6.00	2250	18.00
16	Tapi	105	8.40	105	8.40	105	8.40	3150	25.20
17	Vadodara	600	4.80	600	4.80	600	4.80	1800	14.40
18	Valsad	300	2.40	300	2.40	300	2.40	900	7.20
	Total	990	79.2	990	79.2	990	79.2	2970	237.6

Cost Norms: Rs. 800/trainee/day, 30staff/ training

Table- 4.2.90 Projected Outcome and Growth during the Plan Period Area, Production and Productivity Trend of Soybean Crop in the State

(Area: '00 ha, Production: '00 T, Productivity: q/ha).

SN.	District	Base Year 2015-16			2017-18			2018-19			2019-20		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Ahmedabad	0.10	0.08	7.65	0.11	0.09	8.00	0.12	0.10	8.50	0.12	0.11	9.00
2	Amreli	3.57	2.73	7.65	3.93	3.14	8.00	4.12	3.50	8.50	4.33	3.90	9.00
3	Anand	0.02	0.02	7.65	0.02	0.02	8.00	0.02	0.02	8.50	0.02	0.02	9.00
4	Arvalli	102.97	83.44	8.10	113.27	96.28	8.50	118.93	107.04	9.00	124.88	118.63	9.50
5	Banaskantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Bharuch	0.00	0.00	0.00	0.00	0.00	8.00	0.00	0.00	8.50	0.00	0.00	9.00
7	Bhavnagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Botad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Chhotaudepur	57.25	49.47	8.64	62.98	56.68	9.00	66.12	62.82	9.50	69.43	69.43	10.00
10	Dahod	350.77	278.80	7.95	385.85	327.97	8.50	405.14	364.63	9.00	425.40	404.13	9.50
11	Dang	22.77	17.42	7.65	25.05	20.04	8.00	26.30	22.35	8.50	27.61	24.85	9.00
12	Devbhumi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Gandhinagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	Gir Somnath	24.31	18.48	7.60	26.74	21.39	8.00	28.08	23.87	8.50	29.48	26.53	9.00
15	Jamnagar	3.15	1.19	3.78	3.47	2.60	7.50	3.64	2.91	8.00	3.82	3.25	8.50
16	Junagadh	2.35	1.79	7.60	2.59	2.07	8.00	2.71	2.31	8.50	2.85	2.56	9.00
17	Kachchh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Kheda	2.34	1.85	7.91	2.57	2.06	8.00	2.70	2.30	8.50	2.84	2.55	9.00
19	Mahisagar	15.44	12.00	7.77	16.98	13.59	8.00	17.83	15.16	8.50	18.72	16.85	9.00
20	Mahesana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Morbi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Narmada	27.21	22.34	8.21	29.93	25.44	8.50	31.43	28.28	9.00	33.00	31.35	9.50

SN.	District	Base Year 2015-16			2017-18			2018-19			2019-20		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
23	Navsari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Panchmahal	8.97	6.85	7.64	9.87	7.89	8.00	10.36	8.81	8.50	10.88	9.79	9.00
25	Patan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Porbandar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Rajkot	4.80	1.81	3.78	5.28	3.96	7.50	5.54	4.44	8.00	5.82	4.95	8.50
28	Sabarkantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00	0.00	8.50
29	Surat	63.16	40.79	6.46	69.48	52.11	7.50	72.95	58.36	8.00	76.60	65.11	8.50
30	Surendranagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	Tapi	70.31	57.58	8.19	77.34	65.74	8.50	81.21	73.09	9.00	85.27	81.01	9.50
32	Vadodara	44.05	38.07	8.64	48.46	43.61	9.00	50.88	48.33	9.50	53.42	53.42	10.00
33	Valsad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gujarat State	803.54	634.71	7.90	883.89	744.67	8.42	928.09	828.30	8.92	974.49	918.44	9.42

A=Area in '00 ha, P= Production in'00 ton and Y= Productivity in q/ha

4.2.3.9 Research Related Issues:

1. Development of high yielding varieties with resistance to biotic and abiotic stresses
2. Development of early maturing, high yielding varieties suitable for various cropping systems and rainfed conditions
3. Development of production technologies for increasing yield potential
4. INM & IPDM
5. Identification of more remunerative inter-cropping systems with soybean
6. Effective and economic measures for weed control.
7. Demonstration of soybean improved technologies under real farm conditions.
8. Organic soybean production for export purposes

4.2.4 Niger:

4.2.4.1 Background:

Niger productivity in Gujarat is around 4.0 Q/ha (late kharif average). Rainfall dependent growing condition with low input management is one of the reasons for low productivity. The crop has the adaptability to rainfed conditions on poor soils such as marginal and sub-marginal lands in tribal areas, hilltops and slopes. If this crop is grown in late *Kharif* with better management, higher yield can be realized in Gujarat too.

Vision:

To enhance the state contribution to national vegetable oils economy.

Mission:

- Development of high yielding varieties/hybrids with tolerance to major biotic and abiotic stresses.
- Development of suitable production and protection technologies with enhanced input use efficiency and profitability.
- Collection, maintenance and evaluation of germplasms of Niger.
- Maintenance and seed production of released varieties of Niger.
- To conduct front-line demonstration/TSP demonstration with new varieties and better production technologies.

4.2.4.2 Crop/Area Issues:

- Breeding new varieties/hybrids with disease and insect pest resistant genes by changing the existing genetic makeup.
- Soil-water management technologies for efficient use of resources/inputs and to further reduce the cost of production.
- Intensification of integrated pest and disease management programmes to make the recommendations more eco-friendly.
- Harnessing newer cropping niches/opportunities through reorientation of prevailing cropping pattern.
- Generation of technologies for quality seed production.
- Frontline Demonstration programmes in order to demonstrate increased benefit by the adoption of improved technologies.
- Dissemination of technologies through vibrant training programmes, publication and mass media.

- Developing suitable marketing strategies to ensure maximum shares of price to the farmers.

4.2.4.3 Current Status of Area, Production and Productivity:

Table- 4.2.91 Niger Productivity in Gujarat and India (2011-12 and 2015-16)

Year	Gujarat			India		
	Area (00' ha)	Production (00' T)	Productivity (Q/ha)	Area (00' ha)	Production (00' T)	Productivity (Q/ha)
2011-12	121.0	46.8	3.87	2787	663	2.37
2012-13	95.1	38.1	4.00	3104	1008	3.24
2013-14	91.2	39.3	4.31	2987	978	3.27
2014-15	86.2	33.8	3.92	Not available		
2015-16	79.3	31.1	3.92	Not available		
Average	94.6	37.8	4.00	2959	883	2.98

The impact of frontline demonstrations under real farm conditions conducted by NRS, Varanasi indicated that Indian Niger varieties have good potential to attain higher productivity and production level by sowing under late *Kharif* conditions with use of essential inputs. This implies that for increasing Niger production, besides generating new technologies, concerted efforts are needed to insist farmers for late *Kharif* cultivation where irrigation facility is available. A gradual shift of the Niger crop from *Kharif* to late *Kharif* is desirable.

Table- 4.2.92 Area, Production and Productivity of Niger in the State for the year 2015-16 to 2017-18 (Area in'00 ha, production in 00 T and yield in q/ha)

Sr. No	District	2015-16			2016-17			2017-18			Average		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Ahmedaba	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	0	0	0	0	0	0	0	0	0	0	0	0
3	Anand	0	0	0	0	0	0	0	0	0	0	0	0
4	Arvalli	0	0	0	0	0	0	0	0	0	0	0	0
5	Banaskanth	0	0	0	0	0	0	0	0	0	0	0	0
6	Botad	0	0	0	0	0	0	0	0	0	0	0	0
7	Bharuch	0	0	0	0	0	0	0	0	0	0	0	0
8	Bhavnagar	0	0	0	0	0	0	0	0	0	0	0	0
9	Chhotaude	0	0	0	0	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0	0	0	0	0

Sr. No	District	2015-16			2016-17			2017-18			Average		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
11	Dang	31.1	12.	4.0	40.5	16.0	3.9	35	13.8	3.9	35.5	14.1	3.9
12	Devbhumi	0	0	0	0	0	0	0	0	0	0	0	0
13	Gandhinag	0	0	0	0	0	0	0	0	0	0	0	0
14	Gir	0	0	0	0	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0	0	0	0	0
17	Kheda	0	0	0	0	0	0	0	0	0	0	0	0
18	Kutch	0	0	0	0	0	0	0	0	0	0	0	0
19	Mahisagar	0	0	0	0	0	0	0	0	0	0	0	0
20	Mehsana	0	0	0	0	0	0	0	0	0	0	0	0
21	Morbi	0	0	0	0	0	0	0	0	0	0	0	0
22	Narmada	0	0	0	0	0	0	0	0	0	0	0	0
23	Navsari	11.0	4.2	3.8	9.35	3.67	3.9	6.3	2.51	3.9	8.88	3.46	3.9
24	Panchmah	0	0	0	0	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	0	0	0	0	0	0	0	0
28	Sabarkanth	0	0	0	0	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0	0	0	0	0
30	Surendrana	0	0	0	0	0	0	0	0	0	0	0	0
31	Tapi	0	0	0	0	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0	0	0	0	0
33	Valsad	37.2	14.	3.9	49.5	19.7	3.9	50.	20.0	3.9	45.6	18.1	3.9
	Gujarat	79.3	31.	3.9	99.3	39.3	3.9	91.	36.3	3.9	90.0	35.7	3.9

Source: Department of Agriculture, Gujarat State

4.2.4.4 Major Niger Varieties under Cultivation in the Gujarat State:

Table-4.2.93 Niger Varieties Released and their Salient Features

Variety	Yield (kg/ha)	Days to Maturity	Growing Season	Salient Features
GN-1	295-310	95-100	<i>Kharif</i>	1. Released for cultivation in rainfed situation in south Gujarat. 2. Gave 25% higher yield over western zone check (RCR-317) and a week earlier in maturity.
GN-2	350-450	90-95	<i>Kharif</i>	1. Identified as the earliest variety in the whole country.

				2. Gave 35% higher yield over the National Check in the western zone of Rajasthan, Gujarat, Maharashtra and Karnataka.
GNNIG-3	450-550	105-120	<i>Kharif</i>	1. Bold seeded with shiny black colour High yielding 31.35% & 28.80% increase over the national check IGPN-2004-1 and local check GN-2 respectively. 2. Resistant to the <i>Alternaria</i> and <i>Cercospora</i> leaf spot diseases 3. Moderately resistant to semilooper and caterpillar under field conditions.

Cropping Pattern with respect to Niger Crop:

1. Early Rice-Niger
2. Early Black Gram-Niger
3. Little willed-Niger

Intercropping System with respect to Niger as Inter-crop:

1. Moong + Niger
2. Soybean + Niger
3. Groundnut + Niger

4.2.4.5 Input Management:

4.2.4.5.1 Seeds Requirement:

At present the seed replacement ratio (SRR) of Niger is 10 per cent. The low seed rate, capability to grow on a wide range of soils and sowing period starting from the onset of monsoon in July to August (late *kharif*) makes this crop ideal for contingent planning under dry land situations.

Table- 4.2.94 Niger Seed Requirement in the State (Base Year- 2016-17)

Sr. No.	District	Area ('00 ha)	Seed Rate kg/ha	Total Seed Quantity (Qt)
1	Dang	40.50	5.0	203
2	Navsari	9.35	5.0	47
3	Valsad	49.50	5.0	248
	Total	99.35	5.0	497

Table- 4.2.95 Planning of Niger Seed Input in the State (Projection for three Years)

Sr. No.	District	Seed Quantity (Qt) for the Year 2016-17	SRR	Seed Quantity Required (Qt)		
				2017-18	2018-19	2019-20
1	Dang	203	10	17.5	18.10	19.50
2	Navsari	47	10	3.15	2.50	1.75
3	Valsad	248	10	25.15	29.00	30.15
Total		497	10	45.80	49.60	51.40

4.2.4.5.2 Fertilizer Requirement :

District-wise present consumption of fertilizers and their requirement for next three years for Niger crop is given in Table 4.2.94 and 4.2.95, respectively.

Table- 4.2.96 Fertilizers Requirement in the State for Niger Crop (Base Year- 2016-17)

Sr. No.	District	Area ('00 ha)	As per Recommended Dose (20-20-00) kg/ha		Fertilizer Requirement (Qt)		
			DAP	Urea	DAP	Urea	Total
1	Dang	40.50	43.48	26.46	1761	1072	2833
2	Navsari	9.35	43.48	26.46	407	247	654
3	Valsad	49.50	43.48	26.46	2152	1310	3462
Total		99.35	43.48	26.46	4320	2629	6949

DAP= Diammonium Phosphate

Table- 4.2.97 Planning of Fertilizers Input in the State (Projection for Three Years)

Sr. No.	District	Fertilizers Quantity (Qt) for the Year 2016-17	Fertilizers quantity Required (Qt)		
			2017-18	2018-19	2019-20
1	Dang	2833	2448	2532	2728
2	Navsari	654	441	350	245
3	Valsad	3462	3518	4057	4217
Total		6949	6407	6938	7190

4.2.4.5.3 Pesticides/ Fungicides:

District-wise consumption of pesticides/fungicides and its projection for next three

years is given in Table 4.2.98 and 4.2.99

**Table- 4.2.98 Pesticides/ Fungicides Requirement in the State for Niger Crop
(Base Year- 2016-17)**

Sr.No.	District	Area ('00 ha)	Pesticides Consumption Liquid ('000 Litre)	Fungicides Consumption Liquid ('000 Litre)	Grand Total ('000 Lit/kg)
1	Dang	40.50	1.32	4.05	5.37
2	Navsari	9.35	0.30	0.94	1.24
3	Valsad	49.50	1.61	4.95	6.56
	Total	99.35	3.23	9.94	13.17

Estimated based on crop area and pest and disease status: Liquid pesticide – 0.325 l/ha,
Liquide Fungicide – 1.00 l/ha

Table- 4.2.99 Planning of Pesticides/Fungicides Input in the State

Sr. No.	District	Pesticides/ Fungicides Quantity ('000 Lit/kg) for the Year 2016-17	Pesticides/Fungicides Quantity Required (000 Lit/kg)		
			2017-18	2018-19	2019-20
1	Dang	5.37	4.64	4.80	5.17
2	Navsari	1.24	0.83	0.66	0.46
3	Valsad	6.56	6.66	7.69	7.99
	Total	13.17	12.14	13.14	13.62

4.2.4.6 Constraints Analysis and Recommended Interventions for Yield Gap Analysis of Niger:

Table- 4.2.100 District-wise Yield Gap (Base Year- 2016-17)

Sr No	Name of the Districts	District Yield(q/ha)	State Yield* (q/ha)	Variety (GNNIG-3) Yield (q/ha)	Yield Gap (%) over	
					State Average	Variety Yield
1	Dang	3.95	3.96	4.5	-0.25	-12.22
2	Navsari	3.93	3.96	4.5	-0.76	-12.67
3	Valsad	3.97	3.96	4.5	0.25	-11.78
	Average	3.96	3.96	4.5	-0.76	-36.67

The constraints associated with low productivity are enumerated as under:

- Rainfall dependent growing conditions
- Low input management.
- Poor plant stands due to low germination
- Poor weed management
- Poor insect and disease management
- Low use of organic matter due to poor awareness regarding soil health

Table- 4.2.101 Issues Related to Yield Gap and its Sustainability and Strategies for Bridging Gaps for Niger Crop

Sr. No	Factors/ Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators/ Outputs
a	Low germination due to improper placement of seed and lack of knowledge	To popularize scientific package of practices	Creating awareness through demonstrations, trainings, <i>shibir</i> , literatures etc.	Increased yield (5-8%)
b	Low adoption of improved package practices due to lack of awareness	To popularize scientific package of practices	Creating awareness and adoption of scientific package of practices through demonstrations, trainings, field days, <i>shibir</i> , literatures etc	Increase in the production (10-12%)
c	Insect pest and disease problem due to lack of knowledge of their management options	Integrated Pest and disease management	Creating awareness and adoption of IPM & IDM through demonstrations, training, <i>shibir</i> , literature etc.	Pests- diseases management leads to yield increment (15-20%)
d	Maintain plant population and land configuration High seed rate and sowing in flat land	Thinning and sowing on ridge and furrow	Creating awareness and adoption thinning and land configuration through demonstrations, training, <i>shibir</i> , literatures etc	Increase in yield (2-5%)

Table- 4.2.102 Recommended Interventions for Bridging the Gaps

No	Program	Activities
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1	Increase Availability of Quality Seeds /Seed Production	
	Seed planning and production	<p>Identification of potential areas, Farmers led Participatory seed production of improved varieties of crops</p> <p>Motivating farmers to produce the seed of best varieties through Seed village programmes, capacity building of farmers and extension functionaries and exposure visits</p>
	Seed distribution and seed storage	<p>Establishment of seed selling units for timely distribution</p> <p>Construction of godowns</p>
2.	Increase in Seed Replacement Rate	
	Production of quality seeds as per area to be sown	<p>Create awareness about the production of quality seeds of improved varieties</p> <p>Strengthen the linkage between supply agencies and the farmers</p>
3.	Soil Health Management	
	Soil testing	<p>Establishment of soil and water testing laboratory and mobile soil testing laboratory</p> <p>Create awareness about the importance of soil testing</p>
	Biofertilizer	Popularize the use of bio-fertilizer through capacity building and demonstrations
	Green Manuring	Popularize the green manuring practices through capacity building and demonstrations
	Enrichment of FYM	Popularize the methods of preparation of good quality FYM and vermicompost
	I N M	Educating farmers about the use of balanced fertilizer
	Micronutrient	Identification of micronutrient deficient areas and Educating farmers about their importance
	Recycling of crop residues	Converting of crop residue in small pieces through shredders and using it for composting
	Crop-rotation	Suggesting suitable crop rotation for improving soil health
	IWM	Weeds absorb a huge quantity of nutrients so educating the farmers about integrated weed management practices is necessary.
4.	Plant Health Management	
	Plant health clinic	Establishment of plant health clinics at KVK and mobile health clinic
	IPM/IDM	Educating the farmers about various insect pests and diseases of crop and their IPM/IDM through demonstrations and training

	Proper use of plant protection equipment	Educate the farmers about the proper use of plant protection equipment, provide necessary inputs to the farmers
5.	Farm Mechanization	
	Improved hand tools and small implements	Survey for drudgery reduction Educating farmers for use of machines/ implements
	Hand rotary weeder, Power tiller Shredder Farm tractors, Mechanical harvesters, submersibles, Laser leveller	Educate the farmers and providing units on a co-operative basis and educate farmers for custom hiring Introduction of micro kitchen oil mill in the household
6.	Value Addition	
	Processing Units, the establishment of mini oil extractor/ equipment, grading and packaging units	Create awareness for value addition and educate farmers, provide units on a co-operative basis, marketing awareness
7.	Marketing	
	Strengthening APMC and construction of ware houses	Establishment of the warehouse at cluster and taluka level
	Market linkage	Strengthening market linkage through AGMARK net
	Collection van	Units and monitoring

4.2.4.7 Strategies for Bridging the Gaps:

1. Seed production enhancement through seed village programme
2. Demonstration on IPM
3. Demonstration on INM
4. Demonstration on an improved variety
5. Demonstration on Biofertilizers
6. Demonstration on vermicompost
7. Training to staff and extension functionaries-state level

i.	Soil health management	vi.	Production technology of <i>Kharif niger</i>
ii.	Integrated pests management	vii.	Production technology of <i>Rabi niger</i>
iii.	Plant health management	viii.	Biological control for pest and diseases management
iv.	Organic farming	ix.	Bio-compost of farm waste

v.	Installation and maintenance of drip Irrigation system	x.	Post-harvest technology and value addition
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4.2.4.8 Detailed Action Plan with Costs:

The proposed Activities for Bridging the Gaps are as under:

Table-4.2.103 Niger Seed Planning/Seed Village Program (Seed Production Enhancement)

Sr. No	District	Seed Rate kg/ha	Niger Seed Village Program (Phy-No. Fin- Rs. In Lakh)							
			2017-18		2018-19		2019-20		Total	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	5.0	15	1.13	20	1.50	25	1.88	60	4.50
2	Navsari	5.0	05	0.38	05	0.38	05	0.38	15	1.13
3	Valsad	5.0	15	1.13	20	1.50	25	1.88	60	4.50
	Total	5.0	35	2.64	45	3.38	55	4.14	135	10.13

Cost Norms: 7500/hectare

Table - 4.2.104 District-wise Demonstration Proposed on Integrated Pest Management

Sr No	Districts	Year-wise Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	20	1.50	40	3.00	60	4.50	120	9.00
2	Navsari	5	0.38	10	0.75	15	1.13	30	2.25
3	Valsad	25	1.88	45	3.38	65	4.88	135	10.13
	Total	50	3.75	95	7.13	140	10.50	285	21.38

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.105 District-wise Demonstration Proposed on Integrated Nutrient Management

Sr No	Districts	Year-wise Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	15	1.13	25	1.88	35	2.63	75	5.63
2	Navsari	5	0.38	10	0.75	15	1.13	30	2.25
3	Valsad	20	1.50	30	2.25	40	3.00	90	6.75
	Total	40	3.01	65	4.88	90	6.75	195	14.63

Table- 4.2.106 District-wise Demonstration Proposed on Improved Varieties of Niger

Sr	Districts	Year-wise Demonstration (Phy-No. Fin- Rs. in Lakh)							
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No		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	40	3.00	50	3.75	60	4.50	150	11.25
2	Navsari	10	0.75	20	1.50	30	2.25	60	4.50
3	Valsad	40	3.00	50	3.75	60	4.50	150	11.25
	Total	90	6.75	120	9.00	150	11.25	360	27.00

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.107 District-wise Demonstration Proposed on Effect of Bio-fertilizes in Niger

Sr No	Districts	Year-wise Demonstration (Phy-No. Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	5	0.38	10	0.75	15	1.13	30	2.25
2	Navsari	2	0.15	5	0.38	8	0.60	15	1.13
3	Valsad	10	0.75	15	1.13	20	1.50	45	3.38
	Total	17	1.28	30	2.25	43	3.23	90	6.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.108 District-wise Demonstration Proposed on Effect of Vermin-Compost in Niger

Sr No	Districts	Year-wise Demonstration (Phy-No. Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	5	0.38	10	0.75	15	1.13	30	2.25
2	Navsari	2	0.15	5	0.38	8	0.60	15	1.13
3	Valsad	10	0.75	15	1.13	20	1.50	45	3.38
	Total	17	1.28	30	2.25	43	3.23	90	6.75

Cost Norms: 7500/ demonstration of 0.4 ha

Table- 4.2.109 Training Proposed for Capacity Building for Staff of Extension Functionaries (State Level)

Category	Year-wise Training (Phy-No.of staff, Fin.- Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	25	0.20	30	0.24	35	0.28	90	0.72
Cooperative & NGOs	10	0.08	15	0.12	20	0.16	45	0.36
PRI Staff & Others	10	0.08	15	0.12	20	0.16	45	0.36

Total	45	0.36	60	0.48	75	0.60	180	1.44
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Cost 800/trainee/day, 30staff/ training

Table- 4.2.110 Training Proposed for Capacity Building of Farmers on Soil Health Management at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	40	9.60	50	12.00	60	14.40	150	36.00
2	Navsari	10	2.40	20	4.80	30	7.20	60	14.40
3	Valsad	50	12.00	60	14.40	70	16.80	180	43.20
	Total	100	24.00	130	31.20	160	38.40	390	93.60

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.111 Training Proposed for Capacity Building of Farmers on Integrated Pest Management at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	5	1.20	10	2.40	15	3.60	30	7.20
2	Navsari	2	0.48	4	0.96	6	1.44	12	2.88
3	Valsad	5	1.20	10	2.40	15	3.60	30	7.20
	Total	12	2.88	24	5.76	36	8.64	72	17.28

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.112 Training Proposed for Capacity Building of Farmers on Plant Health Management at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	40	9.60	50	12.00	60	14.40	150	36.00
2	Navsari	10	2.40	20	4.80	30	7.20	60	14.40
3	Valsad	50	12.00	60	14.40	70	16.80	180	43.20
	Total	100	24.0	130	31.20	160	38.40	390	93.60

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.113 Training Proposed for Capacity Building of Farmers on Organic Farming at District Level

Sr	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
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No		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	40	9.60	60	14.40	100	24.00	200	48.00
2	Navsari	10	2.40	20	4.80	30	7.20	60	14.40
3	Valsad	40	9.60	60	14.40	100	24.00	200	48.00
	Total	90	21.60	140	33.60	230	55.20	460	110.40

Table- 4.2.114 Training Proposed for Capacity Building of Farmers on Installation and Maintenance of Drip Irrigation system at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	10	2.40	20	4.80	30	7.20	60	14.40
2	Navsari	2	0.48	4	0.96	4	0.96	10	2.40
3	Valsad	10	2.40	20	4.80	30	7.20	60	14.40
	Total	22	5.28	44	10.56	64	15.36	130	31.20

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.115 Training Proposed for Capacity Building of Farmers on Production Technology of Niger at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	25	6.00	35	8.40	40	9.60	100	24.00
2	Navsari	10	2.40	20	4.80	30	7.20	60	14.40
3	Valsad	25	6.00	35	8.40	40	9.60	100	24.00
	Total	60	14.40	90	21.60	110	26.40	260	62.40

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.116 Training Proposed for Capacity Building of Farmers on Production Technology of Rabi Niger at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	5	1.20	10	2.40	15	3.60	30	7.20
2	Navsari	2	0.48	4	0.96	4	0.96	10	2.40
3	Valsad	5	1.20	10	2.40	15	3.60	30	7.20
	Total	12	2.88	24	5.76	34	8.16	70	16.80

Table- 4.2.117 Training Proposed for Capacity Building of Farmers on Biological Control of Pests and Diseases at District Level

Sr	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
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No		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	5	1.20	10	2.40	15	3.60	30	7.20
2	Navsari	2	0.48	4	0.96	4	0.96	10	2.40
3	Valsad	5	1.20	10	2.40	15	3.60	30	7.20
Total		12	2.88	24	5.76	34	8.16	70	16.80

Table- 4.2.118 Training Proposed for Capacity Building of Farmers on Bio-Compost of Farm Waste at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	10	2.40	20	4.80	30	7.20	60	14.40
2	Navsari	2	0.48	4	0.96	4	0.96	10	2.40
3	Valsad	10	2.40	20	4.80	30	7.20	60	14.40
Total		22	5.28	44	10.56	64	15.36	130	31.20

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.119 Training Proposed for Capacity Building of Farmers on Post Harvest Technology and Value Addition at District Level

Sr No	Districts	Year-wise No. of Training (Phy-No. of Farmer, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dang	50	12.00	75	18.00	100	24.00	225	54.00
2	Navsari	30	7.20	30	7.20	40	9.60	100	24.00
3	Valsad	50	12.00	75	18.00	100	24.00	225	54.00
Total		130	31.20	180	43.20	240	57.60	550	132.00

Cost Norms: 800/trainee/day, 30 Farmers/ training

Table- 4.2.120 Projected Outcome and Growth during the Plan Period for Niger Crop in the State

(Area: '00 ha, Production: '00 T, Productivity: q/ha).

Sr. No	Districts	Base Year 2016-17			2017-18			2018-19			2019-20		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0
2	Amreli	0	0	0	0	0	0	0	0	0	0	0	0
3	Anand	0	0	0	0	0	0	0	0	0	0	0	0
4	Banaskantha	0	0	0	0	0	0	0	0	0	0	0	0
5	Bharuch	0	0	0	0	0	0	0	0	0	0	0	0
6	Bhavnagar	0	0	0	0	0	0	0	0	0	0	0	0
7	Dahod	0	0	0	0	0	0	0	0	0	0	0	0
8	Dang	40.50	16.02	3.5	35	13.82	3.95	36.20	16.29	4.50	39	19.50	5.00
9	Gandhinagar	0	0	0	0	0	0	0	0	0	0	0	0
10	Jamnagar	0	0	0	0	0	0	0	0	0	0	0	0
11	Junagadh	0	0	0	0	0	0	0	0	0	0	0	0
12	Kheda	0	0	0	0	0	0	0	0	0	0	0	0
13	Kutch	0	0	0	0	0	0	0	0	0	0	0	0
14	Mehsana	0	0	0	0	0	0	0	0	0	0	0	0
15	Narmada	0	0	0	0	0	0	0	0	0	0	0	0
16	Navsari	9.35	3.67	3.93	6.3	2.51	3.98	5.00	2.50	5.00	3.50	1.93	5.50
17	Panchmahal	0	0	0	0	0	0	0	0	0	0	0	0
18	Patan	0	0	0	0	0	0	0	0	0	0	0	0
19	Porbandar	0	0	0	0	0	0	0	0	0	0	0	0
20	Rajkot	0	0	0	0	0	0	0	0	0	0	0	0
21	Sabarkantha	0	0	0	0	0	0	0	0	0	0	0	0
22	Surat	0	0	0	0	0	0	0	0	0	0	0	0
23	Surendranagar	0	0	0	0	0	0	0	0	0	0	0	0
24	Tapi	0	0	0	0	0	0	0	0	0	0	0	0
25	Vadodara	0	0	0	0	0	0	0	0	0	0	0	0
26	Valsad	49.50	19.70	3.97	50.3	20.01	3.98	58.00	26.10	4.50	60.30	30.15	5.00
	Gujarat State	99.35	39.39	3.96	91.6	36.34	3.97	99.20	44.89	4.53	102.8	51.58	5.02

4.2.4.9 Research Related Issues:

- a. Development of early maturing, high oil and yielding varieties suitable for various cropping systems and rain fed conditions.
- b. Identification of sources of resistance to biotic stresses (disease & pests) and development of tolerant varieties.
- c. Development of varieties resistant to abiotic stress (drought and thermo-insensitive).
- d. Development of technology of organic niger production for export purposes.
- e. Development of package of practices for late kharif & rabi- summer Niger cultivation.

4.2.5 Castor:

4.2.5.1 Background:

Castor is an important industrial non-edible oilseed crop of the arid and semi-arid region. India in general and Gujarat in particular, is leading state in castor production in the world. Gujarat is the leading state in castor cultivation with 8 lakh ha castor cultivated area which is about 60 % of total castor area of India and total production of 17 lakh tones which is about 80 % of total castor production of India (2012-13). Farmers are cultivating castor crop as a sole crop, intercrop and mix crop under irrigated as well as rainfed condition in Gujarat state. Castor oil, extracted from castor seeds, is of much industrial use due to the presence of ricinolic acid, which is a key fatty acid constituent of castor oil. India is the major castor oil exporter in the world. India is exporting castor oil and its derivatives worth more than Rs 4000 crore. Nowadays export of derivatives based on ricinolic acid is also increasing. The castor growing area in Gujarat is increasing day by day.

Vision:

Through agro-technological intervention, the yield level of castor is to be increased *vis-a-vis* to enhance farmer's income.

Mission:

To augment the production and yield and quality of castor in the state, narrow the yield gap in irrigated and rainfed without mining natural resources, further accelerate technology development process to meet ensuing climatic changes as also the needs/expectation of all stakeholders.

4.2.5.2 Crop/Area Issues:

- Use of inferior quality seeds due to lack of awareness
- Lack of availability of quality seed
- Limited irrigation facility
- Unscientific crop management like spacing, fertilization, harvesting technology
- Poor management of issues related to soil fertility like no/ less sulphur and micronutrient application
- The occurrence of wilt and root rot diseases
- Infestation of semi looper, capsule borer, thrips and whiteflies

4.2.5.3 Priority for Comprehensive Castor Cultivation:

- Create awareness about scientific crop management through demonstrations and training
- Create awareness about the importance of improved hybrids/ varieties through demonstrations, training, *shibir*, literature etc.

- Providing training to progressive farmers for seed production at local level
- Popularization of soil fertility and water management through promotion of MIS, balance fertilization including application of sulphur and micronutrients (Fe &Zn)
- Promotion of use of resistant varieties/ hybrids to diseases
- Adoption of integrated pest management
- Popularization of use of sicklers for harvesting

4.2.5.4 Current Status of Area, Production and Productivity:

In the state, total castor cultivation area is 877700 ha in 2011-12. Area, production and productivity of castor in different districts of Gujarat are given in Table 4.2.121.

Table- 4.2.121 Statement showing district-wise Area, Production and Yield of castor in Gujarat state based on Final Forecast

reports for the year 2011-12 to 2015-16 Total castor

Area: 00" hact. Prod: 00 MT" Yield : kg/ha

Sr	DISTRICT	2011-12			2012-13			2013-14		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Kachchh	1390	2754	1981	1291	2445	1893	972	2100	2162
2	Banaskantha	1790	3670	2050	1277	3082	2413	1105	2772	2508
3	Patan	1310	2313	1766	777	1255	1616	615	1135	1845
4	Mahesana	920	1950	2120	700	1577	2253	588	1257	2138
5	Sabarkantha	740	1315	1777	601	1075	1788	672	1309	1948
6	Arvalli									
7	Gandhinagar	290	586	2022	286	594	2080	295	726	2460
8	Ahmedabad	360	807	2243	525	788	1500	402	549	1367
9	Surendranagar	810	2035	2513	695	1579	2272	542	1362	2512
10	Morbi									
11	Rajkot	160	462	2887	267	225	843	63	168	2661
12	Jamnagar	140	508	3632	303	677	2229	226	813	3596
13	DevbhumiDwarka									
14	Porbandar	60	123	2055	3	6	1988	23	50	2171
15	Junagadh	20	41	2055	11	22	1988	25	54	2171
16	Gir Somnath									
17	Amreli	20	41	2055	31	61	1988	33	72	2171
18	Bhavnagar	7	15	2055	9	18	1988	5	11	2171
19	Botad									
20	Anand	30	62	2055	42	83	1988	22	47	2171
21	Kheda	230	332	1441	174	320	1842	258	389	1506
22	Panchmahal	120	247	2055	108	214	1988	13	28	2171
23	Mahisagar									

Sr	DISTRICT	2011-12			2012-13			2013-14		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
24	Dahod	4	8	2055	5	11	1988	4	9	2171
25	Vadodara	250	506	2023	325	746	2293	364	662	1817
26	Chhotaudepur									
27	Narmada	22	45	2055	12	23	1988	12	25	2171
28	Bharuch	70	144	2055	58	115	1988	33	72	2171
29	Surat	30	62	2055	4	8	1988	3	6	2171
30	Dang	0	0	0	0	0	0	0	0	2170
31	Navsari	0	0	0	0	0	0	0	0	2170
32	Valsad	0	0	0	0	0	0	0	0	2170
33	Tapi	4	8	2055	3	6	1988	4	8	2171
GUJARAT STATE		8777	18034	2055	7507	14930	1989	6278	13623	2170

Table- 4.2.121 Statement showing district-wise Area, Production and Yield of castor in Gujarat state based on Final Forecast

reports for the year 2011-12 to 2015-16 Total castor (Continue...)

Area: 00" hact. Prod: 00 MT" Yield : kg/ha

Sr	DISTRICT	2014-15			2015-16			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Kachchh	928	1758	1894	756	1896	2507	1067	2191	2052
2	Banaskantha	1332	3586	2693	1408	2638	1874	1382	3149	2278
3	Patan	1029	1900	1847	998	1878	1882	946	1696	1794
4	Mahesana	777	1593	2051	842	2017	2395	765	1679	2194
5	Sabarkantha	251	503	2003	319	648	2029	517	970	1877
6	Arvalli	218	350	1607	337	581	1726	277	466	1679
7	Gandhinagar	293	744	2537	227	542	2387	278	638	2294
8	Ahmedabad	476	765	1606	579	869	1501	468	756	1613
9	Surendranagar	669	1073	1605	780	1347	1727	699	1479	2116

Sr	DISTRICT	2014-15			2015-16			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
10	Morbi	128	382	2995	109	304	2794	118	343	2903
11	Rajkot	93	227	2433	83	103	1246	133	237	1779
12	Jamnagar	103	244	2363	88	185	2113	172	485	2823
13	DevbhumiDwarka	14	34	2510	13	20	1570	13	27	2059
14	Porbandar	11	32	2926	29	73	2523	25	57	2256
15	Junagadh	10	25	2575	10	33	3219	15	35	2307
16	Gir Somnath	56	182	3239	2	4	2166	29	93	3203
17	Amreli	18	32	1760	13	22	1742	23	45	1983
18	Bhavnagar	10	23	2240	23	28	1230	11	19	1753
19	Botad	2	6	2886	1	2	1981	1	4	2606
20	Anand	18	41	2240	3	0	0	23	47	2019
21	Kheda	126	225	1787	82	151	1842	174	283	1628
22	Panchmahal	11	15	1285	37	45	1222	58	110	1897
23	Mahisagar	12	22	1911	28	33	1160	20	27	1380
24	Dahod	0	0	2240	2	4	1981	3	7	2112
25	Vadodara	285	532	1870	280	512	1834	301	592	1968
26	Chhotaudepur	15	32	2173	50	97	1927	33	64	1982
27	Narmada	5	9	1647	4	7	2060	11	22	2007
28	Bharuch	36	48	1350	27	36	1354	45	83	1858
29	Surat	1	2	2240	1	2	1981	8	16	2069
30	Dang	0	0	0	0	0	0	0	0	0
31	Navsari	0	0	0	0	0	0	0	0	0
32	Valsad	0	0	0	0	0	0	0	0	0
33	Tapi	9	21	2240	9	17	1981	6	12	2093
GUJARAT STATE		6935	14405	2077	7138	14096	1975	7622	15632	2051

4.2.5.5 Major Castor Varieties / Hybrids in the State:

In *kharif* season, castor is dominant non-edible oilseed crop and in *Rabi* mustard is dominating edible oilseed crop. The varieties grown in the district are given in Table 4.2.122.

Table- 4.2.122 Crops and Major Varieties /Hybrids of the State

Crop	Varieties/ Hybrids
Castor	GCH-2, GCH-4, GCH-5, GCH-6, GCH-7, GC3, GNCH-1 (<i>rabi</i>), GCH-8

Source: Directorate of Agriculture, Gandhinagar

4.2.5.6 Input Management:

4.2.5.6.1 Seed:

The area under castor is 7.7 percent and mustard is 1.9 percent of the total of the total cultivable area in Gujarat. At present, the seed replacement ratio (SRR) of castor is 50 percent and mustard is 25 percent. Thus, the scope of SRR is ambient in future to enhance the productivity of castor and mustard in the state, especially through seed village concept and hybrid seed production programmes.

Table-4.2.123 Planning of Agriculture Inputs in the state – Castor crop seed

S. No.	District	Castor Seed Quantity requirement and SRR				Seed quantity required, tons		
		Area ('00 ha) (2015-16)	Seed rate kg/ha	Total Seed quantity tons	SRR	2017-18	2018-19	2019-20
1	Ahmedabad	579	7.5	434	40	174	191	210
2	Amreli	13	7.5	10	50	5	5	6
3	Anand	3	7.5	2	50	1	1	1
4	Banaskantha	1408	7.5	1056	60	634	697	767
5	Bharuch	27	7.5	20	40	8	9	10
6	Bhavnagar	23	7.5	17	40	7	8	8
7	Dahod	2	7.5	2	45	1	1	1
8	Dang	0	7.5	0	60	0	0	0
9	Gandhinagar	227	7.5	170	60	102	112	124
10	Jamnagar	88	7.5	66	45	30	33	36
11	Junagadh	10	7.5	8	50	4	4	5
12	Kheda	82	7.5	62	50	31	34	37
13	Kutchh	756	7.5	567	35	198	218	240
14	Mehsana	842	7.5	632	45	284	313	344
15	Narmada	4	7.5	3	40	1	1	1

S. No.	District	Castor Seed Quantity requirement and SRR				Seed quantity required, tons		
		Area ('00 ha) (2015-16)	Seed rate kg/ha	Total Seed quantity tons	SRR	2017-18	2018-19	2019-20
16	Navsari	0	7.5	0	60	0	0	0
17	Panchmahal	37	7.5	28	40	11	12	13
18	Patan	998	7.5	749	50	374	412	453
19	Porbandar	29	7.5	22	35	8	8	9
20	Rajkot	83	7.5	62	30	19	21	23
21	Sabarkantha	319	7.5	239	50	120	132	145
22	Surat	1	7.5	1	50	0	0	0
23	Surendranaga	780	7.5	585	50	293	322	354
24	Tapi	9	7.5	7	60	4	4	5
25	Vadodara	280	7.5	210	40	84	92	102
26	Valsad	0	7.5	0	60	0	0	0
27	Aravali	337	7.5	253	40	101	111	122
28	Morbi	109	7.5	82	40	33	36	40
29	DevbhumiDw	13	7.5	10	40	4	4	5
30	Gir Somnath	2	7.5	2	40	1	1	1
31	Botad	1	7.5	1	40	0	0	0
32	Mahisagar	28	7.5	21	40	8	9	10
33	Chhotaudepur	50	7.5	38	40	15	17	18
	Total	7140	7.5	5355	46	2458	2704	2975

4.2.5.6.2 Fertilizer:

District-wise consumption of fertilizers, NPK consumption and ratio in *Rabi* crop and Fertilizer requirements in castor crop during 2011-12 is given in Table no. 4.2.124 to 4.2.126. The total requirement of the fertilizers during 2011-12 is 81228 T. A projection rate of 2 percent is considered in the area. Accordingly, the total requirement of the fertilizers is estimated to be 82852, 84509, 86199, 87923 and 89681 T for the years 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 respectively.

Table- 4.2.124 District-wise Consumption of Fertilizers in *Rabi* Crops (in terms of materials, in T)

Sr.	District	Urea	DAP	MoP	TSP	SSP	AS	Can
1	Ahmedabad	63460	10081	1818	937	7381	1044	645
2	Amreli	36140	18667	1467	213	3632	1895	414
3	Anand	75783	2953	4985	613	3286	7336	976
4	Banaskantha	78973	14152	6076	998	5027	7941	396
5	Bharuch	26108	2182	3923	174	4187	2394	374
6	Bhavnagar	37121	18193	3672	47	8204	5302	1827
7	Dahod	15020	1855	479	232	563	657	0
8	Dang	65	5	12	0	0	101	0
9	Gandhinagar	24180	3275	2196	78	2323	1401	290
10	Jamnagar	30562	17794	1215	490	7008	1561	1250
11	Junagadh	52933	20141	2534	924	5417	1658	2102
12	Kheda	62780	3640	4792	1504	2566	5111	725
13	Kutch	46717	10566	335	0	1463	910	204
14	Mehsana	55318	7962	1750	198	1962	3049	661
15	Narmada	10103	585	2343	102	1082	871	40
16	Navsari	16320	4911	6145	659	4433	3826	186
17	Panchmahal	42995	1731	576	576	586	995	204
18	Patan	34029	4847	182	160	684	1325	227
19	Porbandar	7026	4623	78	73	535	221	317
20	Rajkot	68553	25418	3097	766	10383	3668	2418
21	Sabarkantha	64407	8627	9803	525	3847	3057	1079
22	Surat	34656	9241	14906	466	12455	8007	1369
23	Surendranagar	55279	15503	1125	116	2695	721	1260
24	Tapi	5400	1386	1585	191	1010	2377	382
25	Vadodara	79342	3850	7822	1246	5367	3229	897
26	Valsad	5104	1458	2192	23	505	1235	85
Total		1028374	213646	85108	11311	96601	69892	18328

Table- 4.2.124 District-wise Consumption of Fertilizers in *Rabi* Crops (in terms of materials, in T) (Continue ...)

Sr.	District	20:20:00	15:15:15	24:24:00	12:32:16	10:26:26	16:16:16	16:20:00
1	Ahmedabad	3456	66	21	481	0	31	495
2	Amreli	3854	36	550	4316	350	5	235
3	Anand	5676	398	166	263	0	174	15
4	Banaskantha	10373	0	369	1887	1185	0	3283
5	Bharuch	3514	36	204	1378	875	45	232
6	Bhavnagar	5838	44	514	3287	84	0	0
7	Dahod	1970	45	0	79	0	0	119
8	Dang	39	0	0	0	0	0	0
9	Gandhinagar	2560	0	83	695	423	0	594
10	Jamnagar	4694	111	133	6844	0	0	361
11	Junagadh	8337	94	226	4589	711	177	1041
12	Kheda	3129	147	54	158	0	78	57
13	Kutch	2803	481	0	422	0	0	281
14	Mehsana	4004	22	215	1090	353	85	914
15	Narmada	884	73	92	234	271	0	204
16	Navsari	2935	1198	415	839	773	0	288
17	Panchmahal	3414	256	0	408	0	39	163
18	Patan	2720	0	20	455	81	11	564
19	Porbandar	1377	0	0	887	371	0	52
20	Rajkot	7693	294	599	17516	310	0	3745
21	Sabarkantha	8656	47	850	2703	562	40	2140
22	Surat	7770	374	791	5003	5154	0	950
23	Surendranagar	5402	150	62	783	996	0	26
24	Tapi	1730	60	106	266	792	0	222
25	Vadodara	3804	42	142	1119	55	115	0
26	Valsad	1735	492	278	148	124	0	54
Total		108367	4466	5890	55850	13470	800	16035

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar

Table- 4.2.125 District-wise NPK Consumption and Ratio in *Rabi* Crop (in T)

Sr. No.	District	N	P	K	Total NPK	N:P:K Ratio
1	Ahmedabad	32248	7232	1183	40663	27.26 :6.11:1.00
2	Amreli	21994	11698	1668	35360	13.19 :7.01:1.00
3	Anand	38492	3528	3121	45141	12.33:1.13:1.00
4	Banaskantha	43683	11525	4256	59464	10.26:2.71:1.00
5	Bharuch	14061	3236	2814	20111	5.00 :1.15:1.00
6	Bhavnagar	23658	12075	2758	38491	8.58 :4.38:1.00
7	Dahod	7810	1505	307	9622	25.44 :4.90:1.00
8	Gandhinagar	12837	2899	1539	17275	8.34 :1.88:1.00
9	Jamnagar	19821	12820	1869	34510	10.61:6.86:1.00
10	Junagadh	31427	14185	2466	48078	12.74 :5.75:1.00
11	Kheda	31492	3530	2923	37945	10.77: 1.21:1.00
12	Kutch	24380	5932	354	30666	68.87 :16.76:1.00
13	Mehsana	28866	5551	1319	35736	21.88 :4.21:1.00
14	Narmada	5244	887	1525	7656	3.44 :0.58:1.00
15	Navsari	10341	4684	4208	19233	2.46 :1.11:1.00
16	Panchmahal	21151	2053	451	23655	46.90 :4.55:1.00
17	Patan	17567	3244	203	21014	86.54 :15.98:1.00
18	Porbandar	4623	2913	285	7821	16.22 :10.22:1.00
19	Rajkot	41998	21889	4792	68679	8.76:4.57:1.00
20	Sabarkantha	34779	8217	6467	49463	5.38 :1.27:1.00
21	Surat	22724	11398	11140	45262	2.04:1.02:1.00
22	Surendranagar	30374	9251	1082	40707	28.07 :8.55:1.00
23	Tapi	3385	1607	1208	6200	2.80 :1.33:1.00
24	Dang	735	29	26	790	28.27 :1.12:1.00
25	Vadodara	38633	4401	4893	47927	7.90 :0.9:1.00
26	Valsad	17965	1468	1573	21006	11.42 :0.93:1.00
Total		580288	167757	64173	812218	9.04 :2.61:1.00

*Calculated for 2011-12

Table- 4.2.126 Fertilizers Requirement per Year in Castor Crop

Castor	Area (00ha)	2017-18			2018-19			2019-20		
		Urea	DAP	Gypsum	Urea	DAP	Gypsum	Urea	DAP	Gypsum
Ahmedabad	579	20775	4712	7238	20775	4712	7238	20775	4712	7238
Amreli	13	467	106	163	467	106	163	467	106	163
Anand	3	108	24	38	108	24	38	108	24	38
Banaskantha	1408	50521	11458	17600	50521	11458	17600	50521	11458	17600
Bharuch	27	969	220	338	969	220	338	969	220	338
Bhavnagar	23	825	187	288	825	187	288	825	187	288
Dahod	2	72	17	25	72	17	25	72	17	25
Dang	0	0	0	0	0	0	0	0	0	0
Gandhinagar	227	8145	1847	2838	8145	1847	2838	8145	1847	2838
Jamnagar	88	3157	716	1100	3157	716	1100	3157	716	1100
Junagadh	10	359	82	125	359	82	125	359	82	125
Kheda	82	2942	667	1025	2942	667	1025	2942	667	1025
Kutch	756	27126	6152	9450	27126	6152	9450	27126	6152	9450
Mehsana	842	30212	6852	10525	30212	6852	10525	30212	6852	10525
Narmada	4	143	33	50	143	33	50	143	33	50
Navsari	0	0	0	0	0	0	0	0	0	0
Panchmahal	37	1328	301	463	1328	301	463	1328	301	463
Patan	998	35810	8121	12475	35810	8121	12475	35810	8121	12475
Porbandar	29	1041	236	363	1041	236	363	1041	236	363
Rajkot	83	2978	675	1038	2978	675	1038	2978	675	1038
Sabarkantha	319	11446	2596	3988	11446	2596	3988	11446	2596	3988
Surat	1	36	8	13	36	8	13	36	8	13

Castor	Area (00ha)	2017-18			2018-19			2019-20		
		Urea	DAP	Gypsum	Urea	DAP	Gypsum	Urea	DAP	Gypsum
Surendranagar	780	27988	6347	9750	27988	6347	9750	27988	6347	9750
Tapi	9	324	74	113	324	74	113	324	74	113
Vadodara	280	10046	2278	3500	10046	2278	3500	10046	2278	3500
Valsad	0	0	0	0	0	0	0	0	0	0
Aravali	337	12092	2742	4213	12092	2742	4213	12092	2742	4213
Morbi	109	3909	887	1363	3909	887	1363	3909	887	1363
DevbhumiDwarka	13	466	106	163	466	106	163	466	106	163
Gir Somnath	2	72	17	25	72	17	25	72	17	25
Botad	1	36	8	13	36	8	13	36	8	13
Mahisagar	28	1005	228	350	1005	228	350	1005	228	350
Chhotaudepur	50	1795	408	625	1795	408	625	1795	408	625
Total	7140	256194	58104	89250	256194	58104	89250	256194	58104	89250

*Calculated as per area for 2015-16

4.2.5.6.3 Pesticides:

The district-wise requirement of pesticides for termite and weed management is given in Table 4.2.127.

Table- 4.2.127 District-wise Requirement of Pesticides for Castor Seed

Treatment				
District	Area ('00 ha)	Seed rate (kg/ha)	Total Seed (tons)	Captan /Thirum (tons)
Ahmedabad	579	7.5	434	1.45
Amreli	13	7.5	10	0.03
Anand	3	7.5	2	0.01
Banaskantha	1408	7.5	1056	3.52
Bharuch	27	7.5	20	0.07
Bhavnagar	23	7.5	17	0.06
Dahod	2	7.5	2	0.01
Dang	0	7.5	0	0.00
Gandhinagar	227	7.5	170	0.57
Jamnagar	88	7.5	66	0.22
Junagadh	10	7.5	8	0.03
Kheda	82	7.5	62	0.21
Kutch	756	7.5	567	1.89
Mehsana	842	7.5	632	2.10
Narmada	4	7.5	3	0.01
Navsari	0	7.5	0	0.00
Panchmahal	37	7.5	28	0.09
Patan	998	7.5	749	2.49
Porbandar	29	7.5	22	0.07
Rajkot	83	7.5	62	0.21
Sabarkantha	319	7.5	239	0.80
Surat	1	7.5	1	0.00
Surendranagar	780	7.5	585	1.95
Tapi	9	7.5	7	0.02
Vadodara	280	7.5	210	0.70
Valsad	0	7.5	0	0.00
Aravalli	337	7.5	253	0.84
Morbi	109	7.5	82	0.27
DevbhumiDwarka	13	7.5	10	0.03
Gir Somnath	2	7.5	2	0.01
Botad	1	7.5	1	0.00
Mahisagar	28	7.5	21	0.07
Chhotaudepur	50	7.5	38	0.13
Total	7140	7.5	5355	17.83

4.2.5.7 Constraints Analysis and Recommended Interventions for Castor Crop:

The yield gap analysis of castor crop and enterprises were carried out by SAUs resource team identifying different farming situations under which a crop or an enterprise is being grown under each AES in the state. The study of the existing practices was followed by identifying critical gaps in comparing the existing practices adopted by the farmers with recommended practices. The factors and/ or constraints leading to the gaps were arrived at before finalizing the strategies along with approaches and methodology to overcome the constraints and bridging the gaps. Thereafter the performance indicators and sustainability output are indicated to ensure time bound action and impact assessment. Afterward the sustainability and gap analysis issues were sorted out in a log frame summary indicating the proposed mode of action, collaborations/targets along with the costs involved in addressing the issues critical for increasing productivity with sustainability.

4.2.5.8 Yield Gaps Analysis:

Looking to the Table – 4.2.126 and 4.2.127, reveals that productivity of castor and mustard of some district in the state is lower than the state average. There are some key reasons for yield gap. The major constrains for castor and mustard production in the state are (i) Use of inferior quality seeds due to lack of awareness, (ii) Lack of availability of quality seed, (iii) Limited irrigation facility and lack of knowledge of critical stages, (iv) Unscientific crop management, (v) Poor management of issues related to soil fertility like no/ less sulphur and micronutrient application (vi) Occurrence of soil borne disease and other insects, (vii) Faulty harvesting methods. Soil fertility and fertilizer management and agricultural practices are one of the key issues for yield gap. It might be due to an imbalance of NPK ratio and low or negligible sulphur application. The ideal ratio of NPK is 4:2:1. The expected yield of castor and mustard can be increased in next three years by adopting scientific technologies of the crop of SAUs, recommended dose of NPK along with S and micronutrients, adopting good agricultural practices, judicious use of water, timely plant protection measures *etc.*

4.2.5.9 Reason for yield gap:

The NPK ratio is high, whereas the ideal ratio of NPK is 4:2:1. Therefore, if the line department of Agriculture, SAUs, KVK and the extension department give training to the farmers and educate them to apply the chemical fertilizer as per recommended dose of NPK and S for castor and mustard crops and as per soil test value. Before sowing of the crop, soil analysis is required to know the nutrient status of the soils and thereafter, apply the nutrients in the soil so as the maximum crop yield could be obtained.

Table- 4.2.128 Average Yield of Castor Crop of the State along with Yield Gap.

District	Mean of 3 years (2013-14, 2014-15, 2015-16)	Gap (%)
Ahmedabad	1491	28.11
Amreli	1891	8.82
Anand	1470	29.10
Banaskantha	2195	-13.71
Bharuch	1625	21.66
Bhavnagar	1880	9.34
Dahod	2131	-2.74
Dang	723	65.12
Gandhinagar	2461	-18.68
Jamnagar	2691	-29.73
Junagadh	2655	-28.02
Kheda	1712	17.47
Kutch	2128	-5.48
Mehsana	2195	-5.83
Narmada	1959	5.53
Navsari	723	65.12
Panchmahal	1559	24.83
Patan	1858	10.41
Porbandar	2540	-22.46
Rajkot	2113	-1.90
Sabarkantha	1993	3.89
Surat	2131	-2.74
Surendranagar	1948	6.08
Tapi	2131	-2.74
Vadodara	1840	11.29
Valsad	723	65.12
Aravali	1111	46.43
Morbi	1930	6.96
DevbhumiDwarka	1360	34.43
Gir Somnath	1802	13.13
Botad	1622	21.77
Mahisagar	1024	50.64
Chhotaudepur	1367	34.10
Gujarat	2074	

Table- 4.2.129 District-wise Castor Yield Gap Analysis

S. No.	District	Average yield in q/ha			Yield Gap (%)	Reasons for gap
		District Average	State Average	FLD*		
1	Ahmedabad	1491	2074	3000	101.2	Not adopting recommended package of practices
2	Amreli	1891	2074	3000	58.6	Unscientific cultivation & input management
3	Anand	1470	2074	3000	104.1	Non-traditional area, not aware of recommended package of
4	Banaskantha	2195	2074	3869	76.3	Unscientific cultivation & input management
5	Bharuch	1625	2074	3000	84.6	Non-traditional area, not aware of recommended package of
6	Bhavnagar	1880	2074	3000	59.6	Unscientific cultivation & input management
7	Dahod	2131	2074	3000	40.8	Non-traditional area, not aware of recommended package of
8	Dang	723	2074	3000	314.9	Non-traditional area
9	Gandhinagar	2461	2074	3989	62.1	Unscientific cultivation & input management
10	Jamnagar	2691	2074	3700	37.5	Unscientific cultivation & input management
11	Junagadh	2655	2074	3000	13.0	Unscientific cultivation & input management
12	Kheda	1712	2074	3000	75.2	Non-traditional area, not aware of recommended package of
13	Kutch	2128	2074	3000	41.0	Not adoption of latest released hybrids, Unscientific cultivation &
14	Mehsana	2195	2074	3787	72.5	Unscientific cultivation & input management
15	Narmada	1959	2074	3000	53.1	Non-traditional area, not aware of recommended package of
16	Navsari	723	2074	3000	314.9	Non-traditional area
17	Panchmahal	1559	2074	3000	92.4	Non-traditional area, not aware of recommended package of
18	Patan	1858	2074	4056	118.3	Unscientific cultivation & input management
19	Porbandar	2540	2074	3000	18.1	Non-traditional area, not aware of recommended package of
20	Rajkot	2113	2074	3697	75.0	Unscientific cultivation & input management
21	Sabarkantha	1993	2074	3937	97.5	Unscientific cultivation & input management
22	Surat	2131	2074	3000	40.8	Non-traditional area, not aware of recommended package of
23	Surendranagar	1948	2074	3000	54.0	Unscientific cultivation & input management

S. No.	District	Average yield in q/ha			Yield Gap (%)	Reasons for gap
		District Average	State Average	FLD*		
24	Tapi	2131	2074	3000	40.8	Non-traditional area, not aware of recommended package of
25	Vadodara	1840	2074	3000	63.0	Non-traditional area, not aware of recommended package of
26	Valsad	723	2074	3000	314.9	Non-traditional area, not aware of recommended package of
27	Aravalli	1111	2074	3000	170.0	Unscientific cultivation & input management
28	Morbi	1930	2074	3000	55.4	Non-traditional area, not aware of recommended package of
29	DevbhumiDwarka	1360	2074	3000	120.6	Unscientific cultivation & input management
30	Gir Somnath	1802	2074	3000	66.5	Non-traditional area, not aware of recommended package of
31	Botad	1622	2074	3000	85.0	Non-traditional area, not aware of recommended package of
32	Mahisagar	1024	2074	3000	193.0	Non-traditional area, not aware of recommended package of
33	Chhotaudepur	1367	2074	3000	119.5	Non-traditional area, not aware of recommended package of

* Yield gap based on FLD

Production Constraints:

The constraints associated with low productivity are enumerated as under:

- Short and mild winter
- Improper selection of variety/hybrid as per seeding time
- Variable water supply in quantum and space
- Imbalanced fertilizers application
- Improper placement of seeds and fertilizers
- Poor crop management
- Poor insect and disease management
- Low organic matter due to poor awareness regarding soil health
- Poor resource conservation technology

Table- 4.2.130 Region-wise Constraints for Low Productivity of Castor

Sr. No.	Region	Constraints
1.	North Gujarat	<ul style="list-style-type: none"> ➤ Unscientific castor cultivation (especially spacing) ➤ Too early or too late sowing of castor ➤ Low organic matter in soil and imbalance use of fertilizers, low use of sulphur ➤ Abrupt climate change ➤ Poor irrigation management ➤ Poor adoption in mechanization
2.	Middle Gujarat	<ul style="list-style-type: none"> ➤ Unscientific castor cultivation and poor awareness of package of practice for castor cultivation after rice under <i>Kyari land</i> ➤ Imbalance use of fertilizers, low use of sulphur ➤ Poor irrigation management ➤ Poor adoption in mechanization
3.	South Gujarat	<ul style="list-style-type: none"> ➤ Mis-matching to existing cropping sequence ➤ Unscientific castor cultivation and poor awareness of package of practice for castor cultivation after rice under <i>Kyari land</i> ➤ Imbalance use of fertilizers ➤ Poor adoption in mechanization
4.	Saurashtra	<ul style="list-style-type: none"> ➤ The uncertainty of water availability and poor irrigation management ➤ Unscientific castor cultivation and imbalance use of fertilizers ➤ Improper management of soil and salinity ➤ Poor adoption in mechanization

Table- 4.2.131 Sustainability Issues and Gap Analysis of Productivity of Castor Crop and Resources

S. No.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
i	Untimely sowing	Farmers sow castor too early or too late	Follow recommended time of sowing	Farmer's participatory approach and demonstration	Entire castor growing areas.	Improvement in productivity
ii	Not following recommended spacing	Farmers follow closer row to row and/or plant to plant spacing	Adoption of the recommended spacing of castor	Farmer's participatory approach and demonstration	Entire hybrid and irrigated castor growing areas.	Improvement in productivity
iii	Poor fertilizer management	Farmers apply low or excess N & P fertilizer. The use of sulphur, micronutrients and biofertilizer are negligible	Application of recommended dose of fertilizers. Use of sulphur and micronutrients as per soil testing report.	Farmer's participatory approach and demonstration	Entire castor growing area	Improvement in productivity with sustainable soil health
iv	No use of Organic manure	Low availability of good quality FYM/ organic manures and the higher price of organic manures	Awareness campaign for production of good quality organic manures at their own farms	Farmer's field schools, campaigns	Entire castor growing area	Improvement in productivity with sustainable soil health
v	Unscientific irrigation in castor	Irrigation water flooded throughout the crop season	Judicious use of water or adoption of MIS.	Training and demonstrations on efficient water management practices.	Entire irrigated castor growing area	Increase in water use efficiency and sustain soil health

S. No.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
vi	High incidence of weeds	Grassy and broad leaves weeds are seriously affected yields in the different cropping system. Practices of the unscientific method of weed management by the	Following integrated weed management	Capacity building of extension agencies and farmers for appropriate spraying techniques. On-farm demonstrations of integrated weed management	Entire castor growing area	Increased profitability
vii	Adoption of seed treatment	Recurrence of fungal and soil-borne diseases	To popularize the practice of seed treatment	Educating and motivating farmers on its importance and adoption through demonstrations and training.	Entire castor growing area	Productivity growth on a sustainable basis.
viii	Sowing of non-certified seeds	Low awareness about certified seed	Awareness campaign for use of certified seed.	Farmer's field schools, campaigns.	Entire castor growing areas.	Improvement in yield
ix	The traditional way of harvesting	Sickles are used for castor harvesting	Promotion of secateurs for castor harvesting	Educating and motivating farmers on its importance and adoption through demonstrations and training	Entire castor growing areas.	Reduction in yield loss
x	Poor pest and disease management	Farmers apply an improper dose of pesticide. Not using resistant var./ hybrids for cultivation.	Application of recommended dose of pesticides. Use of IPM to control pests and diseases	Farmer's participatory approach and demonstration	Entire castor growing area	Improvement in productivity with less environmental hazard

Table- 4.2.132 Bridging the Gaps for Realizing the Castor Crop Vision

Activity Output Matrix				
Activity/Crop/Commodity	Issues	Mode of Action	Collaborator/Target	Cost
1. Water management	Irregular water supply in canal water so farmers use more water. Lack of drainage facility.	Supply of water in the canal as per the crop requirement. Drainage facility is created	Irrigation Department and SAUs have jointly work to solve this problem.	Demonstration proposed
	Salinity stress mitigation at farmers' fields	MIS, Green manuring and gypsum use.	Subsidy on gypsum (@ 75per cent) and its availability be ensured.	Demonstration on MIS, green manuring and gypsum proposed.
	Water harvesting and recharging	Construction of water harvesting structures near catchment area of the drain, panchayat/farmers land.	DDA/ concerned departments	Project on water harvesting proposed.
	Watershed development in rain fed areas	Micro-irrigation after creating a facility of community ponds/ water harvesting structure.	DDA/concerned departments in consultation with GGRC	Project proposed.
	Work is also needed to adapt agronomic practices, especially the time and method of sowing and amount of fertilizer and irrigation in order to increase ecological sustainability,	Follow scientific package of practices for castor cultivation.	Demonstrations will be laid out by DDA	Demonstrations proposed in the plan.

(iv) Green manuring or organic matter addition	The improvement in the productivity of crops and also an improvement in the soil health.	DDA will ensure the timely availability of green manure seed at 75 percent subsidy. Fifty percent area will be covered during the plan period of five years.	DDA	Demonstrations proposed. The Govt. has to give 75 percent subsidy to purchase green manure seed for small and marginal farmers
4.Seed production	1. Seed planning	1. Production of released hybrids/varieties at farmers' field. 2. Motivating farmers to produce the seeds of suitable hybrids 3.Mandatory testing of new hybrids /variety through	DDAs in consultation with KVKs.	Project on Seed village concept proposed. Campaigns proposed
	2. Best quality seed	Seed production at farmers' field with farmers participatory, training of farmers for hybrid seed production techniques.	DDA and KVK.	Project proposed.
	3. Seed treatment	1. Motivating farmers for seed treatment 2. Demonstrations will be laid	DDA and KVK	Project and demonstration proposed.

5. Site-specific nutrient management (SSNM)	Number of split application and timing of top dressing with reference to irrigation	The project will identify, test and promote intervention for the sustainable castor based cropping system through site-specific nutrient management. Fertilizer recommendation will be based on the principles of SSNM and soil test basis.	DDA and KVK will conduct the survey.	Demonstrations of doses of fertilizer application.
	Monoculture	Follow recommended crop rotation and cropping sequence	DDA and KVK	Demonstration and awareness campaign will be laid out
	Crop residue	Crop residue management for improving soil health. Improving the efficiency of nutrient utilization.	Machinery for uniform distribution of residue will be ensured by DDA Residue retention machinery, inter-culturing, second-generation machinery, precision farming for crops and	Demonstrations proposed, Campaigns, field days
	Bio-fertilizers	Integrate chemical fertilizers with bio-fertilizers Improve the efficiency of chemical fertilizers	DDA will ensure the availability of quality bio-fertilizers	Demonstrations proposed under INM, free supply of biofertilizer to the small and marginal farmers.
6. Integrated Weed Management (IWM)	Improper weed management.	Demonstration of IWM methods at farmer's field.	DDA / KVK	Demonstration proposed.

8. Timely sowing	More pest & disease problem, Conversion of female flowers into male flowers, therefore, poor yield.	Extension and development agencies should approach in a farmers participatory approach for each of possible solution.	DDAs / KVK	Demonstrations proposed. Campaigns, hoarding/posters, field days, district level training camps
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4.2.5.10 Recommended Interventions for the State, with Detailed Action Plan with

Costs:

For the field extension workers and the farmers, the whole set of activities boils down to extension activities viz. Training, demonstrations on quality seeds, INM, RCTs, soil and water management, credit and market management etc. It is essential to make better use of given research in a sustainable manner for increased production, productivity and employment generation.

The proposed activities are as under

Table- 4.2.133 Training Proposed for Capacity Building of Agriculture Staff for Castor (at State Level)

Crop	Training for Agricultural staff (state level) (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	15610	124.9	15610	124.9	15610	124.9	46830	374.7
Cooperative & NGOs	8410	67.3	8410	67.3	8410	67.3	25230	201.9
PRI Staff & Others	4775	38.2	4775	38.2	4775	38.2	14325	114.6
Total	28795	230.4	28795	230.4	28795	230.4	86385	691.2

Cost Norms: Rs. 800/ Trainee / Day

Table- 4.2.134 District-wise Training Proposed for Capacity Building of Agriculture Staff for Castor

Sr No	Name of the Districts	Training for Agricultural staff (District wise) (Phy-No. Fin- Rs. In Lakh)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
2	Amreli	450	3.6	450	3.6	450	3.6	-	-	-	-	-	-	-	-	-	-	-	-
3	Anand	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	200	1.6	200	1.6	200	1.6
4	Banaskantha	600	4.8	600	4.8	600	4.8	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4
5	Bharuch	500	4	500	4	500	4	300	2.4	300	2.4	300	2.4	100	0.8	100	0.8	100	0.8
6	Bhavnagar	550	4.4	550	4.4	550	4.4	-	-	-	-	-	-	-	-	-	-	-	-
7	Dahod	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
8	Dang	250	2	250	2	250	2	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
9	Gandhinagar	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	200	1.6	200	1.6	200	1.6
10	Jamnagar	200	1.6	200	1.6	200	1.6	150	1.2	150	1.2	150	1.2	150	1.2	150	1.2	150	1.2
11	Junagadh	700	5.6	700	5.6	700	5.6	-	-	-	-	-	-	-	-	-	-	-	-
12	Kachchh	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4	100	0.8	100	0.8	100	0.8
13	Kheda	510	4.08	510	4.08	510	4.08	510	4.0	510	4.0	510	4.0	200	1.6	200	1.6	200	1.6
14	Mehsana	450	3.6	450	3.6	450	3.6	450	3.6	450	3.6	450	3.6	225	1.8	225	1.8	225	1.8
15	Narmada	200	1.6	200	1.6	200	1.6	100	0.8	100	0.8	100	0.8	100	0.8	100	0.8	100	0.8
16	Navsari	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17	Panchmahal	500	4	500	4	500	4	200	1.6	200	1.6	200	1.6	--	--	--	--	--	--
18	Patan	350	2.8	350	2.8	350	2.8	350	2.8	350	2.8	350	2.8	175	1.4	175	1.4	175	1.4
19	Porbandar	150	1.2	150	1.2	150	1.2	-	-	-	-	-	-	-	-	-	-	-	-
20	Rajkot	500	4	500	4	500	4	250	2	250	2	250	2	250	2	250	2	250	2
21	Sabarkantha	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4	325	2.6	325	2.6	325	2.6
22	Surat	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
23	Surendranagar	500	4	500	4	500	4	-	-	-	-	-	-	-	-	-	-	-	-

Sr No	Name of the Districts	Training for Agricultural staff (District wise) (Phy-No. Fin- Rs. In Lakh)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20		2017-18		2018-19		2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Tapi	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
25	Vadodara	1500	12	1500	12	1500	12	1000	8	1000	8	1000	8	500	4	500	4	500	4
26	Valsad	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27	Aravalli	500	4	500	4	500	4	250	2	250	2	250	2	250	2	250	2	250	2
28	Morbi	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4	325	2.6	325	2.6	325	2.6
29	DevbhumiDwark	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
30	Gir Somnath	500	4	500	4	500	4	250	2	250	2	250	2	250	2	250	2	250	2
31	Botad	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4	325	2.6	325	2.6	325	2.6
32	Mahisagar	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
33	Chhotaudepur	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
	Total	15610.	124.	15610.	124.	15610.	124.	8410.	67.3	8410.	67.3	8410.	67.3	4775.	38.	4775.	38.	4775.	38.

Table- 4.2.135 Training Proposed for Capacity Building of Farmers at District Level for Castor (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	INM				NRM				IPM			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	360	1.80	1080	5.4	360	1.80	1080	5.4	360	1.8	1080	5.4
2	Amreli	20	0.10	60	0.3	20	0.10	60	0.3	20	0.1	60	0.3
3	Anand	30	0.15	90	0.45	30	0.15	90	0.45	30	0.15	90	0.45
4	Banaskantha	1790	8.95	5370	26.85	1790	8.95	5370	26.85	1790	8.95	5370	26.85
5	Bharuch	70	0.35	210	1.05	70	0.35	210	1.05	70	0.35	210	1.05
6	Bhavnagar	7	0.04	21	0.12	7	0.04	21	0.12	7	0.04	21	0.12
7	Dahod	4	0.02	12	0.06	4	0.02	12	0.06	4	0.02	12	0.06

Sr No	Name of the Districts	INM				NRM				IPM			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
8	Dang	0	0.00	0	0	0	0.00	0	0	0	0	0	0
9	Gandhinagar	290	1.45	870	4.35	290	1.45	870	4.35	290	1.45	870	4.35
10	Jamnagar	140	0.70	420	2.1	140	0.70	420	2.1	140	0.7	420	2.1
11	Junagadh	20	0.10	60	0.3	20	0.10	60	0.3	20	0.1	60	0.3
12	Kachchh	230	1.15	690	3.45	230	1.15	690	3.45	230	1.15	690	3.45
13	Kheda	1390	6.95	4170	20.85	1390	6.95	4170	20.85	1390	6.95	4170	20.85
14	Mehsana	920	4.60	2760	13.8	920	4.60	2760	13.8	920	4.6	2760	13.8
15	Narmada	22	0.11	66	0.33	22	0.11	66	0.33	22	0.11	66	0.33
16	Navsari	0	0.00	0	0	0	0.00	0	0	0	0	0	0
17	Panchmahal	120	0.60	360	1.8	120	0.60	360	1.8	120	0.6	360	1.8
18	Patan	1310	6.55	3930	19.65	1310	6.55	3930	19.65	1310	6.55	3930	19.65
19	Porbandar	60	0.30	180	0.9	60	0.30	180	0.9	60	0.3	180	0.9
20	Rajkot	160	0.80	480	2.4	160	0.80	480	2.4	160	0.8	480	2.4
21	Sabarkantha	740	3.70	2220	11.1	740	3.70	2220	11.1	740	3.7	2220	11.1
22	Surat	30	0.15	90	0.45	30	0.15	90	0.45	30	0.15	90	0.45
23	Surendranagar	810	4.05	2430	12.15	810	4.05	2430	12.15	810	4.05	2430	12.15
24	Tapi	4	0.02	12	0.06	4	0.02	12	0.06	4	0.02	12	0.06
25	Vadodara	250	1.25	750	3.75	250	1.25	750	3.75	250	1.25	750	3.75
26	Valsad	0	0.00	0	0	0	0.00	0	0	0	0	0	0
27	Aravalli	160	0.80	480	2.4	160	0.80	480	2.4	160	0.8	480	2.4
28	Morbi	740	3.70	2220	11.1	740	3.70	2220	11.1	740	3.7	2220	11.1
29	DevbhumiDwarka	30	0.15	90	0.45	30	0.15	90	0.45	30	0.15	90	0.45
30	Gir Somnath	810	4.05	2430	12.15	810	4.05	2430	12.15	810	4.05	2430	12.15
31	Botad	4	0.02	12	0.06	4	0.02	12	0.06	4	0.02	12	0.06
32	Mahisagar	250	1.25	750	3.75	250	1.25	750	3.75	250	1.25	750	3.75

Sr No	Name of the Districts	INM				NRM				IPM			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
33	Chhotaudepur	0	0.00	0	0	0	0.00	0	0	0	0	0	0
	Total	10771	53.86	32313	161.58	10771	53.86	32313	161.58	10771	53.86	32313	161.58

Cost Norms: Rs. 500/Trainee/Day

Table- 4.2.136 Training Proposed for Capacity Building of Farmers at State Level on Different Technologies of Castor

Name of technology to be transferred	Year wise no. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		TOTAL	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
INM	10771	53.86	10771	53.86	10771	53.86	32313	161.58
NRM	10771	53.86	10771	53.86	10771	53.86	32313	161.58
IPM	10771	53.86	10771	53.86	10771	53.86	32313	161.58
RCTs	8617	43.1	8617	43.1	8617	43.1	25851	129.3
Water management	7540	37.79	7540	37.79	7540	37.79	22620	113.37
Post-Harvest Management	5386	27.0	5386	27.0	5386	27.0	16158	81
Women empowerment	1621	8.2100	1621	8.21	1621	8.21	4863	24.63
Credit & marketing	443	2.22	443	2.22	443	2.22	1329	6.66
Seed Production	648	3.30	648	3.30	648	3.30	1944	9.9
Farm waste management	325	1.67	325	1.67	325	1.67	975	5.01
Vermicomposting	1945	9.80	1945	9.80	1945	9.80	5835	29.4
Farm Mechanization	5386	27.00	5386	27.00	5386	27.00	16158	81
Renewable energy	868	4.4100	868	4.4100	868	4.4100	2604	13.23
Organic Farming	1949	9.8400	1949	9.8400	1949	9.8400	5847	29.52
IWM	9717	48.6400	9717	48.6400	9717	48.6400	29151	145.92
Total	76758	384.56	76758	384.56	76758	384.56	230274	1153.68

Table- 4.2.137 District-wise Training Proposed for Capacity Building of Farmers for Castor at District Level on Different Technologies (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	INM				NRM				IPM			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	360	1.80	1080	5.4	360	1.80	1080	5.4	360	1.8	1080	5.4
2	Amreli	20	0.10	60	0.3	20	0.10	60	0.3	20	0.1	60	0.3
3	Anand	30	0.15	90	0.45	30	0.15	90	0.45	30	0.15	90	0.45
4	Banaskantha	1790	8.95	5370	26.85	1790	8.95	5370	26.85	1790	8.95	5370	26.85
5	Bharuch	70	0.35	210	1.05	70	0.35	210	1.05	70	0.35	210	1.05
6	Bhavnagar	7	0.04	21	0.12	7	0.04	21	0.12	7	0.04	21	0.12
7	Dahod	4	0.02	12	0.06	4	0.02	12	0.06	4	0.02	12	0.06
8	Dang	0	0.00	0	0	0	0.00	0	0	0	0	0	0
9	Gandhinagar	290	1.45	870	4.35	290	1.45	870	4.35	290	1.45	870	4.35
10	Jamnagar	140	0.70	420	2.1	140	0.70	420	2.1	140	0.7	420	2.1
11	Junagadh	20	0.10	60	0.3	20	0.10	60	0.3	20	0.1	60	0.3
12	Kachchh	230	1.15	690	3.45	230	1.15	690	3.45	230	1.15	690	3.45
13	Kheda	1390	6.95	4170	20.85	1390	6.95	4170	20.85	1390	6.95	4170	20.85
14	Mehsana	920	4.60	2760	13.8	920	4.60	2760	13.8	920	4.6	2760	13.8
15	Narmada	22	0.11	66	0.33	22	0.11	66	0.33	22	0.11	66	0.33
16	Navsari	0	0.00	0	0	0	0.00	0	0	0	0	0	0
17	Panchmahal	120	0.60	360	1.8	120	0.60	360	1.8	120	0.6	360	1.8
18	Patan	1310	6.55	3930	19.65	1310	6.55	3930	19.65	1310	6.55	3930	19.65
19	Porbandar	60	0.30	180	0.9	60	0.30	180	0.9	60	0.3	180	0.9
20	Rajkot	160	0.80	480	2.4	160	0.80	480	2.4	160	0.8	480	2.4
21	Sabarkantha	740	3.70	2220	11.1	740	3.70	2220	11.1	740	3.7	2220	11.1

Sr No	Name of the Districts	INM				NRM				IPM			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
22	Surat	30	0.15	90	0.45	30	0.15	90	0.45	30	0.15	90	0.45
23	Surendranagar	810	4.05	2430	12.15	810	4.05	2430	12.15	810	4.05	2430	12.15
24	<u>Tapi</u>	4	0.02	12	0.06	4	0.02	12	0.06	4	0.02	12	0.06
25	Vadodara	250	1.25	750	3.75	250	1.25	750	3.75	250	1.25	750	3.75
26	Valsad	0	0.00	0	0	0	0.00	0	0	0	0	0	0
27	Aravalli	160	0.80	480	2.4	160	0.80	480	2.4	160	0.8	480	2.4
28	Morbi	740	3.70	2220	11.1	740	3.70	2220	11.1	740	3.7	2220	11.1
29	DevbhumiDwarka	30	0.15	90	0.45	30	0.15	90	0.45	30	0.15	90	0.45
30	Gir Somnath	810	4.05	2430	12.15	810	4.05	2430	12.15	810	4.05	2430	12.15
31	Botad	4	0.02	12	0.06	4	0.02	12	0.06	4	0.02	12	0.06
32	Mahisagar	250	1.25	750	3.75	250	1.25	750	3.75	250	1.25	750	3.75
33	Chhotaudepur	0	0	0	0	0	0.00	0	0	0	0	0	0
	Total	10771	53.86	32313	161.58	10771	53.86	32313	161.58	10771	53.86	32313	161.58

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.137 District-wise Training Proposed for Capacity Building of Farmers for Castor at District Level on Different

Technologies ...continue (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	RCT				Water management				Post-Harvest Management			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	288	1.44	864	4.32	252	1.26	756	3.78	180	0.9	540	2.70
2	Amreli	16	0.08	48	0.24	14	0.07	42	0.21	10	0.05	30	0.15
3	Anand	24	0.12	72	0.36	21	0.11	63	0.32	15	0.08	45	0.23
4	Banaskantha	1432	7.16	4296	21.48	1253	6.27	3759	18.80	895	4.48	2685	13.43
5	Bharuch	56	0.28	168	0.84	49	0.25	147	0.74	35	0.18	105	0.53
6	Bhavnagar	6	0.03	18	0.09	5	0.03	15	0.08	4	0.02	12	0.06
7	Dahod	3	0.02	9	0.05	3	0.02	9	0.05	2	0.01	6	0.03
8	Dang	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Gandhinagar	232	1.16	696	3.48	203	1.02	609	3.05	145	0.73	435	2.18
10	Jamnagar	112	0.56	336	1.68	98	0.49	294	1.47	70	0.35	210	1.05
11	Junagadh	16	0.08	48	0.24	14	0.07	42	0.21	10	0.05	30	0.15
12	Kachchh	184	0.92	552	2.76	161	0.81	483	2.42	115	0.58	345	1.73
13	Kheda	1112	5.56	3336	16.68	973	4.87	2919	14.60	695	3.48	2085	10.43
14	Mehsana	736	3.68	2208	11.04	644	3.22	1932	9.66	460	2.3	1380	6.90
15	Narmada	18	0.09	54	0.27	15	0.08	45	0.23	11	0.06	33	0.17
16	Navsari	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Panchmahal	96	0.48	288	1.44	84	0.42	252	1.26	60	0.3	180	0.90
18	Patan	1048	5.24	3144	15.72	917	4.59	2751	13.76	655	3.28	1965	9.83
19	Porbandar	48	0.24	144	0.72	42	0.21	126	0.63	30	0.15	90	0.45
20	Rajkot	128	0.64	384	1.92	112	0.56	336	1.68	80	0.4	240	1.20
21	Sabarkantha	592	2.96	1776	8.88	518	2.59	1554	7.77	370	1.85	1110	5.55

Sr No	Name of the Districts	RCT				Water management				Post-Harvest Management			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
22	Surat	24	0.12	72	0.36	21	0.11	63	0.32	15	0.08	45	0.23
23	Surendranagar	648	3.24	1944	9.72	567	2.84	1701	8.51	405	2.03	1215	6.08
24	Tapi	3	0.02	9	0.05	3	0.02	9	0.05	2	0.01	6	0.03
25	Vadodara	200	1	600	3.00	175	0.88	525	2.63	125	0.63	375	1.88
26	Valsad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Aravalli	128	0.64	384	1.92	112	0.56	336	1.68	80	0.4	240	1.20
28	Morbi	592	2.96	1776	8.88	518	2.59	1554	7.77	370	1.85	1110	5.55
29	DevbhumiDwarka	24	0.12	72	0.36	21	0.11	63	0.32	15	0.08	45	0.23
30	Gir Somnath	648	3.24	1944	9.72	567	2.84	1701	8.51	405	2.03	1215	6.08
31	Botad	3	0.02	9	0.05	3	0.02	9	0.05	2	0.01	6	0.03
32	Mahisagar	200	1	600	3.00	175	0.88	525	2.63	125	0.63	375	1.88
33	Chhotaudepur	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total	8617	43.1	25851	129.2	7540	37.79	22620	113.1	5386	27.0	16158	80.79

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.138 District-wise Training Proposed for Capacity Building of Farmers for Castor at District Level on

Different Technologies (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Women empowerment				Credit & marketing				Seed Production				Farm waste managt.			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	54	0.27	162	0.81	18	0.0	54	0.27	22	0.11	66	0.3	11	0.06	33	0.17
2	Amreli	3	0.02	9	0.05	1	0.0	3	0.02	1	0.01	3	0.0	0	0	0	0.00
3	Anand	5	0.03	15	0.08	2	0.0	6	0.03	2	0.01	6	0.0	1	0.01	3	0.02
4	Banaskantha	269	1.35	807	4.04	90	0.4	270	1.35	10	0.54	321	1.6	54	0.27	16	0.81
5	Bharuch	11	0.06	33	0.17	4	0.0	12	0.06	4	0.02	12	0.0	2	0.01	6	0.03
6	Bhavnagar	1	0.01	3	0.02	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
7	Dahod	1	0.01	3	0.02	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
8	Dang	0	0	0	0.00	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
9	Gandhinagar	44	0.22	132	0.66	15	0.0	45	0.23	17	0.09	51	0.2	9	0.05	27	0.14
10	Jamnagar	21	0.11	63	0.32	7	0.0	21	0.11	9	0.05	27	0.1	4	0.02	12	0.06
11	Junagadh	3	0.02	9	0.05	1	0.0	3	0.02	2	0.01	6	0.0	1	0.01	3	0.02
12	Kachchh	35	0.18	105	0.53	12	0.0	36	0.18	14	0.07	42	0.2	7	0.04	21	0.11
13	Kheda	209	1.05	627	3.14	70	0.3	210	1.05	84	0.42	252	1.2	42	0.21	12	0.63
14	Mehsana	138	0.69	414	2.07	46	0.2	138	0.69	55	0.28	165	0.8	28	0.14	84	0.42
15	Narmada	3	0.02	9	0.05	1	0.0	3	0.02	1	0.01	3	0.0	0	0	0	0.00
16	Navsari	0	0	0	0.00	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
17	Panchmahal	18	0.09	54	0.27	6	0.0	18	0.09	7	0.04	21	0.1	4	0.02	12	0.06
18	Patan	197	0.99	591	2.96	66	0.3	198	0.99	79	0.4	237	1.1	40	0.2	12	0.60
19	Porbandar	9	0.05	27	0.14	3	0.0	9	0.05	4	0.02	12	0.0	2	0.01	6	0.03
20	Rajkot	24	0.12	72	0.36	8	0.0	24	0.12	10	0.05	30	0.1	5	0.03	15	0.08

Sr No	Name of the Districts	Women empowerment				Credit & marketing				Seed Production				Farm waste managt.			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Sabarkantha	111	0.56	333	1.67	37	0.1	111	0.56	44	0.22	132	0.6	22	0.11	66	0.33
22	Surat	5	0.03	15	0.08	2	0.0	6	0.03	2	0.01	6	0.0	1	0.01	3	0.02
23	Surendranagar	121	0.61	363	1.82	41	0.2	123	0.62	49	0.25	147	0.7	24	0.12	72	0.36
24	Tapi	1	0.01	3	0.02	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
25	Vadodara	38	0.19	114	0.57	13	0.0	39	0.20	15	0.08	45	0.2	8	0.04	24	0.12
26	Valsad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
27	Aravalli	24	0.12	72	0.36	8	0.0	24	0.12	10	0.05	30	0.1	5	0.03	15	0.08
28	Morbi	111	0.56	333	1.67	37	0.1	111	0.56	44	0.22	132	0.6	22	0.11	66	0.33
29	DevbhumiDwa	5	0.03	15	0.08	2	0.0	6	0.03	2	0.01	6	0.0	1	0.01	3	0.02
30	Gir Somnath	121	0.61	363	1.82	41	0.2	123	0.62	49	0.25	147	0.7	24	0.12	72	0.36
31	Botad	1	0.01	3	0.02	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
32	Mahisagar	38	0.19	114	0.57	13	0.0	39	0.20	15	0.08	45	0.2	8	0.04	24	0.12
33	Chhotaudepur	0	0	0	0.00	0	0	0	0.00	0	0	0	0.0	0	0	0	0.00
	Total	162	8.21	486	24.3	44	2.2	221	11.0	64	3.30	194	9.7	32	1.67	97	4.87

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.138 District-wise Training Proposed for Capacity Building of Farmers for Castor at District Level on Different

Technologies Continue (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Vermi composting				Farm Mech.				Renewable energy			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	65	0.33	195	0.98	180	0.9	540	2.70	29	0.15	87	0.44
2	Amreli	4	0.02	12	0.06	10	0.05	30	0.15	0	0	0	0.00
3	Anand	5	0.03	15	0.08	15	0.08	45	0.23	3	0.02	9	0.05
4	Banaskantha	322	1.61	966	4.83	895	4.48	2685	13.43	143	0.72	429	2.15
5	Bharuch	13	0.07	39	0.20	35	0.18	105	0.53	6	0.03	18	0.09
6	Bhavnagar	0	0	0	0.00	4	0.02	12	0.06	0	0	0	0.00
7	Dahod	0	0	0	0.00	2	0.01	6	0.03	0	0	0	0.00
8	Dang	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Gandhinagar	52	0.26	156	0.78	145	0.73	435	2.18	23	0.12	69	0.35
10	Jamnagar	25	0.13	75	0.38	70	0.35	210	1.05	12	0.06	36	0.18
11	Junagadh	5	0.03	15	0.08	10	0.05	30	0.15	2	0.01	6	0.03
12	Kachchh	45	0.23	135	0.68	115	0.58	345	1.73	19	0.1	57	0.29
13	Kheda	250	1.25	750	3.75	695	3.48	2085	10.43	112	0.56	336	1.68
14	Mehsana	166	0.83	498	2.49	460	2.3	1380	6.90	75	0.38	225	1.13
15	Narmada	5	0.03	15	0.08	11	0.06	33	0.17	2	0.01	6	0.03
16	Navsari	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Panchmahal	22	0.11	66	0.33	60	0.3	180	0.90	10	0.05	30	0.15
18	Patan	240	1.2	720	3.60	655	3.28	1965	9.83	105	0.53	315	1.58
19	Porbandar	10	0.05	30	0.15	30	0.15	90	0.45	5	0.03	15	0.08
20	Rajkot	30	0.15	90	0.45	80	0.4	240	1.20	13	0.07	39	0.20

21	Sabarkantha	133	0.67	399	2.00	370	1.85	1110	5.55	60	0.3	180	0.90
22	Surat	5	0.03	15	0.08	15	0.08	45	0.23	3	0.02	9	0.05
23	Surendranagar	145	0.73	435	2.18	405	2.03	1215	6.08	65	0.33	195	0.98
24	Tapi	0	0	0	0.00	2	0.01	6	0.03	0	0	0	0.00
25	Vadodara	45	0.23	135	0.68	125	0.63	375	1.88	20	0.1	60	0.30
26	Valsad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Aravalli	30	0.15	90	0.45	80	0.4	240	1.20	13	0.07	39	0.20
28	Morbi	133	0.67	399	2.00	370	1.85	1110	5.55	60	0.3	180	0.90
29	DevbhumiDwarka	5	0.03	15	0.08	15	0.08	45	0.23	3	0.02	9	0.05
30	Gir Somnath	145	0.73	435	2.18	405	2.03	1215	6.08	65	0.33	195	0.98
31	Botad	0	0	0	0.00	2	0.01	6	0.03	0	0	0	0.00
32	Mahisagar	45	0.23	135	0.68	125	0.63	375	1.88	20	0.1	60	0.30
33	Chhotaudepur	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total	1945	9.8000	5835	29.175	5386	27.0000	16158	80.79	868	4.4100	2604	13.02

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.138 District-wise Training Proposed for Capacity Building of Farmers for Castor on Different Technologies

.....continue (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Organic Farming				IWM				Total			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	65	0.33	195	0.98	325	1.63	975	4.88	2504	12.52	7512	37.56
2	Amreli	5	0.03	15	0.08	20	0.1	60	0.30	139	0.695	417	2.09
3	Anand	5	0.03	15	0.08	30	0.15	90	0.45	213	1.065	639	3.20
4	Banaskantha	320	1.6	960	4.80	161	8.05	4830	24.15	1244	62.2	37320	186.60
5	Bharuch	15	0.08	45	0.23	60	0.3	180	0.90	485	2.425	1455	7.28
6	Bhavnagar	1	0.01	3	0.02	10	0.05	30	0.15	51	0.255	153	0.77

Sr No	Name of the Districts	Organic Farming				IWM				Total			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
7	Dahod	1	0.01	3	0.02	5	0.03	15	0.08	28	0.14	84	0.42
8	Dang	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Gandhinagar	52	0.26	156	0.78	260	1.3	780	3.90	2015	10.075	6045	30.23
10	Jamnagar	25	0.13	75	0.38	125	0.63	375	1.88	973	4.865	2919	14.60
11	Junagadh	5	0.03	15	0.08	20	0.1	60	0.30	144	0.72	432	2.16
12	Kachchh	40	0.2	120	0.60	210	1.05	630	3.15	1607	8.035	4821	24.11
13	Kheda	250	1.25	750	3.75	125	6.25	3750	18.75	9662	48.31	28986	144.93
14	Mehsana	165	0.83	495	2.48	825	4.13	2475	12.38	6393	31.965	19179	95.90
15	Narmada	5	0.03	15	0.08	20	0.1	60	0.30	153	0.765	459	2.30
16	Navsari	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Panchmahal	25	0.13	75	0.38	110	0.55	330	1.65	837	4.185	2511	12.56
18	Patan	240	1.2	720	3.60	118	5.9	3540	17.70	9112	45.56	27336	136.68
19	Porbandar	10	0.05	30	0.15	55	0.28	165	0.83	418	2.09	1254	6.27
20	Rajkot	30	0.15	90	0.45	145	0.73	435	2.18	1115	5.575	3345	16.73
21	Sabarkantha	135	0.68	405	2.03	666	3.33	1998	9.99	5143	25.715	15429	77.15
22	Surat	5	0.03	15	0.08	30	0.15	90	0.45	213	1.065	639	3.20
23	Surendranagar	145	0.73	435	2.18	730	3.65	2190	10.95	5630	28.15	16890	84.45
24	Tapi	0	0	0	0.00	5	0.03	15	0.08	28	0.14	84	0.42
25	Vadodara	45	0.23	135	0.68	225	1.13	675	3.38	1739	8.695	5217	26.09
26	Valsad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Aravalli	30	0.15	90	0.45	145	0.73	435	2.18	1115	5.575	3345	16.73
28	Morbi	135	0.68	405	2.03	666	3.33	1998	9.99	5143	25.715	15429	77.15
29	DevbhumiDwark	5	0.03	15	0.08	30	0.15	90	0.45	213	1.065	639	3.20
30	Gir Somnath	145	0.73	435	2.18	730	3.65	2190	10.95	5630	28.15	16890	84.45

Sr No	Name of the Districts	Organic Farming				IWM				Total			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
31	Botad	0	0	0	0.00	5	0.03	15	0.08	28	0.14	84	0.42
32	Mahisagar	45	0.23	135	0.68	225	1.13	675	3.38	1739	8.695	5217	26.09
33	Chhotaudepur	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total	194	9.840	584	29.23	971	48.640	2915	145.75	7491	374.550	22473	1123.6

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.139 District-wise Castor Demonstration (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise Varietal Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	360	18	360	18	360	18	1080	54
2	Amreli	20	1	20	1	20	1	60	3
3	Anand	30	1.5	30	1.5	30	1.5	90	4.5
4	Banaskantha	1790	89.5	1790	89.5	1790	89.5	5370	268.5
5	Bharuch	70	3.5	70	3.5	70	3.5	210	10.5
6	Bhavnagar	7	0.4	7	0.4	7	0.4	21	1.2
7	Dahod	4	0.2	4	0.2	4	0.2	12	0.6
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	290	14.5	290	14.5	290	14.5	870	43.5
10	Jamnagar	140	7	140	7	140	7	420	21
11	Junagadh	20	1	20	1	20	1	60	3
12	Kutch	230	11.5	230	11.5	230	11.5	690	34.5

Sr No	Name of the Districts	Year wise Varietal Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
13	Kheda	1390	69.5	1390	69.5	1390	69.5	4170	208.5
14	Mehsana	920	46	920	46	920	46	2760	138
15	Narmada	22	1.1	22	1.1	22	1.1	66	3.3
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	120	6	120	6	120	6	360	18
18	Patan	1310	65.5	1310	65.5	1310	65.5	3930	196.5
19	Porbandar	60	3	60	3	60	3	180	9
20	Rajkot	160	8	160	8	160	8	480	24
21	Sabarkantha	740	37	740	37	740	37	2220	111
22	Surat	30	1.5	30	1.5	30	1.5	90	4.5
23	Surendranagar	810	40.5	810	40.5	810	40.5	2430	121.5
24	<u>Tapi</u>	4	0.2	4	0.2	4	0.2	12	0.6
25	Vadodara	250	12.5	250	12.5	250	12.5	750	37.5
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	160	8	160	8	160	8	480	24
28	Morbi	740	37	740	37	740	37	2220	111
29	DevbhumiDwarka	30	1.5	30	1.5	30	1.5	90	4.5
30	Gir Somnath	810	40.5	810	40.5	810	40.5	2430	121.5
31	Botad	4	0.2	4	0.2	4	0.2	12	0.6
32	Mahisagar	250	12.5	250	12.5	250	12.5	750	37.5
33	Chhotaudepur	10771	538.6	10771	538.6	10771	538.6	32313	1615.8

Cost Norms: Rs 5000/acre/demonstration C-DAP

Table 4.2.140: Castor Seed planning/Seed village programme (Seed production Enhancement)

(Phy-Area in ha , Fin- Rs. In Lakh)

Sr. No	District	No. of Taluka	No. of Villages/	Seed rate kg/ha	Castor (Seed production Enhancement)							
					2017-18		2018-19		2019-20		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5
2	Amreli	11	55	8.5	165	8.25	165	8.25	165	8.25	495	24.75
3	Anand	8	40	8.5	120	6	120	6	120	6	360	18
4	Banaskantha	12	60	8.5	180	9	180	9	180	9	540	27
5	Bharuch	8	40	8.5	120	6	120	6	120	6	360	18
6	Bhavnagar	11	0	8.5	165	8.25	165	8.25	165	8.25	495	24.75
7	Dahod	7	35	8.5	105	5.25	105	5.25	105	5.25	315	15.75
8	Dang	1	0	8.5	15	0.75	15	0.75	15	0.75	45	2.25
9	Gandhinagar	4	20	8.5	60	3	60	3	60	3	180	9
10	Jamnagar	10	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5
11	Junagadh	14	70	8.5	210	10.5	210	10.5	210	10.5	630	31.5
12	Kutch	10	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5
13	Kheda	10	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5
14	Mehsana	9	45	8.5	135	6.75	135	6.75	135	6.75	405	20.25
15	Narmada	4	20	8.5	60	3	60	3	60	3	180	9
16	Navsari	5	0	8.5	75	3.75	75	3.75	75	3.75	225	11.25
17	Panchmahal	11	55	8.5	165	8.25	165	8.25	165	8.25	495	24.75
18	Patan	8	40	8.5	120	6	120	6	120	6	360	18
19	Porbandar	3	15	8.5	45	2.25	45	2.25	45	2.25	135	6.75
20	Rajkot	14	70	8.5	210	10.5	210	10.5	210	10.5	630	31.5
21	Sabarkantha	13	65	8.5	195	9.75	195	9.75	195	9.75	585	29.25
22	Surat	10	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5
23	Surendranagar	10	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5

Sr. No	District	No. of Taluka	No. of Villages/	Seed rate kg/ha	Castor (Seed production Enhancement)							
					2017-18		2018-19		2019-20		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Tapi	5	0	8.5	75	3.75	75	3.75	75	3.75	225	11.25
25	Vadodara	12	60	8.5	180	9	180	9	180	9	540	27
26	Valsad	5	0	8.5	75	3.75	75	3.75	75	3.75	225	11.25
27	Aravalli	6	70	8.5	210	10.5	210	10.5	210	10.5	630	31.5
28	Morbi	5	65	8.5	195	9.75	195	9.75	195	9.75	585	29.25
29	Devbhumi	4	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5
30	Gir Somnath	6	50	8.5	150	7.5	150	7.5	150	7.5	450	22.5
31	Botad	4	0	8.5	75	3.75	75	3.75	75	3.75	225	11.25
32	Mahisagar	6	60	8.5	180	9	180	9	180	9	540	27
33	Chhotaudepur	6	0	8.5	75	3.75	75	3.75	75	3.75	225	11.25
	Total	262	1285	280.5	426	213	426	213	426	213	1323	661.5

Table- 4.2.141 District-wise INM Demonstrations for Castor

(Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise INM Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	360	7.2	360	7.2	360	7.2	1080	21.6
2	Amreli	20	0.4	20	0.4	20	0.4	60	1.2
3	Anand	30	0.6	30	0.6	30	0.6	90	1.8
4	Banaskantha	1790	35.8	1790	35.8	1790	35.8	5370	107.4
5	Bharuch	70	1.4	70	1.4	70	1.4	210	4.2
6	Bhavnagar	7	0.14	7	0.14	7	0.14	21	0.42
7	Dahod	4	0.08	4	0.08	4	0.08	12	0.24
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	290	5.8	290	5.8	290	5.8	870	17.4
10	Jamnagar	140	2.8	140	2.8	140	2.8	420	8.4

11	Junagadh	20	0.4	20	0.4	20	0.4	60	1.2
12	Kutch	230	4.6	230	4.6	230	4.6	690	13.8
13	Kheda	1390	27.8	1390	27.8	1390	27.8	4170	83.4
14	Mehsana	920	18.4	920	18.4	920	18.4	2760	55.2
15	Narmada	22	0.44	22	0.44	22	0.44	66	1.32
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	120	2.4	120	2.4	120	2.4	360	7.2
18	Patan	1310	26.2	1310	26.2	1310	26.2	3930	78.6
19	Porbandar	60	1.2	60	1.2	60	1.2	180	3.6
20	Rajkot	160	3.2	160	3.2	160	3.2	480	9.6
21	Sabarkantha	740	14.8	740	14.8	740	14.8	2220	44.4
22	Surat	30	0.6	30	0.6	30	0.6	90	1.8
23	Surendranagar	810	16.2	810	16.2	810	16.2	2430	48.6
24	<u>Tapi</u>	4	0.08	4	0.08	4	0.08	12	0.24
25	Vadodara	250	5	250	5	250	5	750	15
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	160	3.2	160	3.2	160	3.2	480	9.6
28	Morbi	740	14.8	740	14.8	740	14.8	2220	44.4
29	Devbhumi Dwarka	30	0.6	30	0.6	30	0.6	90	1.8
30	Gir Somnath	810	16.2	810	16.2	810	16.2	2430	48.6
31	Botad	4	0.08	4	0.08	4	0.08	12	0.24
32	Mahisagar	250	5	250	5	250	5	750	15
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	10411	208.22	10411	208.22	10411	208.22	32313	646.26

Cost Norms: Rs 5000/acre/demonstration

Table- 4.2.142 District-wise Demonstrations on Resource Conservation Technologies (Laser Levelling) for Castor

Sr No	Name of the Districts	Laser levelling (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	70	3.5	70	3.5	70	3.5	210	10.5
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	5	0.25	5	0.25	5	0.25	15	0.75
4	Banaskantha	350	17.5	350	17.5	350	17.5	1050	52.5
5	Bharuch	15	0.75	15	0.75	15	0.75	45	2.25
6	Bhavnagar	1	0.05	1	0.05	1	0.05	3	0.15
7	Dahod	1	0.05	1	0.05	1	0.05	3	0.15
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	60	3	60	3	60	3	180	9
10	Jamnagar	30	1.5	30	1.5	30	1.5	90	4.5
11	Junagadh	5	0.25	5	0.25	5	0.25	15	0.75
12	Kutch	50	2.5	50	2.5	50	2.5	150	7.5
13	Kheda	275	13.75	275	13.75	275	13.75	825	41.25
14	Mehsana	185	9.25	185	9.25	185	9.25	555	27.75
15	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	25	1.25	25	1.25	25	1.25	75	3.75
18	Patan	262	13.1	262	13.1	262	13.1	786	39.3
19	Porbandar	10	0.5	10	0.5	10	0.5	30	1.5
20	Rajkot	30	1.5	30	1.5	30	1.5	90	4.5
21	Sabarkantha	150	7.5	150	7.5	150	7.5	450	22.5
22	Surat	5	0.25	5	0.25	5	0.25	15	0.75
23	Surendranagar	160	8	160	8	160	8	480	24
24	<u>Tapi</u>	1	0.05	1	0.05	1	0.05	3	0.15

25	Vadodara	50	2.5	50	2.5	50	2.5	150	7.5
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	30	1.5	30	1.5	30	1.5	90	4.5
28	Morbi	150	7.5	150	7.5	150	7.5	450	22.5
29	DevbhumiDwarka	5	0.25	5	0.25	5	0.25	15	0.75
30	Gir Somnath	160	8	160	8	160	8	480	24
31	Botad	1	0.05	1	0.05	1	0.05	3	0.15
32	Mahisagar	50	2.5	50	2.5	50	2.5	150	7.5
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	2076	103.8	2076	103.8	2076	103.8	6438	321.9

Cost Norms: Rs 5000/ha demonstration area 0.40 ha C-DAP

Table- 4.2.143 District-wise Demonstrations on Resource Conservation Technologies for Castor (Green Manuring)

Sr No	Name of the Districts	Green manuring (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	100	5	100	5	100	5	300	15
2	Amreli	10	0.5	10	0.5	10	0.5	30	1.5
3	Anand	10	0.5	10	0.5	10	0.5	30	1.5
4	Banaskantha	400	20	400	20	400	20	1200	60
5	Bharuch	20	1	20	1	20	1	60	3
6	Bhavnagar	10	0.5	10	0.5	10	0.5	30	1.5
7	Dahod	10	0.5	10	0.5	10	0.5	30	1.5
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	75	3.75	75	3.75	75	3.75	225	11.25
10	Jamnagar	35	1.75	35	1.75	35	1.75	105	5.25
11	Junagadh	10	0.5	10	0.5	10	0.5	30	1.5
12	Kutch	50	2.5	50	2.5	50	2.5	150	7.5
13	Kheda	275	13.75	275	13.75	275	13.75	825	41.25

14	Mehsana	185	9.25	185	9.25	185	9.25	555	27.75
15	Narmada	10	0.5	10	0.5	10	0.5	30	1.5
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	25	1.25	25	1.25	25	1.25	75	3.75
18	Patan	265	13.25	265	13.25	265	13.25	795	39.75
19	Porbandar	15	0.75	15	0.75	15	0.75	45	2.25
20	Rajkot	30	1.5	30	1.5	30	1.5	90	4.5
21	Sabarkantha	150	7.5	150	7.5	150	7.5	450	22.5
22	Surat	10	0.5	10	0.5	10	0.5	30	1.5
23	Surendranagar	165	8.25	165	8.25	165	8.25	495	24.75
24	<u>Tapi</u>	5	0.25	5	0.25	5	0.25	15	0.75
25	Vadodara	50	2.5	50	2.5	50	2.5	150	7.5
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	30	1.5	30	1.5	30	1.5	90	4.5
28	Morbi	150	7.5	150	7.5	150	7.5	450	22.5
29	DevbhumiDwarka	10	0.5	10	0.5	10	0.5	30	1.5
30	Gir Somnath	165	8.25	165	8.25	165	8.25	495	24.75
31	Botad	5	0.25	5	0.25	5	0.25	15	0.75
32	Mahisagar	50	2.5	50	2.5	50	2.5	150	7.5
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	2225	111.25	2225	111.25	2225	111.25	6975	348.75

Cost Norms: Rs 5000/ha demonstration area 0.40 ha

Table- 4.2.144 District-wise Seed Treatment Demonstrations in Castor (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise Seed Treatment Demonstrations							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	360	3.6	360	3.6	360	3.6	1080	10.8
2	Amreli	20	0.2	20	0.2	20	0.2	60	0.6
3	Anand	30	0.3	30	0.3	30	0.3	90	0.9
4	Banaskantha	1790	17.9	1790	17.9	1790	17.9	5370	53.7
5	Bharuch	70	0.7	70	0.7	70	0.7	210	2.1
6	Bhavnagar	7	0.07	7	0.07	7	0.07	21	0.21
7	Dahod	4	0.04	4	0.04	4	0.04	12	0.12
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	290	2.9	290	2.9	290	2.9	870	8.7
10	Jamnagar	140	1.4	140	1.4	140	1.4	420	4.2
11	Junagadh	20	0.2	20	0.2	20	0.2	60	0.6
12	Kutch	230	2.3	230	2.3	230	2.3	690	6.9
13	Kheda	1390	13.9	1390	13.9	1390	13.9	4170	41.7
14	Mehsana	920	9.2	920	9.2	920	9.2	2760	27.6
15	Narmada	22	0.22	22	0.22	22	0.22	66	0.66
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	120	1.2	120	1.2	120	1.2	360	3.6
18	Patan	1310	13.1	1310	13.1	1310	13.1	3930	39.3
19	Porbandar	60	0.6	60	0.6	60	0.6	180	1.8
20	Rajkot	160	1.6	160	1.6	160	1.6	480	4.8
21	Sabarkantha	740	7.4	740	7.4	740	7.4	2220	22.2
22	Surat	30	0.3	30	0.3	30	0.3	90	0.9
23	Surendranagar	810	8.1	810	8.1	810	8.1	2430	24.3
24	<u>Tapi</u>	4	0.04	4	0.04	4	0.04	12	0.12

Sr No	Name of the Districts	Year wise Seed Treatment Demonstrations							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Vadodara	250	2.5	250	2.5	250	2.5	750	7.5
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	160	1.6	160	1.6	160	1.6	480	4.8
28	Morbi	740	7.4	740	7.4	740	7.4	2220	22.2
29	Devbhumi Dwarka	30	0.3	30	0.3	30	0.3	90	0.9
30	Gir Somnath	810	8.1	810	8.1	810	8.1	2430	24.3
31	Botad	4	0.04	4	0.04	4	0.04	12	0.12
32	Mahisagar	250	2.5	250	2.5	250	2.5	750	7.5
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	10411	104.11	10411	104.11	10411	104.11	32313	323.13

Cost Norms: Rs.1000/- per demonstration area 0.40 ha

Table- 4.2.145 District-wise Organic Farming Demonstration in Castor (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise Organic Farming Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	342	18	342	18	342	18	1026	54
2	Amreli	20	1	20	1	20	1	60	3
3	Anand	30	1.5	30	1.5	30	1.5	90	4.5
4	Banaskantha	1700	89.5	1700	89.5	1700	89.5	5100	268.5
5	Bharuch	65	3.5	65	3.5	65	3.5	195	10.5
6	Bhavnagar	5	0.35	5	0.35	5	0.35	15	1.05
7	Dahod	5	0.2	5	0.2	5	0.2	15	0.6
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	275	14.5	275	14.5	275	14.5	825	43.5
10	Jamnagar	130	7	130	7	130	7	390	21

Sr No	Name of the Districts	Year wise Organic Farming Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Junagadh	20	1	20	1	20	1	60	3
12	Kachchh	220	11.5	220	11.5	220	11.5	660	34.5
13	Kheda	1320	69.5	1320	69.5	1320	69.5	3960	208.5
14	Mehsana	875	46	875	46	875	46	2625	138
15	Narmada	20	1.1	20	1.1	20	1.1	60	3.3
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	115	6	115	6	115	6	345	18
18	Patan	1245	65.5	1245	65.5	1245	65.5	3735	196.5
19	Porbandar	60	3	60	3	60	3	180	9
20	Rajkot	152	8	152	8	152	8	456	24
21	Sabarkantha	700	37	700	37	700	37	2100	111
22	Surat	30	1.5	30	1.5	30	1.5	90	4.5
23	Surendranagar	770	40.5	770	40.5	770	40.5	2310	121.5
24	<u>Tapi</u>	5	0.2	5	0.2	5	0.2	15	0.6
25	Vadodara	240	12.5	240	12.5	240	12.5	720	37.5
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	152	8	152	8	152	8	456	24
28	Morbi	700	37	700	37	700	37	2100	111
29	Devbhumi Dwarka	30	1.5	30	1.5	30	1.5	90	4.5
30	Gir Somnath	770	40.5	770	40.5	770	40.5	2310	121.5
31	Botad	5	0.2	5	0.2	5	0.2	15	0.6
32	Mahisagar	240	12.5	240	12.5	240	12.5	720	37.5
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	9899	520.55	9899	520.55	9899	520.55	30723	1615.65

Cost Norms: Rs 5000/acre/demonstration

Table- 4.2.146 District-wise Bio-fertilizer and Bio-compost Demonstration for Castor (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise Bio-fertilizer and bio-compost Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	342	18	342	18	342	18	1026	54
2	Amreli	20	1	20	1	20	1	60	3
3	Anand	30	1.5	30	1.5	30	1.5	90	4.5
4	Banaskantha	1700	89.5	1700	89.5	1700	89.5	5100	268.5
5	Bharuch	65	3.5	65	3.5	65	3.5	195	10.5
6	Bhavnagar	5	0.35	5	0.35	5	0.35	15	1.05
7	Dahod	5	0.2	5	0.2	5	0.2	15	0.6
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	275	14.5	275	14.5	275	14.5	825	43.5
10	Jamnagar	130	7	130	7	130	7	390	21
11	Junagadh	20	1	20	1	20	1	60	3
12	Kachchh	220	11.5	220	11.5	220	11.5	660	34.5
13	Kheda	1320	69.5	1320	69.5	1320	69.5	3960	208.5
14	Mehsana	875	46	875	46	875	46	2625	138
15	Narmada	20	1.1	20	1.1	20	1.1	60	3.3
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	115	6	115	6	115	6	345	18
18	Patan	1245	65.5	1245	65.5	1245	65.5	3735	196.5
19	Porbandar	60	3	60	3	60	3	180	9
20	Rajkot	152	8	152	8	152	8	456	24
21	Sabarkantha	700	37	700	37	700	37	2100	111
22	Surat	30	1.5	30	1.5	30	1.5	90	4.5
23	Surendranagar	770	40.5	770	40.5	770	40.5	2310	121.5
24	<u>Tapi</u>	5	0.2	5	0.2	5	0.2	15	0.6

Sr No	Name of the Districts	Year wise Bio-fertilizer and bio-compost Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Vadodara	240	12.5	240	12.5	240	12.5	720	37.5
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	152	8	152	8	152	8	456	24
28	Morbi	700	37	700	37	700	37	2100	111
29	DevbhumiDwarka	30	1.5	30	1.5	30	1.5	90	4.5
30	Gir Somnath	770	40.5	770	40.5	770	40.5	2310	121.5
31	Botad	5	0.2	5	0.2	5	0.2	15	0.6
32	Mahisagar	240	12.5	240	12.5	240	12.5	720	37.5
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	9899	520.55	9899	520.55	9899	520.55	30723	1615.65

Cost Norms: Rs 5000/acre/demonstration

Table- 4.2.147 District-wise IWM Demonstration for Castor (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise IWM Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	342	18.00	342	18.00	342	18.00	1026	54
2	Amreli	20	1.00	20	1.00	20	1.00	60	3
3	Anand	30	1.50	30	1.50	30	1.50	90	4.5
4	Banaskantha	1700	89.50	1700	89.50	1700	89.50	5100	268.5
5	Bharuch	65	3.50	65	3.50	65	3.50	195	10.5
6	Bhavnagar	5	0.35	5	0.35	5	0.35	15	1.05
7	Dahod	5	0.20	5	0.20	5	0.20	15	0.6
8	<u>Dang</u>	0	0.00	0	0.00	0	0.00	0	0
9	Gandhinagar	275	14.50	275	14.50	275	14.50	825	43.5
10	Jamnagar	130	7.00	130	7.00	130	7.00	390	21

Sr No	Name of the Districts	Year wise IWM Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Junagadh	20	1.00	20	1.00	20	1.00	60	3
12	Kachchh	220	11.50	220	11.50	220	11.50	660	34.5
13	Kheda	1320	69.50	1320	69.50	1320	69.50	3960	208.5
14	Mehsana	875	46.00	875	46.00	875	46.00	2625	138
15	Narmada	20	1.10	20	1.10	20	1.10	60	3.3
16	Navsari	0	0.00	0	0.00	0	0.00	0	0
17	Panchmahal	115	6.00	115	6.00	115	6.00	345	18
18	Patan	1245	65.50	1245	65.50	1245	65.50	3735	196.5
19	Porbandar	60	3.00	60	3.00	60	3.00	180	9
20	Rajkot	152	8.00	152	8.00	152	8.00	456	24
21	Sabarkantha	700	37.00	700	37.00	700	37.00	2100	111
22	Surat	30	1.50	30	1.50	30	1.50	90	4.5
23	Surendranagar	770	40.50	770	40.50	770	40.50	2310	121.5
24	<u>Tapi</u>	5	0.20	5	0.20	5	0.20	15	0.6
25	Vadodara	240	12.50	240	12.50	240	12.50	720	37.5
26	Valsad	0	0.00	0	0.00	0	0.00	0	0
27	Aravalli	152	8.00	152	8.00	152	8.00	456	24
28	Morbi	700	37.00	700	37.00	700	37.00	2100	111
29	DevbhumiDwarka	30	1.50	30	1.50	30	1.50	90	4.5
30	Gir Somnath	770	40.50	770	40.50	770	40.50	2310	121.5
31	Botad	5	0.20	5	0.20	5	0.20	15	0.6
32	Mahisagar	240	12.50	240	12.50	240	12.50	720	37.5
33	Chhotaudepur	0	0.00	0	0.00	0	0.00	0	0
	Total	10241	538.55	10241	538.55	10241	538.55	30723	1615.65

Cost Norms: Rs 5000/acre/demonstration

Table- 4.2.148 District-wise Farmer Field Schools Covering Identified Critical Technologies for Castor Crop

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	18	3.6	18	3.6	18	3.6	54	10.8
2	Amreli	1	0.2	1	0.2	1	0.2	3	0.6
3	Anand	3	0.6	3	0.6	3	0.6	9	1.8
4	Banaskantha	90	18	90	18	90	18	270	54
5	Bharuch	4	0.8	4	0.8	4	0.8	12	2.4
6	Bhavnagar	0	0	0	0	0	0	0	0
7	Dahod	0	0	0	0	0	0	0	0
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	15	3	15	3	15	3	45	9
10	Jamnagar	7	1.4	7	1.4	7	1.4	21	4.2
11	Junagadh	1	0.2	1	0.2	1	0.2	3	0.6
12	Kutch	12	2.4	12	2.4	12	2.4	36	7.2
13	Kheda	70	14	70	14	70	14	210	42
14	Mehsana	45	9	45	9	45	9	135	27
15	Narmada	1	0.2	1	0.2	1	0.2	3	0.6
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	6	1.2	6	1.2	6	1.2	18	3.6
18	Patan	70	14	70	14	70	14	210	42
19	Porbandar	3	0.6	3	0.6	3	0.6	9	1.8
20	Rajkot	8	1.6	8	1.6	8	1.6	24	4.8
21	Sabarkantha	37	7.4	37	7.4	37	7.4	111	22.2
22	Surat	2	0.4	2	0.4	2	0.4	6	1.2
23	Surendranagar	40	8	40	8	40	8	120	24
24	<u>Tapi</u>	0	0	0	0	0	0	0	0

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Vadodara	12	2.4	12	2.4	12	2.4	36	7.2
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	8	1.6	8	1.6	8	1.6	24	4.8
28	Morbi	37	7.4	37	7.4	37	7.4	111	22.2
29	DevbhumiDwarka	2	0.4	2	0.4	2	0.4	6	1.2
30	Gir Somnath	40	8	40	8	40	8	120	24
31	Botad	0	0	0	0	0	0	0	0
32	Mahisagar	12	2.4	12	2.4	12	2.4	36	7.2
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	544	108.8	544	108.8	544	108.8	1632	326.4

Cost Norms: Rs. 20,000/- per School

Table- 4.2.149 Group Formation /Commodity Interest Groups Formation for Specific Activities (State)

Interest Group	Year wise no. of Group formation (Phy-No. Fin- Rs. In Lakh)							
	2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Seed production	740	148	740	148	740	148	2220	444
Organic Farming	360	72	360	72	360	72	1080	216
Value addition	340	68	340	68	340	68	1020	204
Specific Crop group	560	112	560	112	560	112	1680	336
Total	2000	400	2000	400	2000	400	6000	1200

Cost Norms: Rs.0.20 lakh/group (for capacity building, input assistance, marketing and for group specific activities)

Table- 4.2.150 District-wise Group Formation / Commodity Interest Groups Formation for Specific Activities for Castor

(Phy-No. Fin- Rs. In Lakh)

Sr. No.	Name of the Districts	Seed Production				Organic Farming				Value addition				Specific Crop group				Total			
		2017-18		2017 -		2017-18		2017 -		2017-18		2017 -		2017-18		2017 -		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	25	5	75	15.	10	2	30	6.0	10	2	30	6.0	20	4	60	12.	65	13	19	39.
2	Amreli	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3	Anand	5	1	15	3.0	0	0	0	0.0	0	0	0	0.0	5	1	15	3.0	10	2	30	6.0
4	Banaskantha	12	24	36	72.	60	1	18	36.	55	1	16	33.	90	18	27	54.	32	65	97	195
5	Bharuch	5	1	15	3.0	0	0	0	0.0	0	0	0	0.0	5	1	15	3.0	10	2	30	6.0
6	Bhavnagar	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
7	Dahod	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
8	<u>Dang</u>	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
9	Gandhinagar	20	4	60	12.	10	2	30	6.0	10	2	30	6.0	15	3	45	9.0	55	11	16	33.
10	Jamnagar	10	2	30	6.0	5	1	15	3.0	5	1	15	3.0	10	2	30	6.0	30	6	90	18.
11	Junagadh	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
12	Kutch	15	3	45	9.0	10	2	30	6.0	10	2	30	6.0	10	2	30	6.0	45	9	13	27.
13	Kheda	95	19	28	57.	50	1	15	30.	45	9	13	27.	70	14	21	42.	26	52	78	156
14	Mehsana	60	12	18	36.	30	6	90	18.	30	6	90	18.	45	9	13	27.	16	33	49	99.
15	Narmada	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
16	Navsari	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
17	Panchmahal	10	2	30	6.0	5	1	15	3.0	5	1	15	3.0	5	1	15	3.0	25	5	75	15.
18	Patan	90	18	27	54.	45	9	13	27.	40	8	12	24.	70	14	21	42.	24	49	73	147
19	Porbandar	5	1	15	3.0	5	1	15	3.0	0	0	0	0.0	5	1	15	3.0	15	3	45	9.0
20	Rajkot	10	2	30	6.0	5	1	15	3.0	5	1	15	3.0	10	2	30	6.0	30	6	90	18.
21	Sabarkantha	50	10	15	30.	25	5	75	15.	25	5	75	15.	40	8	12	24.	14	28	42	84.

Sr. No.	Name of the Districts	Seed Production				Organic Farming				Value addition				Specific Crop group				Total			
		2017-18		2017 -		2017-18		2017 -		2017-18		2017 -		2017-18		2017 -		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
22	Surat	5	1	15	3.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	5	1	15	3.0
23	Surendranagar	55	11	16	33.	25	5	75	15.	25	5	75	15.	40	8	12	24.	14	29	43	87.
24	Tapi	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
25	Vadodara	20	4	60	12.	10	2	30	6.0	10	2	30	6.0	15	3	45	9.0	55	11	16	33.
26	Valsad	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
27	Aravalli	10	2	30	6.0	5	1	15	3.0	5	1	15	3.0	10	2	30	6.0	30	6	90	18.
28	Morbi	50	10	15	30.	25	5	75	15.	25	5	75	15.	40	8	12	24.	14	28	42	84.
29	DevbhumiDwark	5	1	15	3.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	5	1	15	3.0
30	Gir Somnath	55	11	16	33.	25	5	75	15.	25	5	75	15.	40	8	12	24.	14	29	43	87.
31	Botad	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
32	Mahisagar	20	4	60	12.	10	2	30	6.0	10	2	30	6.0	15	3	45	9.0	55	11	16	33.
33	Chhotaudepur	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
	Total	74	14	22	44	36	7	10	21	34	6	10	20	56	11	16	33	20	40	60	120

Cost Norms: Rs.0.20 lakh/group (for capacity building, input assistance, marketing and for group specific activities)

4.2.5.11 Researchable issues:

- Need to study suitable changes in agronomical practices due to weather effects
- New agricultural practices to adjust with the climatic variations
- Scheduling of nutrients for increasing fertilizer use efficiency while reducing cost
- Soil test based nutrient management (STCR) and real time nutrient management (SSNM)
- Market research combined with weather changes for deciding the crop area for a season
- Small equipments so as to reduce harvest losses and value addition in post-harvest produce
- To deal with insect, pest and diseases in newly released varieties

4.2.6 Mustard:

4.2.6.1 Background:

Mustard is an important edible oilseeds crop of the arid and semi-arid region. It is growing extensively in rainfed as well as in irrigated conditions. In Gujarat, in the year of 2012-13, mustard was grown in 2.14 lakh hectare of land with 3.18 lakh tonnes of total crop production. North Gujarat is the main mustard producing area. Farmers are cultivating mustard crop as a *Rabi* crop. Mustard oil contains mono and poly unsaturated fatty acids in enough quantity which is healthier for a human being. Mustard is the important edible oilseed crop in India after groundnut. This crop accounts for 22.7 % of total oilseed production and 19.2 % of total cropped area in the country. The mustard sown area in Gujarat has potential to increase.

Vision:

Gujarat is a leading state in castor production and second in mustard productivity. Through agro-technological intervention, the yield level of castor and mustard are to be increased *vis-a-vis* enhancement in farmer's income.

Mission:

To augment the production and yield and quality of castor and mustard in the state, narrow the yield gap in irrigated and rainfed without mining natural resources, further accelerate technology development process to meet ensuing climatic changes as also the needs/expectation of all stakeholders.

4.2.6.2 Crop/Area Issues:

- Use of inferior quality seeds due to lack of awareness
- Lack of availability of quality seed
- Limited irrigation facility
- Unscientific crop management like spacing, fertilization, harvesting technology
- Poor management of issues related to soil fertility like no/ less sulphur and micronutrient application
- The occurrence of wilt and root rot diseases
- Infestation of semi looper, capsule borer, thrips and whiteflies

4.2.6.3 Current Status of Area, Production and Productivity:

The Area, Production and Productivity of mustard in different years for different districts of Gujarat is given below:

Table- 4.2.151 Area, Production and Productivity of Mustard in Different Districts of Gujarat

Sr	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			Average		
		Area	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Area	Prod	Yie
1	Kachchh	197	323	163	19	355	18	56	107	19	54	111	20	97	175	181	75	143	19
2	Banaskantha	1124	175	156	11	206	17	14	257	17	12	234	19	12	169	140	121	202	16
3	Patan	254	415	163	27	424	15	31	551	17	26	436	16	29	431	147	280	433	15
4	Mahesana	248	385	154	36	535	14	25	373	14	19	308	15	21	330	157	204	319	15
5	Sabarkantha	97	153	157	23	38	16	40	71	17	11	14	13	11	12	117	11	13	12
6	Arvalli										11	17	15	11	15	134	11	16	14
7	Gandhinagar	41	62	152	38	61	15	20	28	14	15	21	14	11	19	166	13	20	15
8	Ahmedabad	18	28	157	5	9		13	24	17	6	11	18	7	11	145	7	11	16
9	Surendranag	12	18	157	3	5	16	33	59	17	17	31	18	10	15	145	14	23	16
10	Morbi										13	23	18	10	14	145	11	19	16
11	Rajkot	5	8	157	1	1	16	1	2	17	0	0	18	0	1	145	0	0	15
12	Jamnagar	2	4	157	2	3	16	12	22	17	2	3	18	0	0	0	1	1	18
13	DevbhumiDw										0	0	18	0	0	0	0	0	18
14	Porbandar	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
15	Junagadh	1	1	157	0	0	0	0	1	17	0	0	18	0	0	0	0	0	18
16	Gir Somnath										0	0	18	0	0	0	0	0	18
17	Amreli	0	0	0	0	0	0	0	0	17	0	0	18	0	0	145	0	0	17
18	Bhavnagar	1	1	157	0	0	0	0	1	17	0	1	18	0	0	145	0	1	16
19	Botad										0	0	0	0	0	0	0	0	0
20	Anand	28	44	157	33	55	16	19	33	17	14	17	12	14	20	145	14	18	13
21	Kheda	35	56	157	26	44	16	24	41	17	8	9	11	6	9	141	7	9	12
22	Panchmahal	2	4	157	3	5	16	4	7	17	0	0	0	2	3	145	1	2	14
23	Mahisagar										2	3	18	2	3	145	2	3	16
24	Dahod	1	1	157	1	2	16	1	2	17	2	4	18	2	3	145	2	3	16
25	Vadodara	4	7	157	3	5	16	3	6	17	1	1	18	1	1	145	1	1	16

Sr	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16			Average		
		Area	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Are	Pro	Yiel	Area	Prod	Yie
26	Chhotaudepu										0	0	18	0	0	145	0	0	16
27	Narmada	0	0	0	0	0	0	1	1	17	1	1	18	1	2	145	1	1	15
28	Bharuch	2	3	157	0	0	0	3	4	17	2	4	18	0	0	145	1	2	17
29	Surat	2	3	157	0	0	0	0	1	17	0	0	18	4	5	145	2	3	14
30	Dang	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
31	Navsari	2	3	157	1	2	16	1	1	17	1	1	18	0	0	145	0	1	17
32	Valsad	0	0	0	0	0	0	0	0	17	0	0	18	0	0	0	0	0	18
33	Tapi	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
GUJARAT STATE		2076	327	157	21	360	16	27	488	17	18	336	18	19	276	145	187	306	16

Source: Directorate of Agri., Gandhinagar

Area in '00 ha, Production in '00 T., and Productivity in kg/ha.

Source: apy_2011-12_b

4.2.6.4 Major Mustard varieties in the state:

Mustard is dominating edible oilseed crop. The varieties grown in the State are given in Table 4.2.152.

Table - 4.2.152 Mustard Major Varieties of the State:

Crop	Varieties/ Hybrids
Mustard	GM-1, GM-2, GM-3, GDM-4

Source: Directorate of Agriculture, Gandhinagar

4.2.6.5 Input Management:

4.2.6.5.1 Seed:

The area under mustard is 1.9 percent of the total of the total cultivable area in Gujarat. At present, the seed replacement ratio (SRR) of mustard is 25 percent. Thus, the scope of SRR is ambient in future to enhance the productivity of mustard in the state, especially through seed village concept and hybrid seed production programs.

Table- 4.2.153 Planning of Agriculture Inputs in the State – Mustard Crop Seed

Sr. No.	Mustard Seed Quantity requirement and SRR							
	District	Area ('00 ha) (2015-16)	Seed rate kg/ha	Total Seed quantity	SRR	Seed quantity Required, tons		
						2017-18	2018-19	2019-20
1	Ahmedabad	7	3.5	2.45	25	0.6	0.7	0.7
2	Amreli	0	3.5	0	15	0.0	0.0	0.0
3	Anand	14	3.5	4.9	35	1.7	1.9	2.1
4	Banaskantha	1210	3.5	423.5	60	254.1	279.5	307.5
5	Bharuch	0	3.5	0	30	0.0	0.0	0.0
6	Bhavnagar	0	3.5	0	15	0.0	0.0	0.0
7	Dahod	2	3.5	0.7	20	0.1	0.2	0.2
8	Dang	0	3.5	0	15	0.0	0.0	0.0
9	Gandhinagar	11	3.5	3.85	20	0.8	0.8	0.9

Sr. No.	Mustard Seed Quantity requirement and SRR							
	District	Area ('00 ha) (2015-16)	Seed rate kg/ha	Total Seed quantity	SRR	Seed quantity Required, tons		
						2017-18	2018-19	2019-20
10	Jamnagar	0	3.5	0	15	0.0	0.0	0.0
11	Junagadh	0	3.5	0	12	0.0	0.0	0.0
12	Kheda	6	3.5	2.1	35	0.7	0.8	0.9
13	Kutch	97	3.5	33.95	45	15.3	16.8	18.5
14	Mehsana	210	3.5	73.5	40	29.4	32.3	35.6
15	Narmada	1	3.5	0.35	20	0.1	0.1	0.1
16	Navsari	0	3.5	0	15	0.0	0.0	0.0
17	Panchmahal	2	3.5	0.7	20	0.1	0.2	0.2
18	Patan	293	3.5	102.55	25	25.6	28.2	31.0
19	Porbandar	0	3.5	0	10	0.0	0.0	0.0
20	Rajkot	0	3.5	0	20	0.0	0.0	0.0
21	Sabarkantha	11	3.5	3.85	20	0.8	0.8	0.9
22	Surat	4	3.5	1.4	15	0.2	0.2	0.3
23	Surendranagar	10	3.5	3.5	25	0.9	1.0	1.1
24	Tapi	0	3.5	0	10	0.0	0.0	0.0
25	Vadodara	1	3.5	0.35	25	0.1	0.1	0.1
26	Valsad	0	3.5	0	15	0.0	0.0	0.0
27	Aravalli	11	3.5	3.85	20	0.8	0.8	0.9
28	Morbi	10	3.5	3.5	20	0.7	0.8	0.8
29	DevbhumiDwarka	0	3.5	0	15	0.0	0.0	0.0
30	Gir Somnath	0	3.5	0	25	0.0	0.0	0.0
31	Botad	0	3.5	0	10	0.0	0.0	0.0
32	Mahisagar	2	3.5	0.7	25	0.2	0.2	0.2
33	Chhotaudepur	0	3.5	0	15	0.0	0.0	0.0
	Total	1902	3.5	666	22	147.7	162.4	178.7

4.2.6.5.2 Fertilizer:

District-wise consumption of fertilizers, NPK consumption and ratio in mustard crop 2011-12 is given in Table No. 4.2.154. The total requirement of the fertilizers during 2011-12 is 81228 T. A projection rate of 2 percent is considered in the area. Accordingly, the total requirement of the fertilizers is estimated to be 82852, 84509, 86199, 87923 and 89681 T for the years 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 respectively.

Table- 4.2.154 District-wise Consumption of Fertilizers in Mustard Crop 2011-12 (in terms of materials, in T)

Sr.	District	Urea	DAP	MoP	TSP	SSP	AS	Can	20:20:0	15:15:1	24:24:0	12:32:	10:26:	16:16:	16:20:
1	Ahmedabad	63460	10081	1818	937	7381	1044	645	3456	66	21	481	0	31	495
2	Amreli	36140	18667	1467	213	3632	1895	414	3854	36	550	4316	350	5	235
3	Anand	75783	2953	4985	613	3286	7336	976	5676	398	166	263	0	174	15
4	Banaskantha	78973	14152	6076	998	5027	7941	396	10373	0	369	1887	1185	0	3283
5	Bharuch	26108	2182	3923	174	4187	2394	374	3514	36	204	1378	875	45	232
6	Bhavnagar	37121	18193	3672	47	8204	5302	1827	5838	44	514	3287	84	0	0
7	Dahod	15020	1855	479	232	563	657	0	1970	45	0	79	0	0	119
8	Gandhinagar	24180	3275	2196	78	2323	1401	290	2560	0	83	695	423	0	594
9	Jamnagar	30562	17794	1215	490	7008	1561	1250	4694	111	133	6844	0	0	361
10	Junagadh	52933	20141	2534	924	5417	1658	2102	8337	94	226	4589	711	177	1041
11	Kheda	62780	3640	4792	1504	2566	5111	725	3129	147	54	158	0	78	57
12	Kutch	46717	10566	335	0	1463	910	204	2803	481	0	422	0	0	281
13	Mehsana	55318	7962	1750	198	1962	3049	661	4004	22	215	1090	353	85	914
14	Narmada	10103	585	2343	102	1082	871	40	884	73	92	234	271	0	204
15	Navsari	16320	4911	6145	659	4433	3826	186	2935	1198	415	839	773	0	288
16	Panchmahal	42995	1731	576	576	586	995	204	3414	256	0	408	0	39	163
17	Patan	34029	4847	182	160	684	1325	227	2720	0	20	455	81	11	564
18	Porbandar	7026	4623	78	73	535	221	317	1377	0	0	887	371	0	52

Sr.	District	Urea	DAP	MoP	TSP	SSP	AS	Can	20:20:0	15:15:1	24:24:0	12:32:	10:26:	16:16:	16:20:
19	Rajkot	68553	25418	3097	766	1038	3668	2418	7693	294	599	17516	310	0	3745
20	Sabarkantha	64407	8627	9803	525	3847	3057	1079	8656	47	850	2703	562	40	2140
21	Surat	34656	9241	1490	466	1245	8007	1369	7770	374	791	5003	5154	0	950
22	Surendranag	55279	15503	1125	116	2695	721	1260	5402	150	62	783	996	0	26
23	Tapi	5400	1386	1585	191	1010	2377	382	1730	60	106	266	792	0	222
24	Dang	65	5	12	0	0	101	0	39	0	0	0	0	0	0
25	Vadodara	79342	3850	7822	1246	5367	3229	897	3804	42	142	1119	55	115	0
26	Valsad	5104	1458	2192	23	505	1235	85	1735	492	278	148	124	0	54
Total		102837	21364	8510	1131	9660	6989	1832	108367	4466	5890	55850	13470	800	16035

Source: Fertilizer Division, Gandhinagar

Table- 4.2.155 District-wise NPK Consumption and Ratio in Mustard Crop in 2011-12 (T)

Sr. No.	District	N	P	K	Total NPK	N:P:K Ratio
1	Ahmedabad	32248	7232	1183	40663	27.26 :6.11:1.00
2	Amreli	21994	11698	1668	35360	13.19 :7.01:1.00
3	Anand	38492	3528	3121	45141	12.33:1.13:1.00
4	Banaskantha	43683	11525	4256	59464	10.26:2.71:1.00
5	Bharuch	14061	3236	2814	20111	5.00 :1.15:1.00
6	Bhavnagar	23658	12075	2758	38491	8.58 :4.38:1.00
7	Dahod	7810	1505	307	9622	25.44 :4.90:1.00
8	Gandhinagar	12837	2899	1539	17275	8.34 :1.88:1.00
9	Jamnagar	19821	12820	1869	34510	10.61:6.86:1.00
10	Junagadh	31427	14185	2466	48078	12.74 :5.75:1.00
11	Kheda	31492	3530	2923	37945	10.77: 1.21:1.00
12	Kutch	24380	5932	354	30666	68.87 :16.76:1.00
13	Mehsana	28866	5551	1319	35736	21.88 :4.21:1.00
14	Narmada	5244	887	1525	7656	3.44 :0.58:1.00
15	Navsari	10341	4684	4208	19233	2.46 :1.11:1.00
16	Panchmahal	21151	2053	451	23655	46.90 :4.55:1.00
17	Patan	17567	3244	203	21014	86.54 :15.98:1.00
18	Porbandar	4623	2913	285	7821	16.22 :10.22:1.00
19	Rajkot	41998	21889	4792	68679	8.76:4.57:1.00
20	Sabarkantha	34779	8217	6467	49463	5.38 :1.27:1.00
21	Surat	22724	11398	11140	45262	2.04:1.02:1.00
22	Surendranagar	30374	9251	1082	40707	28.07 :8.55:1.00
23	Tapi	3385	1607	1208	6200	2.80 :1.33:1.00
24	Dang	735	29	26	790	28.27 :1.12:1.00
25	Vadodara	38633	4401	4893	47927	7.90 :0.9:1.00
26	Valsad	17965	1468	1573	21006	11.42 :0.93:1.00
Total		580288	167757	64173	812218	9.04 :2.61:1.00

*Calculated for 2011-12

Table- 4.2.156 Fertilizers Requirement in Mustard Crops 2011-12

District	Area (00 ha)	2017-18			2018-19			2019-20		
		Urea	DAP	Gypsum	Urea	DAP	Gypsum	Urea	DAP	Gypsum
Ahmedabad	7	46	195	450	119	195	450	119	195	450
Amreli	0	0	0	0	0	0	0	0	0	0
Anand	14	93	304	700	185	304	700	185	304	700
Banaskantha	1210	7999	12195	28100	7432	12195	28100	7432	12195	28100
Bharuch	0	0	0	0	0	0	0	0	0	0
Bhavnagar	0	0	0	0	0	0	0	0	0	0
Dahod	2	13	11	25	7	11	25	7	11	25
Dang	0	0	0	0	0	0	0	0	0	0
Gandhinagar	11	73	445	1025	271	445	1025	271	445	1025
Jamnagar	0	0	0	0	0	0	0	0	0	0
Junagadh	0	0	0	0	0	0	0	0	0	0
Kheda	6	40	380	875	231	380	875	231	380	875
Kutch	97	641	2137	4925	1303	2137	4925	1303	2137	4925
Mehsana	210	1388	2691	6200	1640	2691	6200	1640	2691	6200
Narmada	1	7	0	0	0	0	0	0	0	0
Navsari	0	0	0	0	0	0	0	0	0	0
Panchmahal	2	13	22	50	13	22	50	13	22	50
Patan	293	1937	2756	6350	1679	2756	6350	1679	2756	6350
Porbandar	0	0	0	0	0	0	0	0	0	0
Rajkot	0	0	0	0	0	0	0	0	0	0
Sabarkantha	11	73	1052	2425	641	1052	2425	641	1052	2425
Surat	4	26	22	50	13	22	50	13	22	50
Surendranagar	10	66	130	300	79	130	300	79	130	300
Tapi	0	0	0	0	0	0	0	0	0	0
Vadodara	1	7	43	100	26	43	100	26	43	100
Valsad	0	0	0	0	0	0	0	0	0	0
Aravalli	11	73	1052	2425	641	1052	2425	641	1052	2425

District	Area (00 ha)	2017-18			2018-19			2019-20		
		Urea	DAP	Gypsum	Urea	DAP	Gypsum	Urea	DAP	Gypsum
Morbi	10	66	130	300	79	130	300	79	130	300
DevbhumiDwarka	0	0	0	0	0	0	0	0	0	0
Gir Somnath	0	0	0	0	0	0	0	0	0	0
Botad	0	0	0	0	0	0	0	0	0	0
Mahisagar	2	13	22	50	13	22	50	13	22	50
Chhotaudepur	0	0	0	0	0	0	0	0	0	0
Total	1902	12574	23587	54350	14372	23587	54350	14372	23587	54350

*Calculated for 2015-16

4.2.6.5.3 Pesticides:

The district-wise requirement of pesticides for termite and weed management is given in Table. 4.2.157.

Mustard

Insect Management: For the control of aphids, jassids and sucking type of insects, Di-methoate 15 ml or monocrotophos 12 ml dilute in 10 liter of water and it should be spray or 2% Methyl Parathion powder apply @ 25 kg/ha by dusting as per requirement. Or for spray phosphamidine 0.05% or Quinalphos 0.025% At 15 days interval

Disease Management: Powdery mildew -For control of this disease spray after dilution of 0.2 % wettable sulphur @25 g or 0.025% Denocap 5 ml in a 10 liter of water, as per requirement.

White Rust -For the control of this disease, 25 g Diathen M -45 dilutes in 10 liter water and it should be spray at 35-40 days after sowing as per requirement.

Table- 4.2.157 District-wise Requirement of Pesticides /Herbicide for Mustard

District	Area	Seed rate (kg/ha)	Total Seed (tons)	Captan/ Thirum	Pendi-methaline
Ahmedabad	7	3.5	2.45	0.008	1.17
Amreli	0	3.5	0	0.000	0.00
Anand	14	3.5	4.9	0.016	2.33
Banaskantha	1210	3.5	423.5	1.412	201.59
Bharuch	0	3.5	0	0.000	0.00
Bhavnagar	0	3.5	0	0.000	0.00
Dahod	2	3.5	0.7	0.002	0.33
Dang	0	3.5	0	0.000	0.00
Gandhinagar	11	3.5	3.85	0.013	1.83
Jamnagar	0	3.5	0	0.000	0.00
Junagadh	0	3.5	0	0.000	0.00
Kheda	6	3.5	2.1	0.007	1.00
Kutch	97	3.5	33.95	0.113	16.16
Mehsana	210	3.5	73.5	0.245	34.99
Narmada	1	3.5	0.35	0.001	0.17
Navsari	0	3.5	0	0.000	0.00
Panchmahal	2	3.5	0.7	0.002	0.33
Patan	293	3.5	102.55	0.342	48.81
Porbandar	0	3.5	0	0.000	0.00
Rajkot	0	3.5	0	0.000	0.00
Sabarkantha	11	3.5	3.85	0.013	1.83
Surat	4	3.5	1.4	0.005	0.67
Surendranagar	10	3.5	3.5	0.012	1.67
Tapi	0	3.5	0	0.000	0.00
Vadodara	1	3.5	0.35	0.001	0.17
Valsad	0	3.5	0	0.000	0.00

District	Area	Seed rate (kg/ha)	Total Seed (tons)	Captan/ Thirum	Pendi-methaline
Aravalli	11	3.5	3.85	0.013	1.83
Morbi	10	3.5	3.5	0.012	1.67
DevbhumiDwarka	0	3.5	0	0.000	0.00
Gir Somnath	0	3.5	0	0.000	0.00
Botad	0	3.5	0	0.000	0.00
Mahisagar	2	3.5	0.7	0.002	0.33
Chhotaudepur	0	3.5	0	0.000	0.00
Total	2055	3.5	666	2.221	316.87

4.2.6.6 Constraints Analysis and Recommended Interventions for Mustard Crop:

4.2.6.6.1 Yield Gaps Analysis:

Soil fertility and fertilizer management and agricultural practices are one of the key issues for yield gap. It might be due to an imbalance of NPK ratio and low or negligible sulphur application. The ideal ratio of NPK is 4:2:1. The expected yield of mustard can be increased in next five years by adopting scientific technologies of the crop by SAUs, recommended a dose of NPK along with S and micronutrients, adopting good agricultural practices, judicious use of water, timely plant protection measures *etc.*

Table- 4.2.158 District-wise Mustard Yield Gap Analysis

S. No.	District	Average yield in q/ha			Yield Gap %	Reasons for gap
		District Average	State Average	FLD*		
1	Ahmedabad	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
2	Amreli	1679	1678	2768	64.9	Non-traditional area
3	Anand	1482	1678	2768	86.8	Non-traditional area, not aware of recommended package of practices

S. No.	District	Average yield in q/ha			Yield Gap %	Reasons for gap
		District Average	State Average	FLD*		
4	Banaskantha	1692	1678	2110	24.7	Unscientific cultivation & input management
5	Bharuch	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
6	Bhavnagar	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
7	Dahod	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
8	Dang	0	1678	2768	0.0	Non-traditional area
9	Gandhinagar	1508	1678	2768	83.6	Unscientific cultivation & input management
10	Jamnagar	1194	1678	2768	131.8	Non-traditional area, not aware of recommended package of practices
11	Junagadh	1194	1678	2768	131.8	Non-traditional area, not aware of recommended package of practices
12	Kheda	1429	1678	2768	93.7	Non-traditional area, High incident of insect and disease, Unscientific cultivation & input management
13	Kutch	1928	1678	2768	43.6	Not adoption of latest released variety, Unscientific cultivation & input management
14	Mehsana	1539	1678	2176	41.4	Unscientific cultivation & input management
15	Narmada	1679	1678	2768	64.9	Non-traditional area
16	Navsari	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
17	Panchmahal	1073	1678	2768	158.0	Non-traditional area, not aware of recommended package of practices
18	Patan	1622	1678	2270	40.0	Unscientific cultivation & input management
19	Porbandar	0	1678	2768	0	Non-traditional area
20	Rajkot	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
21	Sabarkantha	1414	1678	2768	95.8	Unscientific cultivation & input management

S. No.	District	Average yield in q/ha			Yield Gap %	Reasons for gap
		District Average	State Average	FLD*		
22	Surat	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
23	Surendranagar	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
24	Tapi	0	1678	2768	0.0	Non-traditional area
25	Vadodara	1679	1678	2768	64.9	Non-traditional area, not aware of recommended package of practices
26	Valsad	1194	1678	2768	131.8	Non-traditional area
27	Aravalli	954	1678	2768	190.1	Non-traditional area, not aware of recommended package of practices
28	Morbi	1091	1678	2768	153.7	Unscientific cultivation & input management
29	DevbhumiDwarka	606	1678	2768	356.8	Non-traditional area, not aware of recommended package of practices
30	Gir Somnath	606	1678	2768	356.8	Non-traditional area, not aware of recommended package of practices
31	Botad	0	1678	2768	0.0	Non-traditional area
32	Mahisagar	1091	1678	2768	153.7	Non-traditional area, not aware of recommended package of practices
33	Chhotaudepur	1091	1678	2768	153.7	Non-traditional area

4.2.6.6.2 Production Constraints:

The constrains associated with low productivity may be enumerated as under

- Short and mild winter
- Improper selection of variety/hybrid as per seeding time
- Variable water supply in quantum and space
- Imbalanced fertilizers application
- Improper placement of seeds and fertilizers
- Poor crop management
- Poor insect and disease management

- Low organic matter due to poor awareness regarding soil health
- Poor resource conservation technology

Table- 4.2.159 Region-wise constraints for low productivity for Mustard

S. No	Region	constraints
1.	North Gujarat	<ul style="list-style-type: none"> ➤ Traditional sowing method and dense plant population ➤ Improper time of sowing ➤ Imbalance use of fertilizers with poor sulphur application ➤ Abrupt climate change ➤ Unscientific mustard cultivation
2.	Middle Gujarat	<ul style="list-style-type: none"> ➤ Short winter period ➤ Improper plant stand ➤ Poor water management in the canal area ➤ High incidence of pest and diseases ➤ Less remunerative as comparative to existing crops ➤ Unscientific mustard cultivation
3.	South Gujarat	<ul style="list-style-type: none"> ➤ Short winter period, relatively high temperature ➤ Less remunerative as comparative to existing crops ➤ Difficulty in land preparation ➤ High incidence of pest and diseases ➤ Unscientific mustard cultivation
4.	Saurashtra	<ul style="list-style-type: none"> ➤ Short winter period, relatively high temperature ➤ The uncertainty of water availability and poor irrigation management ➤ High incidence of pest and diseases ➤ Unscientific mustard cultivation

Table- 4.2.160 Sustainability Issues and Gap Analysis of Productivity of Mustard Crop and Resources

S. No.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
i	Untimely sowing	Farmers sow mustard too early or too late	Follow recommended time of sowing	Farmer's participatory approach and demonstration	Entire mustard growing areas.	Improvement in productivity
ii	The traditional method of sowing and use of high seed rate	Farmers follow broadcasting to sow mustard No thinning in most of the cases	Adoption of recommended method of sowing	Farmer's participatory approach and demonstration	Entire mustard growing area.	Improvement in productivity
iii	Poor fertilizer management	Farmers apply a haphazard dose of fertilizers. The use of sulphur and micronutrients and bio fertilizers are negligible	Application of recommended dose of fertilizers. Use of sulphur and micronutrients as per soil testing	Farmer's participatory approach and demonstration	Entire mustard growing area	Improvement in productivity with sustainable soil health
iv	No use of Organic Manure	Low availability of good quality FYM/ organic manures and the higher price of organic manures	Awareness campaign for production of good quality organic manures at their own farms	Farmer's field schools, campaigns	Entire mustard growing area	Improvement in productivity with sustainable soil health

S. No.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
v	Faulty use of irrigation water / use of soil moisture	Irrigation water flooded throughout the crop season. In rain fed mustard water conservation is an issue	Irrigation at critical crop stages.	Training and demonstrations on efficient water management practices.	Entire mustard growing area	Increase in water use efficiency and sustain soil health
vi	High incidence of weeds	Grassy and broad leaves, as well as parasitic weeds, are seriously affected mustard yields in the different cropping system. Practices of the unscientific method of weed management by the farmers	Following integrated weed management	Integrated weed management in the mustard crop. Capacity building of extension agencies and farmers for appropriate spraying techniques. On-farm demonstrations for integrated weed management	Entire mustard growing area	Increased profitability
vii	Low Adoption of seed treatment	Recurrence of fungal and soil-borne diseases	To popularize the practice of seed treatment	Educating and motivating farmers on its importance and adoption through demonstrations and training.	Entire mustard growing area	Increased profitability
viii	Sowing of traditional seed	Low awareness about certified seed	Awareness campaign for use of certified seed.	Farmer's field schools, campaigns.	Entire mustard growing areas.	Improvement in yield

S. No.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
ix	Late harvesting and traditional way of threshing	Late harvesting and traditional way of threshing lead to yield loss.	Awareness campaign to educate farmers	Educating and motivating farmers on its importance and adoption through demonstrations and training	Entire mustard growing area	Improvement in yield
x	Poor pest management	Farmers apply an improper dose of pesticides and not following IPM practices at the proper time.	Application of recommended dose of pesticides at the proper time. Use of IPM to control pests	Farmer's participatory approach and demonstration	Entire mustard growing area	Improvement in productivity with less environmental hazard

Table- 4.2.161 Closing the Gaps for Realizing the Mustard Crop Vision

Activity Output Matrix				
Activity/Crop/Commodit	Issues	Mode of Action	Collaborator/Target	Cost
1. Water Management	Irregular water supply in canal water so farmers use more water. Lack of drainage facility.	Supply of water in the canal as per the crop requirement. Drainage facility is created	Irrigation Department and SAUs have jointly work to solve this problem.	Demonstration proposed
	Salinity stress mitigation at farmers' fields	MIS, Green manuring and gypsum use.	Subsidy on gypsum (@ 75per cent) and its availability be ensured.	Demonstration on MIS, green manuring and gypsum proposed.
	Water harvesting and recharging	Construction of water harvesting structures near catchment area of the drain, ranchayat /farmers land	DDA/ concerned departments	Project on water harvesting proposed.
	Watershed development in rain fed areas	Sprinkler/drip irrigation after creating a facility of community ponds/ water harvesting	DDA/concerned departments in consultation with GGRC	The project, Demonstrations proposed.
	Work is also needed to adapt agronomic practices, especially the time and method of sowing and amount of fertilizer and irrigation in order to increase ecological sustainability, profitability and yield.	Follow scientific package of practices for castor cultivation.	Demonstrations will be laid out by DDA	Demonstrations proposed in the plan.

Activity Output Matrix				
Activity/Crop/Commodit	Issues	Mode of Action	Collaborator/Target	Cost
2. Green Manuring	The improvement in the productivity of crops and also an improvement in the soil health.	DDA will ensure the timely availability of green manure seed at 75 percent subsidy. Fifty percent area will be covered during the plan period of five years.	DDA Ten percent area will be covered.	Demonstrations proposed. The Govt. has to give 75 percent subsidy to purchase green manure seed for small and marginal farmers
3. Seed production	1. Seed planning	1. Production of released hybrids/varieties at farmers' field. 2. Motivating farmers to produce the seeds of suitable hybrids 3. Mandatory testing of new hybrids (variety through	DDAs in consultation with KVKs.	Project on Seed village concept proposed. Campaigns proposed
	2. Best quality seed	Seed production at farmers' field with farmers participatory, training of farmers for hybrid seed production techniques.	DDA and KVK.	Project proposed.
	3. Seed treatment	1. Motivating farmers for seed treatment 2. Demonstrations will be laid	DDA and KVK	Project and demonstration proposed.

Activity Output Matrix				
Activity/Crop/Commodit	Issues	Mode of Action	Collaborator/Target	Cost
4. Site-specific nutrient management	Number of split application and timing of top dressing with reference to irrigation	The project will identify, test and promote intervention for the sustainable mustard based cropping system through site-specific nutrient management. Fertilizer recommendation will be based on the principles of SSNM and soil test basis.	DDA and KVK will conduct the survey.	Demonstrations of doses of fertilizer application.
	Legume in the cropping rotation	Integrated soil and crop management for rehabilitation of legume production in mustard-based cropping system.	DDA will ensure quality seed of important legumes green gram for the summer season	The demonstration will be laid out on the green gram.
	Crop residue	Crop residue management for improving soil health. Improving the efficiency of nutrient utilization.	Machinery for uniform incorporation of residue will be ensured by DDA	Demonstrations proposed, Campaigns, field days
	Bio-fertilizers	Integrate chemical fertilizers with bio-fertilizers Improve the efficiency of chemical fertilizers	DDA will ensure the availability of quality bio-fertilizers	Demonstrations proposed under INM, free supply of bio fertilizer to the small and marginal farmers.

Activity Output Matrix				
Activity/Crop/Commodit	Issues	Mode of Action	Collaborator/Target	Cost
5. Integrated Weed Management (IWM)	Improper weed management	Demonstration of IWM methods at farmer's field.	DDA / KVK	Demonstration proposed.
6. Timely seeding	More insect and pest attack. Due to short winter period, there are chances to get low yield.	Extension and development agencies should approach in a farmers participatory approach for each of possible solution.	DDAs / KVK	Demonstrations proposed. Campaigns, hoarding/posters, field days, district level training camps

4.2.6.7 Recommended Interventions for the State with Detailed Action Plan with Costs:

The physical and finance requirements towards training, demonstrations on quality seeds, INM, RCTs, soil and water management, credit and market management etc are given in Table- 4.2.162. It is essential to make better use of given research in a sustainable manner for increased production, productivity and employment generation.

Table- 4.2.162 Training Proposed for Capacity Building of Agriculture Staff for Mustard

Crop	Training for Agricultural staff (state level) (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	14510.0	116.1	14510.0	116.1	14510.0	116.1	43530	348.3
Cooperative & NGOs	7710.0	61.7	7710.0	61.7	7710.0	61.7	23130	185.1
PRI Staff & Others	4175.0	33.4	4175.0	33.4	4175.0	33.4	12525	100.2
Total	26395	211.2	26395	211.2	26395	211.2	79185	633.6

Cost Norms: Rs. 800/ Trainee / Day

Table-4.2.163 District-wise Training Proposed for Capacity Building of Agriculture Staff for Mustard

Sr No	Name of the Districts	Training for Agricultural staff (District wise) (Phy-No. Fin- Rs. In Lakh)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		2017-18		(2018-19)		(2019-20)		2017-18		(2018-19)		(2019-20)		2017-18		(2018-19)		(2019-20)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
2	Amreli	450	3.6	450	3.6	450	3.6	-	-	-	-	-	-	-	-	-	-	-	-
3	Anand	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	200	1.6	200	1.6	200	1.6
4	Banaskantha	600	4.8	600	4.8	600	4.8	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4
5	Bharuch	500	4	500	4	500	4	300	2.4	300	2.4	300	2.4	100	0.8	100	0.8	100	0.8
6	Bhavnagar	550	4.4	550	4.4	550	4.4	-	-	-	-	-	-	-	-	-	-	-	-
7	Dahod	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
8	Dang	250	2	250	2	250	2	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
9	Gandhinagar	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	400	3.2	200	1.6	200	1.6	200	1.6
10	Jamnagar	200	1.6	200	1.6	200	1.6	150	1.2	150	1.2	150	1.2	150	1.2	150	1.2	150	1.2
11	Junagadh	700	5.6	700	5.6	700	5.6	-	-	-	-	-	-	-	-	-	-	-	-
12	Kachchh	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4	100	0.8	100	0.8	100	0.8
13	Kheda	510	4.08	510	4.08	510	4.08	510	4.0	510	4.0	510	4.0	200	1.6	200	1.6	200	1.6
14	Mehsana	450	3.6	450	3.6	450	3.6	450	3.6	450	3.6	450	3.6	225	1.8	225	1.8	225	1.8
15	Narmada	200	1.6	200	1.6	200	1.6	100	0.8	100	0.8	100	0.8	100	0.8	100	0.8	100	0.8
16	Navsari	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17	Panchmahal	500	4	500	4	500	4	200	1.6	200	1.6	200	1.6	--	--	--	--	--	--
18	Patan	350	2.8	350	2.8	350	2.8	350	2.8	350	2.8	350	2.8	175	1.4	175	1.4	175	1.4
19	Porbandar	150	1.2	150	1.2	150	1.2	-	-	-	-	-	-	-	-	-	-	-	-
20	Rajkot	500	4	500	4	500	4	250	2	250	2	250	2	250	2	250	2	250	2
21	Sabarkantha	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4	325	2.6	325	2.6	325	2.6
22	Surat	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8

Sr No	Name of the Districts	Training for Agricultural staff (District wise) (Phy-No. Fin- Rs. In Lakh)																	
		Agriculture						Cooperative & NGOs						PRI Staff & Others					
		2017-18		(2018-19)		(2019-20)		2017-18		(2018-19)		(2019-20)		2017-18		(2018-19)		(2019-20)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
23	Surendranagar	500	4	500	4	500	4	-	-	-	-	-	-	-	-	-	-	-	-
24	Tapi	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
25	Vadodara	1500	12	1500	12	1500	12	1000	8	1000	8	1000	8	500	4	500	4	500	4
26	Valsad	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
27	Aravalli																		
28	Morbi	350	2.8	350	2.8	350	2.8	350	2.8	350	2.8	350	2.8	175	1.4	175	1.4	175	1.4
29	DevbhumiDwark	150	1.2	150	1.2	150	1.2	-	-	-	-	-	-	-	-	-	-	-	-
30	Gir Somnath	500	4	500	4	500	4	250	2	250	2	250	2	250	2	250	2	250	2
31	Botad	600	4.8	600	4.8	600	4.8	300	2.4	300	2.4	300	2.4	325	2.6	325	2.6	325	2.6
32	Mahisagar	500	4	500	4	500	4	250	2	250	2	250	2	100	0.8	100	0.8	100	0.8
33	Chhotaudepur	500	4	500	4	500	4	-	-	-	-	-	-	-	-	-	-	-	-
	Total	14510.0	116.1	14510.	116.	14510.	116.	7710.	61.	7710.	61.	7710.	61.	4175.	33.	4175.	33.	4175.	33.

Table- 4.2.164 Training Proposed for Capacity Building of Farmers at District Level for Mustard

Cost Norms: Rs. 600/ Trainee / Day

Name of technology to be transferred	Year wise no. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		TOTAL	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
INM	2203	11.07	2203	11.07	2203	11.07	6609	33.21
NRM	2203	11.07	2203	11.07	2203	11.07	6609	33.21
IPM	2203	11.07	2203	11.07	2203	11.07	6609	33.21
RCTs	1986	10	1986	10	1986	10	5958	30
Water management	1547	7.75	1547	7.75	1547	7.75	4641	23.25

Post-Harvest Management	1111	5.63	1111	5.63	1111	5.63	3333	16.89
Women empowerment	333	1.73	333	1.73	333	1.73	999	5.19
Credit & marketing	120	0.61	110	0.55	110	0.55	340	1.71
Seed Production	145	0.76	145	0.76	145	0.76	435	2.28
Farm waste managt.	65	0.36	65	0.36	65	0.36	195	1.08
Vermicomposting	403	2.07	403	2.07	403	2.07	1209	6.21
Farm Mechanization	1128	5.79	1128	5.79	1128	5.79	3384	17.37
Renewable energy	174	0.89	174	0.89	174	0.89	522	2.67
Organic Farming	425	2.17	425	2.17	425	2.17	1275	6.51
IWM	1990	10.02	1990	10.02	1990	10.02	5970	30.06
Total	16036	80.99	16026	80.93	16026	80.93	48088	242.85

Table- 4.2.165 Districtwise Training Proposed for Capacity Building of Farmers for Mustard at District Level on Different

Technologies (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	INM				NRM				IPM			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	0.1	60	0.3	20	0.1	60	0.3	20	0.1	60	0.3
2	Amreli	0	0	0	0	0	0	0	0	0	0	0	0
3	Anand	30	0.15	90	0.45	30	0.15	90	0.45	30	0.15	90	0.45
4	Banaskantha	1125	5.63	3375	16.89	1125	5.63	3375	16.89	1125	5.63	3375	16.89
5	Bharuch	2	0.01	6	0.03	2	0.01	6	0.03	2	0.01	6	0.03
6	Bhavnagar	0	0	0	0	0	0	0	0	0	0	0	0
7	Dahod	0	0	0	0	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0	0	0	0	0
9	Gandhinagar	40	0.2	120	0.6	40	0.2	120	0.6	40	0.2	120	0.6
10	Jamnagar	2	0.01	6	0.03	2	0.01	6	0.03	2	0.01	6	0.03

Sr No	Name of the Districts	INM				NRM				IPM			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Junagadh	0	0	0	0	0	0	0	0	0	0	0	0
12	Kachchh	35	0.18	105	0.54	35	0.18	105	0.54	35	0.18	105	0.54
13	Kheda	197	0.99	591	2.97	197	0.99	591	2.97	197	0.99	591	2.97
14	Mehsana	248	1.24	744	3.72	248	1.24	744	3.72	248	1.24	744	3.72
15	Narmada	0	0	0	0	0	0	0	0	0	0	0	0
16	Navsari	0	0	0	0	0	0	0	0	0	0	0	0
17	Panchmahal	2	0.01	6	0.03	2	0.01	6	0.03	2	0.01	6	0.03
18	Patan	254	1.27	762	3.81	254	1.27	762	3.81	254	1.27	762	3.81
19	Porbandar	0	0	0	0	0	0	0	0	0	0	0	0
20	Rajkot	5	0.03	15	0.09	5	0.03	15	0.09	5	0.03	15	0.09
21	Sabarkantha	97	0.49	291	1.47	97	0.49	291	1.47	97	0.49	291	1.47
22	Surat	5	0.03	15	0.09	5	0.03	15	0.09	5	0.03	15	0.09
23	Surendranagar	12	0.06	36	0.18	12	0.06	36	0.18	12	0.06	36	0.18
24	<u>Tapi</u>	0	0	0	0	0	0	0	0	0	0	0	0
25	Vadodara	5	0.03	15	0.09	5	0.03	15	0.09	5	0.03	15	0.09
26	Valsad	0	0	0	0	0	0	0	0	0	0	0	0
27	Aravalli	5	0.03	15	0.09	5	0.03	15	0.09	5	0.03	15	0.09
28	Morbi	97	0.49	291	1.47	97	0.49	291	1.47	97	0.49	291	1.47
29	DevbhumiDwarka	5	0.03	15	0.09	5	0.03	15	0.09	5	0.03	15	0.09
30	Gir Somnath	12	0.06	36	0.18	12	0.06	36	0.18	12	0.06	36	0.18
31	Botad	0	0	0	0	0	0	0	0	0	0	0	0
32	Mahisagar	5	0.03	15	0.09	5	0.03	15	0.09	5	0.03	15	0.09
33	Chhotaudepur	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2203	11.07	6609	33.21	2203	11.07	6609	33.21	2203	11.07	6609	33.21

Cost Norms: Rs. 500/ Trainee / Day; Phy- No., Fin. - Rs in Lakh

Table- 4.2.165 Districtwise Training Proposed for Capacity Building of Farmers at District Level for Mustard on Different Technologies ...continue (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	RCT				Water management				Post-Harvest Management			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Phy	Phy	Fin	Phy	Fin	Phy	Phy	Fin	Phy
1	Ahmedabad	18	0.09	54	0.27	14	0.07	42	0.21	10	0.05	30	0.15
2	Amreli	0	0	0	0	0	0	0	0	0	0	0	0
3	Anand	27	0.14	81	0.42	21	0.11	63	0.33	15	0.08	45	0.24
4	Banaskantha	1012	5.06	3036	15.18	788	3.94	2364	11.82	563	2.82	1689	8.46
5	Bharuch	2	0.01	6	0.03	2	0.01	6	0.03	1	0.01	3	0.03
6	Bhavnagar	0	0	0	0	0	0	0	0	4	0.02	12	0.06
7	Dahod	0	0	0	0	0	0	0	0	0	0	0	0
8	Dang	0	0	0	0	0	0	0	0	0	0	0	0
9	Gandhinagar	36	0.18	108	0.54	28	0.14	84	0.42	20	0.1	60	0.3
10	Jamnagar	2	0.01	6	0.03	2	0.01	6	0.03	1	0.01	3	0.03
11	Junagadh	0	0	0	0	0	0	0	0	0	0	0	0
12	Kachchh	32	0.16	96	0.48	25	0.13	75	0.39	18	0.09	54	0.27
13	Kheda	177	0.89	531	2.67	138	0.69	414	2.07	99	0.5	297	1.5
14	Mehsana	223	1.12	669	3.36	174	0.87	522	2.61	124	0.62	372	1.86
15	Narmada	0	0	0	0	0	0	0	0	0	0	0	0
16	Navsari	0	0	0	0	0	0	0	0	0	0	0	0
17	Panchmahal	2	0.01	6	0.03	1	0.01	3	0.03	1	0.01	3	0.03
18	Patan	229	1.15	687	3.45	178	0.89	534	2.67	127	0.64	381	1.92
19	Porbandar	0	0	0	0	0	0	0	0	0	0	0	0
20	Rajkot	5	0.03	15	0.09	4	0.02	12	0.06	3	0.02	9	0.06
21	Sabarkantha	87	0.44	261	1.32	68	0.34	204	1.02	49	0.25	147	0.75
22	Surat	5	0.03	15	0.09	4	0.02	12	0.06	3	0.02	9	0.06

Sr No	Name of the Districts	RCT				Water management				Post-Harvest Management			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Phy	Phy	Fin	Phy	Fin	Phy	Phy	Fin	Phy
23	Surendranagar	11	0.06	33	0.18	8	0.04	24	0.12	6	0.03	18	0.09
24	Tapi	0	0	0	0	0	0	0	0	0	0	0	0
25	Vadodara	5	0.03	15	0.09	4	0.02	12	0.06	3	0.02	9	0.06
26	Valsad	0	0	0	0	0	0	0	0	0	0	0	0
27	Aravalli	5	0.03	15	0.09	4	0.02	12	0.06	3	0.02	9	0.06
28	Morbi	87	0.44	261	1.32	68	0.34	204	1.02	49	0.25	147	0.75
29	DevbhumiDwarka	5	0.03	15	0.09	4	0.02	12	0.06	3	0.02	9	0.06
30	Gir Somnath	11	0.06	33	0.18	8	0.04	24	0.12	6	0.03	18	0.09
31	Botad	0	0	0	0	0	0	0	0	0	0	0	0
32	Mahisagar	5	0.03	15	0.09	4	0.02	12	0.06	3	0.02	9	0.06
33	Chhotaudepur	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1986	10	5958	30	1547	7.75	4641	23.25	1111	5.63	3333	16.89

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.165 District-wise Training Proposed for Capacity Building of Farmers for Mustard at District Level on Different Technologies conti.. (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Women empowerment				Credit & marketing				Seed Production				Farm waste managt.			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	3	0.02	9	0.06	0	0.00	0	0.00	1	0.01	3	0.03	0	0	0	0.00
2	Amreli	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Anand	5	0.03	15	0.09	0	0.00	0	0.00	2	0.01	6	0.03	1	0.01	3	0.03

4	Banaskantha	169	0.85	507	2.55	60	0.30	180	0.90	70	0.35	210	1.05	35	0.18	105	0.54
5	Bharuch	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
6	Bhavnagar	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
7	Dahod	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
8	Dang	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Gandhinagar	6	0.03	18	0.09	0	0.00	0	0.00	5	0.03	15	0.09	1	0.01	3	0.03
10	Jamnagar	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
11	Junagadh	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
12	Kachchh	5	0.03	15	0.09	0	0.00	0	0.00	3	0.02	9	0.06	1	0.01	3	0.03
13	Kheda	30	0.15	90	0.45	10	0.05	30	0.15	15	0.08	45	0.24	6	0.03	18	0.09
14	Mehsana	37	0.19	111	0.57	15	0.08	45	0.24	15	0.08	45	0.24	7	0.04	21	0.12
15	Narmada	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
16	Navsari	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Panchmahal	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
18	Patan	38	0.19	114	0.57	15	0.08	45	0.24	20	0.1	60	0.30	8	0.04	24	0.12
19	Porbandar	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
20	Rajkot	1	0.01	3	0.03	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
21	Sabarkantha	15	0.08	45	0.24	10	0.05	30	0.15	6	0.03	18	0.09	3	0.02	9	0.06
22	Surat	1	0.01	3	0.03	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
23	Surendranagar	2	0.01	6	0.03	0	0.00	0	0.00	1	0.01	3	0.03	0	0	0	0.00
24	Tapi	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
25	Vadodara	1	0.01	3	0.03	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
26	Valsad	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Aravali	1	0.01	3	0.03	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
28	Morbi	15	0.08	45	0.24	10	0.05	30	0.15	6	0.03	18	0.09	3	0.02	9	0.06
29	DevbhumiDwarka	1	0.01	3	0.03	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Gir Somnath	2	0.01	6	0.03	0	0.00	0	0.00	1	0.01	3	0.03	0	0	0	0.00
31	Botad	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00

32	Mahisagar	1	0.01	3	0.03	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
33	Chhotaudepur	0	0	0	0	0	0.00	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total	333	1.73	999	5.19	120	0.61	360	1.83	145	0.76	435	2.28	65	0.36	195	1.08

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.165 District-wise Training Proposed for Capacity Building of Farmers for Mustard at District Level on Different Technologies Conti.... (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Vermi composting				Farm Mech.				Renewable energy			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Phy	Fin	Phy	Phy	Fin	Fin	Phy	Phy	Fin
1	Ahmedabad	4	0.02	12	0.06	10	0.05	30	0.15	2	0.01	6	0.03
2	Amreli	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Anand	5	0.03	15	0.09	15	0.08	45	0.24	2	0.01	6	0.03
4	Banaskantha	202	1.01	606	3.03	565	2.83	1695	8.49	90	0.45	270	1.35
5	Bharuch	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
6	Bhavnagar	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
7	Dahod	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
8	<u>Dang</u>	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Gandhinagar	7	0.04	21	0.12	20	0.1	60	0.30	3	0.02	9	0.06
10	Jamnagar	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
11	Junagadh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
12	Kachchh	6	0.03	18	0.09	20	0.1	60	0.30	3	0.02	9	0.06
13	Kheda	36	0.18	108	0.54	100	0.5	300	1.50	16	0.08	48	0.24
14	Mehsana	45	0.23	135	0.69	125	0.63	375	1.89	20	0.1	60	0.30
15	Narmada	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00

Sr No	Name of the Districts	Vermi composting				Farm Mech.				Renewable energy			
		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Phy	Fin	Phy	Phy	Fin	Fin	Phy	Phy	Fin
16	Navsari	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Panchmahal	0	0	0	0.00	1	0.01	3	0.03	0	0	0	0.00
18	Patan	46	0.23	138	0.69	130	0.65	390	1.95	20	0.1	60	0.30
19	Porbandar	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
20	Rajkot	1	0.01	3	0.03	5	0.03	15	0.09	0	0	0	0.00
21	Sabarkantha	20	0.1	60	0.30	50	0.25	150	0.75	8	0.04	24	0.12
22	Surat	1	0.01	3	0.03	5	0.03	15	0.09	0	0	0	0.00
23	Surendranagar	3	0.02	9	0.06	6	0.03	18	0.09	1	0.01	3	0.03
24	Tapi	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
25	Vadodara	1	0.01	3	0.03	5	0.03	15	0.09	0	0	0	0.00
26	Valsad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Aravali	1	0.01	3	0.03	5	0.03	15	0.09	0	0	0	0.00
28	Morbi	20	0.1	60	0.30	50	0.25	150	0.75	8	0.04	24	0.12
29	DevbhumiDwarka	1	0.01	3	0.03	5	0.03	15	0.09	0	0	0	0.00
30	Gir Somnath	3	0.02	9	0.06	6	0.03	18	0.09	1	0.01	3	0.03
31	Botad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Mahisagar	1	0.01	3	0.03	5	0.03	15	0.09	0	0	0	0.00
33	Chhotaudepur	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total	403	2.07	1209	6.21	1128	5.69	3384	17.07	174	0.89	522	2.67

Cost Norms: Rs. 500/ Trainee / Day

Table- 4.2.165 District-wise Training Proposed for Capacity Building of Farmers for Mustard at District Level on Different Technologies Conti... (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Organic Farming				IWM				Total			
		2017-18		2017-18 to 2019-		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Phy	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	5	0.03	15	0.09	20	0.1	60	0.30	143	0.72	429	2.16
2	Amreli	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Anand	5	0.03	15	0.09	28	0.14	84	0.42	213	1.07	639	3.21
4	Banaskantha	205	1.03	615	3.09	1010	5.05	3030	15.15	7936	39.68	23808	119.04
5	Bharuch	0	0	0	0.00	2	0.01	6	0.03	13	0.07	39	0.21
6	Bhavnagar	0	0	0	0.00	0	0	0	0.00	4	0.02	12	0.06
7	Dahod	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
8	Dang	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Gandhinagar	10	0.05	30	0.15	35	0.18	105	0.54	283	1.42	849	4.26
10	Jamnagar	0	0	0	0.00	2	0.01	6	0.03	13	0.07	39	0.21
11	Junagadh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
12	Kachchh	10	0.05	30	0.15	32	0.16	96	0.48	252	1.26	756	3.78
13	Kheda	35	0.18	105	0.54	175	0.88	525	2.64	1393	6.97	4179	20.91
14	Mehsana	45	0.23	135	0.69	225	1.13	675	3.39	1751	8.76	5253	26.28
15	Narmada	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
16	Navsari	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Panchmahal	0	0	0	0.00	5	0.03	15	0.09	16	0.08	48	0.24
18	Patan	50	0.25	150	0.75	230	1.15	690	3.45	1803	9.02	5409	27.06
19	Porbandar	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
20	Rajkot	0	0	0	0.00	5	0.03	15	0.09	39	0.2	117	0.60
21	Sabarkantha	20	0.1	60	0.30	87	0.44	261	1.32	689	3.45	2067	10.35
22	Surat	5	0.03	15	0.09	5	0.03	15	0.09	39	0.2	117	0.60
23	Surendranagar	5	0.03	15	0.09	11	0.06	33	0.18	86	0.43	258	1.29

Sr No	Name of the Districts	Organic Farming				IWM				Total			
		2017-18		2017-18 to 2019-		2017-18		2017-18 to 2019-20		2017-18		2017-18 to 2019-20	
		Phy	Fin	Phy	Phy	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Tapi	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
25	Vadodara	0	0	0	0.00	5	0.03	15	0.09	39	0.2	117	0.60
26	Valsad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Aravalli	0	0	0	0.00	5	0.03	15	0.09	39	0.2	117	0.60
28	Morbi	20	0.1	60	0.30	87	0.44	261	1.32	689	3.45	2067	10.35
29	DevbhumiDwarka	5	0.03	15	0.09	5	0.03	15	0.09	39	0.2	117	0.60
30	Gir Somnath	5	0.03	15	0.09	11	0.06	33	0.18	86	0.43	258	1.29
31	Botad	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Mahisagar	0	0	0	0.00	5	0.03	15	0.09	39	0.2	117	0.60
33	Chhotaudepur	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total	425	2.17	1275	6.51	1990	10.02	5970	30.06	15604	78.1	46812	234.3

Cost Norms: Rs. 500/ Trainee / Day; Phy- No., Fin. – Rs. in Lakh

Table- 4.2.166 District-wise Varietal Demonstration on Mustard

(Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise Varietal Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	18	0.9	18	0.9	18	0.9	54	2.7
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	28	1.4	28	1.4	28	1.4	84	4.2
4	Banaskantha	1124	56.2	1124	56.2	1124	56.2	3372	168.6
5	Bharuch	2	0.1	2	0.1	2	0.1	6	0.3
6	Bhavnagar	1	0.1	1	0.1	1	0.1	3	0.3
7	Dahod	1	0.1	1	0.1	1	0.1	3	0.3
8	Dang	0	0	0	0	0	0	0	0.0
9	Gandhinagar	41	2.1	41	2.1	41	2.1	123	6.3

Sr No	Name of the Districts	Year wise Varietal Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	Jamnagar	2	0.1	2	0.1	2	0.1	6	0.3
11	Junagadh	1	0.1	1	0.1	1	0.1	3	0.3
12	Kutch	35	1.8	35	1.8	35	1.8	105	5.4
13	Kheda	197	9.9	197	9.9	197	9.9	591	29.7
14	Mehsana	248	12.4	248	12.4	248	12.4	744	37.2
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	2	0.1	2	0.1	2	0.1	6	0.3
17	Panchmahal	2	0.1	2	0.1	2	0.1	6	0.3
18	Patan	254	12.7	254	12.7	254	12.7	762	38.1
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	5	0.3	5	0.3	5	0.3	15	0.9
21	Sabarkantha	97	4.9	97	4.9	97	4.9	291	14.7
22	Surat	2	0.1	2	0.1	2	0.1	6	0.3
23	Surendranagar	12	0.6	12	0.6	12	0.6	36	1.8
24	Tapi	0	0	0	0	0	0	0	0.0
25	Vadodara	4	0.2	4	0.2	4	0.2	12	0.6
26	Valsad	0	0	0	0	0	0	0	0.0
27	Aravalli	5	0.3	5	0.3	5	0.3	15	0.9
28	Morbi	97	4.9	97	4.9	97	4.9	291	14.7
29	DevbhumiDwarka	2	0.1	2	0.1	2	0.1	6	0.3
30	Gir Somnath	12	0.6	12	0.6	12	0.6	36	1.8
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	4	0.2	4	0.2	4	0.2	12	0.6
33	Chhotaudepur	0	0	0	0	0	0	0	0.0
	Total	2196	110.3	2196	110.3	2196	110.3	6588	330.9

Table- 4.2.167 Mustard Seed Planning/Seed Village Program (Seed Production Enhancement) (Phy-No. Fin- Rs. In Lakh)

Sr. No.	District	No. of Taluka	No. of Villages/	Seed rate kg/ha	Mustard Seed village programme (Seed production Enhancement)							
					2017-18		2018-19		2019-20		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
2	Amreli	11	22	3.5	33	1.65	33	1.65	33	1.65	99	4.95
3	Anand	8	16	3.5	24	1.2	24	1.2	24	1.2	72	3.6
4	Banaskantha	12	24	3.5	36	1.8	36	1.8	36	1.8	108	5.4
5	Bharuch	8	16	3.5	24	1.2	24	1.2	24	1.2	72	3.6
6	Bhavnagar	11	22	3.5	33	1.65	33	1.65	33	1.65	99	4.95
7	Dahod	7	14	3.5	21	1.05	21	1.05	21	1.05	63	3.15
8	Dang	1	2	3.5	3	0.15	3	0.15	3	0.15	9	0.45
9	Gandhinagar	4	8	3.5	12	0.6	12	0.6	12	0.6	36	1.8
10	Jamnagar	10	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
11	Junagadh	14	28	3.5	42	2.1	42	2.1	42	2.1	126	6.3
12	Kutch	10	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
13	Kheda	10	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
14	Mehsana	9	18	3.5	27	1.35	27	1.35	27	1.35	81	4.05
15	Narmada	4	8	3.5	12	0.6	12	0.6	12	0.6	36	1.8
16	Navsari	5	10	3.5	15	0.75	15	0.75	15	0.75	45	2.25
17	Panchmahal	11	22	3.5	33	1.65	33	1.65	33	1.65	99	4.95
18	Patan	8	16	3.5	24	1.2	24	1.2	24	1.2	72	3.6
19	Porbandar	3	6	3.5	9	0.45	9	0.45	9	0.45	27	1.35
20	Rajkot	14	28	3.5	42	2.1	42	2.1	42	2.1	126	6.3
21	Sabarkantha	13	26	3.5	39	1.95	39	1.95	39	1.95	117	5.85
22	Surat	10	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
23	Surendranagar	10	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
24	Tapi	5	10	3.5	15	0.75	15	0.75	15	0.75	45	2.25

Sr. No.	District	No. of Taluka	No. of Villages/	Seed rate kg/ha	Mustard Seed village programme (Seed production Enhancement)							
					2017-18		2018-19		2019-20		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Vadodara	12	24	3.5	36	1.8	36	1.8	36	1.8	108	5.4
26	Valsad	5	10	3.5	15	0.75	15	0.75	15	0.75	45	2.25
27	Aravalli	6	28	3.5	42	2.1	42	2.1	42	2.1	126	6.3
28	Morbi	5	26	3.5	39	1.95	39	1.95	39	1.95	117	5.85
29	DevbhumiDwark	4	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
30	Gir Somnath	6	20	3.5	30	1.5	30	1.5	30	1.5	90	4.5
31	Botad	4	10	3.5	15	0.75	15	0.75	15	0.75	45	2.25
32	Mahisagar	6	24	3.5	36	1.8	36	1.8	36	1.8	108	5.4
33	Chhotaudepur	6	10	3.5	15	0.75	15	0.75	15	0.75	45	2.25
	Total	225	450	115.5	882	44.1	882	44.1	882	44.1	2646	132.3

Table- 4.2.168 District-wise INM Demonstrations for Mustard (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise INM Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	18	0.36	18	0.36	18	0.36	54	1.1
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	28	0.56	28	0.56	28	0.56	84	1.7
4	Banaskantha	1124	22.48	1124	22.48	1124	22.48	3372	67.4
5	Bharuch	2	0.04	2	0.04	2	0.04	6	0.1
6	Bhavnagar	1	0.02	1	0.02	1	0.02	3	0.1
7	Dahod	1	0.02	1	0.02	1	0.02	3	0.1
8	Dang	0	0	0	0	0	0	0	0.0
9	Gandhinagar	41	0.82	41	0.82	41	0.82	123	2.5
10	Jamnagar	2	0.04	2	0.04	2	0.04	6	0.1

Sr No	Name of the Districts	Year wise INM Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Junagadh	1	0.02	1	0.02	1	0.02	3	0.1
12	Kutch	35	0.7	35	0.7	35	0.7	105	2.1
13	Kheda	197	3.94	197	3.94	197	3.94	591	11.8
14	Mehsana	248	4.96	248	4.96	248	4.96	744	14.9
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	2	0.04	2	0.04	2	0.04	6	0.1
17	Panchmahal	2	0.04	2	0.04	2	0.04	6	0.1
18	Patan	254	5.08	254	5.08	254	5.08	762	15.2
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	5	0.1	5	0.1	5	0.1	15	0.3
21	Sabarkantha	97	1.94	97	1.94	97	1.94	291	5.8
22	Surat	2	0.04	2	0.04	2	0.04	6	0.1
23	Surendranagar	12	0.24	12	0.24	12	0.24	36	0.7
24	<u>Tapi</u>	0	0	0	0	0	0	0	0.0
25	Vadodara	4	0.08	4	0.08	4	0.08	12	0.2
26	Valsad	0	0	0	0	0	0	0	0.0
27	Aravali	5	0.1	5	0.1	5	0.1	15	0.3
28	Morbi	97	1.94	97	1.94	97	1.94	291	5.8
29	DevbhumiDwarka	2	0.04	2	0.04	2	0.04	6	0.1
30	Gir Somnath	12	0.24	12	0.24	12	0.24	36	0.7
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	4	0.08	4	0.08	4	0.08	12	0.2
33	Chhotaudepur	0	0	0	0	0	0	0	0.0
	Total	2196	43.92	2196	43.92	2196	43.92	6588	131.76

Table- 4.2.169 District-wise Demonstrations on Resource Conservation Technologies for Mustard (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Laser levelling							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	70	3.5	70	3.5	70	3.5	210	10.5
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	5	0.25	5	0.25	5	0.25	15	0.75
4	Banaskantha	350	17.5	350	17.5	350	17.5	1050	52.5
5	Bharuch	15	0.75	15	0.75	15	0.75	45	2.25
6	Bhavnagar	1	0.05	1	0.05	1	0.05	3	0.15
7	Dahod	1	0.05	1	0.05	1	0.05	3	0.15
8	<u>Dang</u>	0	0	0	0	0	0	0	0
9	Gandhinagar	60	3	60	3	60	3	180	9
10	Jamnagar	30	1.5	30	1.5	30	1.5	90	4.5
11	Junagadh	5	0.25	5	0.25	5	0.25	15	0.75
12	Kutch	50	2.5	50	2.5	50	2.5	150	7.5
13	Kheda	275	13.75	275	13.75	275	13.75	825	41.25
14	Mehsana	185	9.25	185	9.25	185	9.25	555	27.75
15	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	25	1.25	25	1.25	25	1.25	75	3.75
18	Patan	262	13.1	262	13.1	262	13.1	786	39.3
19	Porbandar	10	0.5	10	0.5	10	0.5	30	1.5
20	Rajkot	30	1.5	30	1.5	30	1.5	90	4.5
21	Sabarkantha	150	7.5	150	7.5	150	7.5	450	22.5
22	Surat	5	0.25	5	0.25	5	0.25	15	0.75
23	Surendranagar	160	8	160	8	160	8	480	24
24	<u>Tapi</u>	1	0.05	1	0.05	1	0.05	3	0.15

Sr No	Name of the Districts	Laser levelling							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
25	Vadodara	50	2.5	50	2.5	50	2.5	150	7.5
26	Valsad	0	0	0	0	0	0	0	0
27	Aravalli	30	1.5	30	1.5	30	1.5	90	4.5
28	Morbi	150	7.5	150	7.5	150	7.5	450	22.5
29	Devbhumi Dwarka	5	0.25	5	0.25	5	0.25	15	0.75
30	Gir Somnath	160	8	160	8	160	8	480	24
31	Botad	1	0.05	1	0.05	1	0.05	3	0.15
32	Mahisagar	50	2.5	50	2.5	50	2.5	150	7.5
33	Chhotaudepur	0	0	0	0	0	0	0	0
	Total	2076	103.8	2076	103.8	2076	103.8	6438	321.9

Cost Norms: Rs 5000/ha demonstration area 0.40 ha C-DAP

Table- 4.2.169 District-wise Demonstrations on Resource Conservation Technologies for Mustard Continue

Sr No	Name of the Districts	Green manuring (Phy-No. Fin- Rs. In Lakh)							
		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	5	0.25	5	0.25	5	0.25	15	0.8
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	10	0.5	10	0.5	10	0.5	30	1.5
4	Banaskantha	225	11.25	225	11.25	225	11.25	675	33.8
5	Bharuch	10	0.5	10	0.5	10	0.5	30	1.5
6	Bhavnagar	10	0.5	10	0.5	10	0.5	30	1.5
7	Dahod	10	0.5	10	0.5	10	0.5	30	1.5
8	<u>Dang</u>	0	0	0	0	0	0	0	0.0
9	Gandhinagar	15	0.75	15	0.75	15	0.75	45	2.3

Sr No	Name of the Districts	Green manuring (Phy-No. Fin- Rs. In Lakh)							
		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	Jamnagar	10	0.5	10	0.5	10	0.5	30	1.5
11	Junagadh	10	0.5	10	0.5	10	0.5	30	1.5
12	Kutch	15	0.75	15	0.75	15	0.75	45	2.3
13	Kheda	50	2.5	50	2.5	50	2.5	150	7.5
14	Mehsana	60	3	60	3	60	3	180	9.0
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	0	--	0	--	0	--	0	--
17	Panchmahal	0	0	0	0	0	0	0	0.0
18	Patan	60	3	60	3	60	3	180	9.0
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	0	0	0	0	0	0	0	0.0
21	Sabarkantha	25	1.25	25	1.25	25	1.25	75	3.8
22	Surat	0	0	0	0	0	0	0	0.0
23	Surendranagar	10	0.5	10	0.5	10	0.5	30	1.5
24	<u>Tapi</u>	0	0	0	0	0	0	0	0.0
25	Vadodara	5	0.25	5	0.25	5	0.25	15	0.8
26	Valsad	0	--	0	--	0	--	0	--
27	Aravalli	0	0	0	0	0	0	0	0.0
28	Morbi	25	1.25	25	1.25	25	1.25	75	3.8
29	DevbhumiDwarka	0	0	0	0	0	0	0	0.0
30	Gir Somnath	10	0.5	10	0.5	10	0.5	30	1.5
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	5	0.25	5	0.25	5	0.25	15	0.8
33	Chhotaudepur	0	--	0	--	0	--	0	--
	Total	570	28.5	570	28.5	570	28.5	1710	85.9

Table- 4.2.170 District-wise Seed Treatment Demonstrations in Mustard

Sr No	Name of the Districts	Year wise Seed Treatment Demonstrations (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	0.2	20	0.2	20	0.2	60	0.6
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	30	0.3	30	0.3	30	0.3	90	0.9
4	Banaskantha	1125	11.25	1125	11.25	1125	11.25	3375	33.8
5	Bharuch	2	0.02	2	0.02	2	0.02	6	0.1
6	Bhavnagar	0	0	0	0	0	0	0	0.0
7	Dahod	0	0	0	0	0	0	0	0.0
8	<u>Dang</u>	0	0	0	0	0	0	0	0.0
9	Gandhinagar	40	0.4	40	0.4	40	0.4	120	1.2
10	Jamnagar	2	0.02	2	0.02	2	0.02	6	0.1
11	Junagadh	0	0	0	0	0	0	0	0.0
12	Kutch	35	0.35	35	0.35	35	0.35	105	1.1
13	Kheda	197	1.97	197	1.97	197	1.97	591	5.9
14	Mehsana	248	2.48	248	2.48	248	2.48	744	7.4
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	0	0	0	0	0	0	0	0.0
17	Panchmahal	2	0.02	2	0.02	2	0.02	6	0.1
18	Patan	254	2.54	254	2.54	254	2.54	762	7.6
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	5	0.05	5	0.05	5	0.05	15	0.2
21	Sabarkantha	97	0.97	97	0.97	97	0.97	291	2.9
22	Surat	5	0.05	5	0.05	5	0.05	15	0.2
23	Surendranagar	12	0.12	12	0.12	12	0.12	36	0.4
24	<u>Tapi</u>	0	0	0	0	0	0	0	0.0

Sr No	Name of the Districts	Year wise Seed Treatment Demonstrations (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Vadodara	5	0.05	5	0.05	5	0.05	15	0.2
26	Valsad	0	0	0	0	0	0	0	0.0
27	Aravalli	5	0.05	5	0.05	5	0.05	15	0.2
28	Morbi	97	0.97	97	0.97	97	0.97	291	2.9
29	DevbhumiDwarka	5	0.05	5	0.05	5	0.05	15	0.2
30	Gir Somnath	12	0.12	12	0.12	12	0.12	36	0.4
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	5	0.05	5	0.05	5	0.05	15	0.2
33	Chhotaudepur	0	0	0	0	0	0	0	0.0
	Total	2203	22.03	2203	22.03	2203	22.03	6609	66.1

Cost norms Rs.1000/- per demonstration area 0.40 ha

Table- 4.2.171 District-wise Organic Farming Demonstration in Mustard

Sr No	Name of the Districts	Year wise Organic Farming Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	18	0.1	18	0.1	18	0.1	54	0.3
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	30	0.15	30	0.15	30	0.15	90	0.5
4	Banaskantha	1010	5.63	1010	5.63	1010	5.63	3030	16.9
5	Bharuch	2	0.01	2	0.01	2	0.01	6	0.0
6	Bhavnagar	0	0	0	0	0	0	0	0.0
7	Dahod	0	0	0	0	0	0	0	0.0
8	<u>Dang</u>	0	0	0	0	0	0	0	0.0
9	Gandhinagar	40	0.2	40	0.2	40	0.2	120	0.6
10	Jamnagar	0	0.01	0	0.01	0	0.01	0	0.0

Sr No	Name of the Districts	Year wise Organic Farming Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Junagadh	0	0	0	0	0	0	0	0.0
12	Kachchh	30	0.18	30	0.18	30	0.18	90	0.5
13	Kheda	180	0.99	180	0.99	180	0.99	540	3.0
14	Mehsana	225	1.24	225	1.24	225	1.24	675	3.7
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	0	0	0	0	0	0	0	0.0
17	Panchmahal	5	0.01	5	0.01	5	0.01	15	0.0
18	Patan	230	1.27	230	1.27	230	1.27	690	3.8
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	5	0.03	5	0.03	5	0.03	15	0.1
21	Sabarkantha	90	0.49	90	0.49	90	0.49	270	1.5
22	Surat	5	0.03	5	0.03	5	0.03	15	0.1
23	Surendranagar	10	0.06	10	0.06	10	0.06	30	0.2
24	Tapi	0	0	0	0	0	0	0	0.0
25	Vadodara	5	0.03	5	0.03	5	0.03	15	0.1
26	Valsad	0	0	0	0	0	0	0	0.0
27	Aravalli	5	0.03	5	0.03	5	0.03	15	0.1
28	Morbi	90	0.49	90	0.49	90	0.49	270	1.5
29	DevbhumiDwarka	5	0.03	5	0.03	5	0.03	15	0.1
30	Gir Somnath	10	0.06	10	0.06	10	0.06	30	0.2
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	5	0.03	5	0.03	5	0.03	15	0.1
33	Chhotaudepur	0	0	0	0	0	0	0	0.0
	Total	2000	11.07	2000	11.07	2000	11.07	6000	33.2

Cost Norms: Rs 5000/0.4 ha (demonstration)

Table- 4.2.172 District-wise Bio-fertilizer and bio-compost Demonstration for Mustard

Sr No	Name of the Districts	Year wise Bio-fertilizer and bio-compost Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	18	0.1	18	0.1	18	0.1	54	0.3
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	30	0.15	30	0.15	30	0.15	90	0.5
4	Banaskantha	1010	5.63	1010	5.63	1010	5.63	3030	16.9
5	Bharuch	2	0.01	2	0.01	2	0.01	6	0.0
6	Bhavnagar	0	0	0	0	0	0	0	0.0
7	Dahod	0	0	0	0	0	0	0	0.0
8	<u>Dang</u>	0	0	0	0	0	0	0	0.0
9	Gandhinagar	40	0.2	40	0.2	40	0.2	120	0.6
10	Jamnagar	0	0.01	0	0.01	0	0.01	0	0.0
11	Junagadh	0	0	0	0	0	0	0	0.0
12	Kachchh	30	0.18	30	0.18	30	0.18	90	0.5
13	Kheda	180	0.99	180	0.99	180	0.99	540	3.0
14	Mehsana	225	1.24	225	1.24	225	1.24	675	3.7
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	0	0	0	0	0	0	0	0.0
17	Panchmahal	5	0.01	5	0.01	5	0.01	15	0.0
18	Patan	230	1.27	230	1.27	230	1.27	690	3.8
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	5	0.03	5	0.03	5	0.03	15	0.1
21	Sabarkantha	90	0.49	90	0.49	90	0.49	270	1.5
22	Surat	5	0.03	5	0.03	5	0.03	15	0.1
23	Surendranagar	10	0.06	10	0.06	10	0.06	30	0.2
24	<u>Tapi</u>	0	0	0	0	0	0	0	0.0

Sr No	Name of the Districts	Year wise Bio-fertilizer and bio-compost Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Vadodara	5	0.03	5	0.03	5	0.03	15	0.1
26	Valsad	0	0	0	0	0	0	0	0.0
27	Aravalli	5	0.03	5	0.03	5	0.03	15	0.1
28	Morbi	90	0.49	90	0.49	90	0.49	270	1.5
29	DevbhumiDwarka	5	0.03	5	0.03	5	0.03	15	0.1
30	Gir Somnath	10	0.06	10	0.06	10	0.06	30	0.2
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	5	0.03	5	0.03	5	0.03	15	0.1
33	Chhotaudepur	0	0	0	0	0	0	0	0.0
	Total	2000	11.07	2000	11.07	2000	11.07	6000	33.2

Cost Norms: Rs 5000/0.4 ha (demonstration)

Table- 4.2.173 District-wise IWM Demonstration for Mustard

Sr No	Name of the Districts	Year wise IWM Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	18	0.1	18	0.1	18	0.1	54	0.3
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	30	0.15	30	0.15	30	0.15	90	0.5
4	Banaskantha	1010	5.63	1010	5.63	1010	5.63	3030	16.9
5	Bharuch	2	0.01	2	0.01	2	0.01	6	0.0
6	Bhavnagar	0	0	0	0	0	0	0	0.0
7	Dahod	0	0	0	0	0	0	0	0.0
8	<u>Dang</u>	0	0	0	0	0	0	0	0.0
9	Gandhinagar	40	0.2	40	0.2	40	0.2	120	0.6

Sr No	Name of the Districts	Year wise IWM Demonstration (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	Jamnagar	0	0.01	0	0.01	0	0.01	0	0.0
11	Junagadh	0	0	0	0	0	0	0	0.0
12	Kachchh	30	0.18	30	0.18	30	0.18	90	0.5
13	Kheda	180	0.99	180	0.99	180	0.99	540	3.0
14	Mehsana	225	1.24	225	1.24	225	1.24	675	3.7
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	0	0	0	0	0	0	0	0.0
17	Panchmahal	5	0.01	5	0.01	5	0.01	15	0.0
18	Patan	230	1.27	230	1.27	230	1.27	690	3.8
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	5	0.03	5	0.03	5	0.03	15	0.1
21	Sabarkantha	90	0.49	90	0.49	90	0.49	270	1.5
22	Surat	5	0.03	5	0.03	5	0.03	15	0.1
23	Surendranagar	10	0.06	10	0.06	10	0.06	30	0.2
24	<u>Tapi</u>	0	0	0	0	0	0	0	0.0
25	Vadodara	5	0.03	5	0.03	5	0.03	15	0.1
26	Valsad	0	0	0	0	0	0	0	0.0
27	Aravalli	5	0.03	5	0.03	5	0.03	15	0.1
28	Morbi	90	0.49	90	0.49	90	0.49	270	1.5
29	DevbhumiDwarka	5	0.03	5	0.03	5	0.03	15	0.1
30	Gir Somnath	10	0.06	10	0.06	10	0.06	30	0.2
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	5	0.03	5	0.03	5	0.03	15	0.1
33	Chhotaudepur	0	0	0	0	0	0	0	0.0
	Total	2000	11.07	2000	11.07	2000	11.07	6000	33.2

Table- 4.2.174 District-wise Farmer Field Schools Covering Identified Critical Technologies for Mustard Crop

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2	0.4	2	0.4	2	0.4	6	1.2
2	Amreli	0	0	0	0	0	0	0	0.0
3	Anand	2	0.4	2	0.4	2	0.4	6	1.2
4	Banaskantha	56	11.2	56	11.2	56	11.2	168	33.6
5	Bharuch	0	0	0	0	0	0	0	0.0
6	Bhavnagar	0	0	0	0	0	0	0	0.0
7	Dahod	0	0	0	0	0	0	0	0.0
8	Dang	0	0	0	0	0	0	0	0.0
9	Gandhinagar	2	0.4	2	0.4	2	0.4	6	1.2
10	Jamnagar	0	0	0	0	0	0	0	0.0
11	Junagadh	0	0	0	0	0	0	0	0.0
12	Kutch	2	0.4	2	0.4	2	0.4	6	1.2
13	Kheda	10	2	10	2	10	2	30	6.0
14	Mehsana	12	2.4	12	2.4	12	2.4	36	7.2
15	Narmada	0	0	0	0	0	0	0	0.0
16	Navsari	0	0	0	0	0	0	0	0.0
17	Panchmahal	0	0	0	0	0	0	0	0.0
18	Patan	13	2.6	13	2.6	13	2.6	39	7.8
19	Porbandar	0	0	0	0	0	0	0	0.0
20	Rajkot	0	0	0	0	0	0	0	0.0
21	Sabarkantha	5	1	5	1	5	1	15	3.0
22	Surat	0	0	0	0	0	0	0	0.0
23	Surendranagar	1	0.2	1	0.2	1	0.2	3	0.6
24	Tapi	0	0	0	0	0	0	0	0.0
25	Vadodara	1	0.2	1	0.2	1	0.2	3	0.6
26	Valsad	0	0	0	0	0	0	0	0.0

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
27	Aravalli	0	0	0	0	0	0	0	0.0
28	Morbi	5	1	5	1	5	1	15	3.0
29	DevbhumiDwarka	0	0	0	0	0	0	0	0.0
30	Gir Somnath	1	0.2	1	0.2	1	0.2	3	0.6
31	Botad	0	0	0	0	0	0	0	0.0
32	Mahisagar	1	0.2	1	0.2	1	0.2	3	0.6
33	Chhotaudepur	0	0	0	0	0	0	0	0.0
	Total	113	22.6	113	22.6	113	22.6	339	67.8

Cost Norms: Rs. 20,000/- per School

Table- 4.2.175 District-wise Group Formation / Commodity Interest Groups Formation for Specific Activities for Mustard

(Phy-No. Fin- Rs. In Lakh)

Sr. No.	Name of the Districts	Seed Production				Organic Farming				Value addition			
		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2	0.4	6	1.2	0	0	0	0.0	0	0	0	0.0
2	Amreli	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
3	Anand	3	0.6	9	1.8	2	0.4	6	1.2	1	0.2	3	0.6
4	Banaskantha	110	22	330	66.0	40	8	120	24.0	40	8	120	24.0
5	Bharuch	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
6	Bhavnagar	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
7	Dahod	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
8	<u>Dang</u>	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
9	Gandhinagar	5	1	15	3.0	2	0.4	6	1.2	2	0.4	6	1.2
10	Jamnagar	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
11	Junagadh	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
12	Kutch	5	1	15	3.0	2	0.4	6	1.2	2	0.4	6	1.2
13	Kheda	20	4	60	12.0	7	1.4	21	4.2	10	2	30	6.0
14	Mehsana	25	5	75	15.0	10	2	30	6.0	10	2	30	6.0
15	Narmada	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
16	Navsari	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
17	Panchmahal	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
18	Patan	25	5	75	15.0	10	2	30	6.0	10	2	30	6.0
19	Porbandar	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
20	Rajkot	1	0.2	3	0.6	1	0.2	3	0.6	0	0	0	0.0
21	Sabarkantha	10	2	30	6.0	5	1	15	3.0	5	1	15	3.0
22	Surat	1	0.2	3	0.6	0	0	0	0.0	0	0	0	0.0
23	Surendranagar	2	0.4	6	1.2	1	0.2	3	0.6	1	0.2	3	0.6

Sr. No.	Name of the Districts	Seed Production				Organic Farming				Value addition			
		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Tapi	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
25	Vadodara	1	0.2	3	0.6	0	0	0	0.0	0	0	0	0.0
26	Valsad	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
27	Aravalli	1	0.2	3	0.6	1	0.2	3	0.6	0	0	0	0.0
28	Morbi	10	2	30	6.0	5	1	15	3.0	5	1	15	3.0
29	DevbhumiDwarka	1	0.2	3	0.6	0	0	0	0.0	0	0	0	0.0
30	Gir Somnath	2	0.4	6	1.2	1	0.2	3	0.6	1	0.2	3	0.6
31	Botad	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
32	Mahisagar	1	0.2	3	0.6	0	0	0	0.0	0	0	0	0.0
33	Chhotaudepur	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
	Total	225	45	675	135	87	17.5	261	52.2	87	17.5	261	52.2

Cost Norms: Rs.0.20 lacs/group (for capacity building, input assistance, marketing and for group-specific activities)

Table- 4.2.175 District-wise Group Formation / Commodity Interest Groups Formation for Specific Activities for Mustard Conti..

Sr. No.	Name of the Districts	Specific Crop group				Total			
		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2	0.4	6	1.2	4	0.8	12	2.4
2	Amreli	0	0	0	0.0	0	0	0	0.0
3	Anand	5	1	15	3.0	11	2.2	33	6.6
4	Banaskantha	75	15	225	45.0	265	53	795	159.0
5	Bharuch	0	0	0	0.0	0	0	0	0.0
6	Bhavnagar	0	0	0	0.0	0	0	0	0.0
7	Dahod	0	0	0	0.0	0	0	0	0.0
8	Dang	0	0	0	0.0	0	0	0	0.0

Sr. No.	Name of the Districts	Specific Crop group				Total			
		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
9	Gandhinagar	5	1	15	3.0	14	2.8	42	8.4
10	Jamnagar	0	0	0	0.0	0	0	0	0.0
11	Junagadh	0	0	0	0.0	0	0	0	0.0
12	Kutch	5	1	15	3.0	14	2.8	42	8.4
13	Kheda	15	3	45	9.0	52	10.4	156	31.2
14	Mehsana	20	4	60	12.0	65	13	195	39.0
15	Narmada	0	0	0	0.0	0	0	0	0.0
16	Navsari	0	0	0	0.0	0	0	0	0.0
17	Panchmahal	0	0	0	0.0	0	0	0	0.0
18	Patan	20	4	60	12.0	65	13	195	39.0
19	Porbandar	0	0	0	0.0	0	0	0	0.0
20	Rajkot	0	0	0	0.0	2	0.4	6	1.2
21	Sabarkantha	10	2	30	6.0	30	6	90	18.0
22	Surat	0	0	0	0.0	1	0.2	3	0.6
23	Surendranagar	1	0.2	3	0.6	5	1	15	3.0
24	<u>Tapi</u>	0	0	0	0.0	0	0	0	0.0
25	Vadodara	0	0	0	0.0	1	0.2	3	0.6
26	Valsad	0	0	0	0.0	0	0	0	0.0
27	Aravalli	0	0	0	0.0	2	0.4	6	1.2
28	Morbi	10	2	30	6.0	30	6	90	18.0
29	DevbhumiDwarka	0	0	0	0.0	1	0.2	3	0.6
30	Gir Somnath	1	0.2	3	0.6	5	1	15	3.0
31	Botad	0	0	0	0.0	0	0	0	0.0
32	Mahisagar	0	0	0	0.0	1	0.2	3	0.6
33	Chhotaudepur	0	0	0	0.0	0	0	0	0.0

Sr. No.	Name of the Districts	Specific Crop group				Total			
		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Total	169	33.8	507	101.4	568	113.6	1704	340.8

4.2.6.8 Researchable Issues:

- Need to study suitable changes in agronomical practices due to weather effects
- New agricultural practices to adjust with the climatic variations
- Scheduling of nutrients for increasing fertilizer use efficiency while reducing cost
- Market research combined with weather changes for deciding the crop area for a season
- Small equipment so as to reduce harvest losses and value addition in the post-harvest produce
- To deal with insect, pest and diseases in newly released varieties

4.2.7 Pulse Crops:

4.2.7.1 Background:

In Gujarat state, pulse crops are cultivated in *kharif*, *rabi* and summer seasons. The total area under pulse crops is hovering around nine lakh hectares. Kharif pulse crops viz., Pigeon pea, Mung bean, Urd bean, Cowpea and Moth bean require warm climate throughout growing season of the crop. Major *rabi* pulses like Gram require mild cold climate during sowing period, cold climate during vegetative to pod development and warm climate during maturity / harvesting. For summer pulses, the crops require warm climate. The pulse crops are normally grown in all agro ecological zones of the Gujarat state. However, long duration crop like Pigeon pea is commands major area as sole crop in high rainfall zone i.e., South Gujarat. Crops like Guar and Moth bean is drought hardy hence spread arid and semi-arid zone of the state, while, the short duration crops like Mung bean, Urd bean and Cowpea grown throughout the state. The productivity of pulse crops in Gujarat is higher than the national average. The major emphasis and thrust is to increase pulses area for which centrally sponsored scheme like national food security mission and Accelerated Pulses Production Programme (A3P) are begin implemented. The state has wide range of cropping systems like Pigeon pea + Groundnut (1:3 ratio), Pigeon pea + Cotton (1:1 ratio), Pigeon pea + Soybean (2:2 ratio), Moong-Pulses/Barley, Pearl millets + moth bean (2:1), Maize + moth bean (4:4), Crop is grown as pure crop as well as mixed crop with sorghum, pearl millet, pigeon pea, sesame or niger, Kharif fallow–Gram. Based on the climatic condition different pulse crops are grown in different regions of Gujarat State.

Vision:

Self-sufficiency and sustainable production of pulse crops, so as to achieve food and nutritional security.

Mission:

To bridge yield gaps between potential yield and farmer's yield through integrated crop management. Promotions of pulses as inter crops to bring more area under pulses cultivation.

Table- 4.2.176 Important Pulse Crops of Gujarat and Growing Season

Sr.	Crop	Crop seasons	Temperature	Major growing Districts
1	Pigeonpea	<i>Kharif</i>	28-35 °C	Bharuch, Dahod, Narmada,
2	Urdbean	<i>Kharif</i>	28-35 °C	Patan, Vadodara,
3	Mungbean	<i>Kharif</i>	28-35 °C	Banaskantha, Mahesana,
4	Cowpea	<i>Kharif</i>	28-35 °C	North and Middle Gujarat
5	Mothbean	<i>Kharif</i>	28-35 °C	Kutch, Banaskantha, Patan
6	Horsegram	<i>Kharif</i>	28-35 °C	Tribal areas

7	Fieldpea	Rabi	15-25 °C	Limited area
8	Rajmash	Rabi	15-25 °C	Limited area
9	Chickpea	Rabi	15-25 °C	Dahod, Jamnagar,
10	Indianbean	Rabi	15-25 °C	South and Middle Gujarat
11	Mungbean	Summer	25-40 °C	Banaskantha, Mahesana,
12	Cowpea	Summer	25-40 °C	North and Middle Gujarat
13	Guar	<i>Kharif</i> and	28-35 °C	Banaskantha, Kutch, Patan,

4.2.7.2 Crop area Issues:

- Since pulse crops are less remunerative, the area of traditional pulses are being replaced by cash crops like cotton.
- Generally, the pulses are grown on poor fertility soils and under harsher environments. Most of the area under pulses in the state is rainfed coupled with poor management.
- Sensitive to environment and unsuitable yield: Unpredictable environment coupled with extreme temperature effect on grain production in pulses.
- The poor yields in pulses can be attributed to lower rate of seed replacement because of non-availability of high yielding varieties.
- About 20-30 percent post-harvest losses occur because of lack of efficient and suitable harvesting and threshing equipments. Store grain pests also cause considerable losses during storage.
- The wide fluctuation in price is mainly due to unorganized market and insufficient storage.
- Poor availability of critical inputs: The critical inputs like bio-fertilizers bio-pesticides and micro-nutrients are not made available timely.

4.2.7.3 Priority for Comprehensive Pulse Cultivation:

State Priorities:

- Conversions of various pulses mission mode projects like NFSM, Accelerated Pulses Production Programme (A3P) and RKVY projects
- Development of high yielding varieties in pulse crops suitable to different agro climatic and resistance to biotic and a-biotic factors
- Promotion of *Rhizobacteria* and PSB to enhance productivity levels
- Seed production activity under seed village concept
- Popularization of soil moisture conservation techniques for pulse under dry land agriculture
- Promotion of pulses for organic farming
- Promotion of micro-irrigation system in pulses
- Market development for crops like Rajmash and Field pea
- Area expansion pulses through inter crops

- Monitoring of pulse crops for new emerging diseases and pes.

4.2.7.4 Current Status of Area, Production and Productivity:

The District-wise area, production and productivity under pulses crop in different years is given in Tables from 4.2.177 to 4.2.190.

Table- 4.2.177 Area, Production and Productivity of Pulses of the State during 2009-10

Sr	Districts	Kharif			Rabi			Total		
		Area	Product	Producti	Area	Product	Producti	Area	Product	Producti
1	Ahmedab	108	65	602	44	25	568	152	90	592.1
2	Anand	18	13	722	43	28	651	61	41	672.1
3	Banaskan	341	125	367	2	2	944	343	127	370.2
4	Bharuch	711	457	643	49	40	816	760	497	653.9
5	Dahod	223	155	695	44	324	726	669	479	715.9
6	Dang	83	65	783	33	25	757	116	90	775.8
7	Gandhina	130	83	638	0	0	0	130	83	638.4
8	Kheda	48	24	500	7	6	944	55	30	545.4
9	Mehsana	269	114	424	2	2	944	271	116	428.0
10	Narmada	199	204	1025	9	9	944	208	213	1024.
11	Navsari	96	69	719	61	51	836	157	120	764.3
12	Panchma	336	338	1006	10	81	801	437	419	958.8
13	Patan	359	95	265	20	11	538	379	106	279.6
14	Sabarkant	354	198	559	41	29	689	395	227	574.6
15	Surat	146	198	1356	10	8	800	156	206	1320.
16	Tapi	210	32	629	37	38	1027	247	70	283.4
17	Vadodara	886	850	959	23	22	944	909	872	959.3
18	Valsad	105	58	552	87	67	770	192	125	651.0
19	Amreli	77	40	519	18	21	153	95	61	642.1
20	Bhavnaga	57	28	491	5	4	944	62	32	516.1
21	Jamnagar	49	45	918	22	338	1474	278	383	1377.
22	Junagadh	61	35	574	70	96	1371	131	131	1000.
23	Kutch	783	324	414	2	2	944	785	326	415.2
24	Porbanda	4	2	500	74	77	1040	78	79	1012.
25	Rajkot	144	66	458	49	69	1415	193	135	699.4
26	Surendra	27	11	407	72	30	415	99	41	414.1
	Total	582	3694	16725	153	1405	21455	735	5099	

Source: Directorate of Agriculture, Gandhinagar

Table- 4.2.178 Present Status of Area, Production and Productivity of Pulses of the State during 2010-11

Sr. No.	Districts	Kharif			Rabi			Total		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
1	Ahmedabad	132	75	568	44	33	750	176	108	613.64
2	Anand	33	17	515	31	20	645	64	37	578.13
3	Banaskantha	354	259	732	9	12	1333	363	271	746.56
4	Bharuch	719	650	904	65	54	831	784	704	897.96
5	Dahod	226	220	973	507	418	821	733	638	870.40
6	Dang	82	47	573	43	40	930	125	87	696.00
7	Gandhinagar	55	36	655	1	1	1000	56	37	660.71
8	Kheda	62	43	694	9	13	1444	71	56	788.73
9	Mehsana	261	149	571	6	7	1167	267	156	584.27
10	Narmada	184	159	864	5	7	1400	189	166	878.31
11	Navsari	96	77	802	62	63	1016	158	140	886.08
12	Panchmahal	306	398	1301	117	101	863	423	499	1179.67
13	Patan	287	151	526	122	85	697	409	236	577.02
14	Sabarkantha	347	215	620	23	24	1043	370	239	645.95
15	Surat	172	178	1035	13	16	1231	185	194	1048.65
16	Tapi	218	134	615	46	51	1109	264	185	700.76
17	Vadodara	930	958	1030	15	20	1333	945	978	1034.92
18	Valsad	117	72	615	62	50	806	179	122	681.56
19	Amreli	75	42	560	24	35	1458	99	77	777.78
20	Bhavnagar	72	41	569	26	36	1385	98	77	785.71
21	Jamnagar	92	35	380	240	370	1542	332	405	1219.88
22	Junagadh	103	65	531	103	182	1767	206	247	1199.03
23	Kutch	939	448	477	4	5	1250	943	453	480.38
24	Porbandar	16	9	563	114	153	1342	130	162	1246.15
25	Rajkot	145	80	552	88	121	1375	233	201	862.66
26	Surendranagar	103	46	447	215	263	1218	318	309	971.70
Total		6126	4604	17672	1994	2180	29756	8120	6784	

Table- 4.2.179 Present Status of Area, Production and Productivity of Pulses of the State during 2011-12

Sr.	Districts	Area			Production			Productivity			Total		
		K	R	S	K	R	S	K	R	S	A	P	Y
1	Ahmedabad	162	297	4	94	208	3	580	700	750	463	305	659
2	Amreli	47	26	22	32	38	12	681	1462	545	95	82	863
3	Anand	13	26	33	11	17	19	846	654	576	72	47	653
4	Aravalli	0	0	0	0	0	0	0	0	0	0	0	0
5	Banaskantha	477	4	26	286	5	18	600	1250	692	507	309	609
6	Bharuch	520	113	27	443	96	14	852	850	519	660	553	838
7	Bhavnagar	68	15	16	43	15	9	632	1000	563	99	67	677
8	Botad	0	0	0	0	0	0	0	0	0	0	0	0
9	Chhota Udaipur	0	0	0	0	0	0	0	0	0	0	0	0
10	Dahod	253	512	21	267	508	8	1055	992	381	786	783	996
11	Dang	113	178	5	84	187	2	743	1051	400	296	273	922
12	DevbhoomiDwarka	0	0	0	0	0	0	0	0	0			0
13	Gandhinagar	113	0	2	60	0	1	531	-	500	115	61	530
14	Gir Somnath	0	0	0	0	0	0	0	0	0	0	0	0
15	Jamnagar	65	239	87	39	337	47	600	1410	540	391	423	1082
16	Junagadh	104	137	60	77	280	30	740	2047	500	301	387	1286
17	Kutch	1322	11	15	509	10	8	385	909	533	1348	527	391
18	Kheda	41	8	6	38	10	3	927	1250	500	55	51	927
19	Mahisagar	0	0	0	0	0	0	0	0	0	0	0	0
20	Mehsana	203	3	5	106	4	3	522	1418	600	211	113	536
21	Morbi	0	0	0	0	0	0	0	0	0	0	0	0
22	Narmada	248	40	30	229	43	12	923	1075	400	318	284	893
23	Navsari	68	33	19	34	31	11	500	939	579	120	76	633
24	Panchmahal	251	95	42	337	85	19	1343	895	452	388	441	1137
25	Patan	220	190	0	114	122	0	518	642	0	410	236	576

Sr.	Districts	Area			Production			Productivity			Total		
		K	R	S	K	R	S	K	R	S	A	P	Y
26	Porbandar	38	189	59	24	241	25	632	1275	424	286	290	1014
27	Rajkot	98	107	7	69	153	4	704	1430	571	212	226	1066
28	Sabarkantha	243	45	77	190	39	48	782	867	623	365	277	759
29	Surat	215	13	90	161	13	47	749	1000	522	318	221	695
30	Surendranagar	82	216	5	51	314	3	622	1454	600	303	368	1215
31	Tapi	196	59	53	129	71	20	656	1203	377	308	220	714
32	Vadodara	922	37	11	1011	41	7	1097	1108	636	970	1059	1092
33	Valsad	123	46	3	77	43	1	626	935	333	172	121	703
Total		6205	2639	725	4515	2911	374	18846	27816	13116	9569	7800	

Source: Directorate of Agriculture, Gandhinagar

Table 4.2.180 Statement showing district-wise Area, Production and Yield of Total Pulses in Gujarat state based on Final Forecast reports for the year 2012-13. (Area in 00 Ha., Production in 00 M.T., Yield in Kg/Ha)

No	District	2012-13											
		Kharif			Rabi			Summer			Total		
		AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
1	Ahmedabad	76	37	484	157	113	720	5	3	461	239	153	638
2	Anand	24	18	750	27	19	700	1	1	962	52	38	726
3	Banaskantha	257	136	530	2	2	926	29	14	487	288	152	529
4	Bharuch	598	525	878	83	63	762	12	6	526	693	594	858
5	Dahod	250	268	1072	488	473	969	38	17	444	776	758	976
6	Dang	90	68	756	6	4	737	4	2	590	100	75	748
7	Gandhinagar	28	19	691	0	0	0	1	1	517	29	20	684
8	Kheda	31	26	836	8	8	1000	8	4	550	47	38	818
9	Mehsana	122	63	517	4	4	1000	1	1	650	127	68	533

No	District	2012-13											
		Kharif			Rabi			Summer			Total		
		AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD	AREA	PROD.	YIELD
10	Narmada	226	212	938	23	22	959	14	8	594	263	243	922
11	Navsari	54	39	725	46	39	848	0	0	0	100	78	782
12	Panchmahal	235	399	1698	120	152	1274	12	6	490	366	557	1521
13	Patan	226	107	475	99	51	515	0	0	0	325	158	487
14	Sabarkantha	283	232	820	15	23	1533	65	31	484	363	286	789
15	Surat	117	181	1550	7	7	887	0	0	0	124	188	1510
16	Tapi	192	190	990	45	51	1121	24	11	475	261	252	967
17	Vadodara	799	930	1163	14	14	962	4	3	827	817	947	1158
18	Valsad	152	98	646	53	46	866	0	0	699	205	144	703
19	Amreli	50	25	494	23	20	870	1	1	505	74	45	611
20	Bhavnagar	31	12	387	5	5	1000	1	1	546	37	18	474
21	Jamnagar	81	46	572	72	67	931	2	1	231	155	114	733
22	Junagadh	126	51	405	82	140	1707	11	8	748	219	199	910
23	Kutch	339	111	327	3	3	1000	4	2	472	346	116	335
24	Porbandar	18	8	444	15	16	1060	1	1	745	34	25	726
25	Rajkot	35	16	463	21	31	1476	1	1	788	56	48	845
26	Surendranagar	23	6	267	136	100	740	1	1	834	160	107	672
Gujarat state		4462	3824	857	1554	1473	948	238	121	510	6255	5419	866

Table 4.2.181 Statement showing district-wise Area, Production and Yield of Total Pulses in Gujarat state on Final Forecast reports for the year 2010- 11 to 2012-13.

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	186	113	608	463	305	659	239	153	638	296	190	643
2	Anand	80	46	575	72	47	653	52	38	726	68	44	641
3	Banaskantha	402	294	731	507	309	609	288	152	529	399	252	631
4	Bharuch	804	715	889	660	553	838	693	594	858	719	621	863
5	Dahod	749	644	860	786	783	996	776	758	976	770	728	945
6	Dang	133	91	684	296	273	922	100	75	748	176	146	829
7	Gandhinagar	68	44	647	115	61	530	29	20	684	71	42	589
8	Kheda	77	60	779	55	51	927	47	38	818	60	50	835
9	Mehsana	268	157	586	211	113	537	127	68	533	202	113	558
10	Narmada	214	180	841	318	284	893	263	243	922	265	236	889
11	Navsari	184	155	842	120	76	633	100	78	782	135	103	765
12	Panchmahal	488	533	1092	388	441	1137	366	557	1521	414	510	1233
13	Patan	410	237	578	410	236	576	325	158	487	382	210	551
14	Sabarkantha	490	310	633	365	277	759	363	286	789	406	291	717
15	Surat	271	238	878	318	221	695	124	188	1510	238	216	907
16	Tapi	296	202	682	308	220	713	261	252	967	288	225	779
17	Vadodara	1018	1022	1004	970	1060	1093	817	947	1158	935	1010	1080
18	Valsad	184	125	679	172	121	703	205	144	703	187	130	695
19	Amreli	122	89	730	95	82	863	74	45	611	97	72	743
20	Bhavnagar	123	91	740	99	67	677	37	18	474	86	59	678
21	Jamnagar	382	432	1131	391	423	1082	155	114	733	309	323	1044
22	Junagadh	265	281	1060	301	387	1287	219	199	910	262	289	1106

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
23	Kutch	964	464	481	1348	526	390	346	116	335	886	369	416
24	Porbandar	160	178	1113	286	290	1014	34	25	726	160	164	1026
25	Rajkot	241	206	855	212	226	1066	56	48	845	170	160	942
26	Surendranagar	322	311	966	303	368	1215	160	107	672	262	262	1002
Gujarat state		8901	7218	811	9569	7800	815	6255	5419	866	8242	6812	827

Table 4.2.182 Statement showing district-wise Area, Production and Yield of Total Rabi Pulses in Gujarat state based on Final Forecast reports for the year 2010-11 to 2012-13 (Area in 00 Ha. Production in 00 M.T., Yield in Kg/Ha)

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	44	33	750	297	208	700	157	113	720	166	118	711
2	Anand	31	20	645	26	17	654	27	19	700	28	19	666
3	Banaskantha	9	12	1333	4	5	1250	2	2	926	5	6	1249
4	Bharuch	65	54	831	113	96	850	83	63	762	87	71	817
5	Dahod	507	416	821	512	508	992	488	473	969	502	466	927
6	Dang	43	40	930	178	187	1051	6	4	737	76	77	1020
7	Gandhinagar	1	1	1000	0	0	0	0	0	0	0	0	1000
8	Kheda	9	13	1444	8	10	1250	8	8	1000	8	10	1240
9	Mehsana	6	7	1167	3	4	1418	4	4	1000	4	5	1173
10	Narmada	5	7	1400	40	43	1075	23	22	959	23	24	1059
11	Navsari	62	63	1016	33	31	939	46	39	848	47	44	943
12	Panchmahal	117	101	863	95	85	895	120	152	1274	111	113	1020
13	Patan	122	85	697	190	122	642	99	51	515	137	86	628
14	Sabarkantha	23	24	1043	45	39	867	15	23	1533	28	29	1036
15	Surat	13	16	1231	13	13	1000	7	7	887	11	12	1064

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
16	Tapi	46	51	1109	59	71	1203	45	51	1121	50	58	1150
17	Vadodara	15	20	1333	37	42	1135	14	14	962	22	25	1143
18	Valsad	62	50	806	46	43	935	53	46	866	54	46	863
19	Amreli	24	35	1458	26	38	1462	23	20	870	24	31	1274
20	Bhavnagar	26	36	1385	15	15	1000	5	5	1000	15	19	1217
21	Jamnagar	240	370	1542	239	337	1410	72	67	931	184	258	1405
22	Junagadh	103	182	1767	137	280	2047	82	140	1707	107	201	1871
23	Kutch	4	5	1250	11	9	818	3	3	1000	6	6	944
24	Porbandar	114	153	1342	189	241	1275	15	16	1060	106	137	1289
25	Rajkot	88	121	1375	107	153	1430	21	31	1476	72	102	1412
26	Surendranagar	216	263	1218	216	314	1454	136	100	740	189	226	1194
Gujarat state		1995	2178	1092	2639	2912	1103	1554	1473	948	2063	2188	1061

Table 4.2.183 Statement showing district-wise Area, Production and Yield of Total Kharif Pulses in Gujarat state based on Final Forecast reports for the year 2010-11 to 2012-13 (Area in 00 Ha. Production in 00 M.T., Yield in Kg/Ha)

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	132	75	568	162	94	580	76	37	484	123	69	556
2	Anand	33	17	515	13	11	846	24	18	750	23	15	657
3	Banaskantha	354	259	732	477	286	600	257	136	530	363	227	626
4	Bharuch	719	650	904	520	443	852	598	525	878	612	539	881
5	Dahod	226	220	973	253	267	1055	250	268	1072	243	252	1036
6	Dang	82	47	573	113	84	743	90	68	756	95	66	698
7	Gandhinagar	55	36	655	113	60	531	28	19	691	65	38	588
8	Kheda	62	43	694	41	38	927	31	26	836	45	36	798
9	Mehsana	261	149	571	203	106	522	122	63	517	195	106	543

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
10	Narmada	184	159	864	248	229	923	226	212	938	219	200	912
11	Navsari	96	77	802	68	34	500	54	39	725	73	50	689
12	Panchmahal	306	398	1301	251	337	1343	235	399	1698	264	378	1432
13	Patan	287	151	526	220	114	518	226	107	475	244	124	508
14	Sabarkantha	347	215	620	243	190	782	283	232	820	291	212	730
15	Surat	172	178	1035	215	161	749	117	181	1550	168	173	1032
16	Tapi	218	134	615	196	129	656	192	190	990	202	151	747
17	Vadodara	930	958	1030	922	1011	1097	799	930	1163	884	966	1093
18	Valsad	117	72	615	123	77	626	152	98	646	131	82	631
19	Amreli	75	42	560	47	32	681	50	25	494	57	33	574
20	Bhavnagar	72	41	569	68	43	632	31	12	387	57	32	561
21	Jamnagar	92	35	380	65	39	600	81	46	572	79	40	506
22	Junagadh	103	65	631	104	77	740	126	51	405	111	64	580
23	Kutch	939	448	477	1322	509	385	339	111	327	867	356	411
24	Porbandar	16	9	563	38	24	632	18	8	444	24	14	569
25	Rajkot	145	80	552	98	69	704	35	16	463	93	55	594
26	Surendranagar	103	46	447	82	51	622	23	6	267	69	34	496
Gujarat state		6126	4604	752	6205	4515	728	4462	3824	857	5598	4314	771

Table 4.2.184 Statement showing district-wise Area, Production and Yield of Total Summer Pulses in Gujarat state based

on Final Forecast reports for the year 2010-11 to 2012-13 (Area in 00 Ha. Production in 00 M.T., Yield in Kg/Ha)

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Ahmedabad	10	5	500	4	3	750	5	3	461	6	4	541
2	Anand	16	9	563	33	19	576	1	1	962	17	10	576
3	Banaskantha	39	23	590	26	18	692	29	14	487	31	18	587
4	Bharuch	20	11	550	27	14	519	12	6	526	20	10	531

No	District	2010-11			2011-12			2012-13			Average		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
5	Dahod	16	8	500	21	8	381	38	17	444	25	11	439
6	Dang	8	4	500	5	2	400	4	2	590	6	3	492
7	Gandhinagar	12	7	583	2	1	500	1	1	517	5	3	567
8	Kheda	6	4	667	6	3	500	8	4	550	7	4	571
9	Mehsana	1	1	1000	5	3	600	1	1	650	2	2	664
10	Narmada	25	14	560	30	12	400	14	8	594	23	11	497
11	Navsari	26	15	577	19	11	579	0	0	0	15	9	578
12	Panchmahal	65	34	523	42	19	452	12	6	490	40	20	495
13	Patan	1	1	1000	0	0	0	0	0	0	0	0	1000
14	Sabarkantha	120	71	592	77	48	623	65	31	484	87	50	574
15	Surat	86	44	512	90	47	522	0	0	0	59	30	517
16	Tapi	32	17	531	53	20	377	24	11	475	36	16	444
17	Vadodara	73	44	603	11	7	636	4	3	827	29	18	617
18	Valsad	5	3	600	3	1	333	0	0	699	3	1	510
19	Amreli	23	12	522	22	12	545	1	1	505	15	8	533
20	Bhavnagar	25	14	560	16	9	563	1	1	546	14	8	561
21	Jamnagar	50	27	540	87	47	540	2	1	231	46	25	535
22	Junagadh	59	34	576	60	30	500	11	8	748	43	24	555
23	Kutch	21	11	524	15	8	533	4	2	472	13	7	523
24	Porbandar	30	16	533	59	25	424	1	1	745	30	14	465
25	Rajkot	8	5	625	7	4	571	1	1	788	5	3	609
26	Surendranagar	3	2	667	5	3	600	1	1	834	3	2	643
Gujarat state		780	436	559	725	374	516	238	121	510	581	310	534

Table 4.2.185 Statement showing crop-wise Area, Production and Yield of Pulses in Gujarat state based on Final Forecast reports for the year 2010-11 to 2012-13 (Area in 00 Ha .Production in 00 M.T., Yield in Kg/Ha)

KHARIF PULSES												
	2010-11			2011-12			2012-13			AV		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Tur	2767	2729	986	2444	2575	1054	2281	2702	1185	2497	2669	1069
Mung	1774	892	503	2000	877	439	916	399	436	1563	723	462
Math	224	126	563	457	227	496	141	54	383	274	136	495
Udad	1021	687	673	962	676	703	944	596	631	976	653	669
Other Pulses	340	170	500	342	160	467	180	73	405	287	134	467
Total Kharif	6126	4604	752	6205	4515	728	4462	3824	857	5598	4314	771
RABI PULSES												
Gram	1755	1998	1138	2399	2733	1139	1361	1331	978	1838	2021	1099
Other Rabi Pulses	240	180	750	240	179	745	193	142	736	224	167	744
Total Rabi	1995	2178	1092	2639	2912	1103	1554	1473	948	2063	2188	1061
SUMMER PULSES												
Mung (Green	710	390	549	655	330	504	234	116	497	533	279	523
Udad	70	46	657	70	44	629	4	5	1272	48	32	660
Total Summer	780	436	559	725	374	516	238	121	510	581	310	534

Area in 00 Ha., Production in 00 M.T., Yield in Kg/Ha

Crops	2010-11			2011-12			2012-13			Average		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Total Mung	2484	1282	516	2655	1207	455	1150	515	448	2096	1001	478
Total Udad	1091	733	672	1032	720	698	948	601	634	1024	685	669
Total Pulses	8901	7218	811	9569	7800	815	6255	5419	866	8242	6812	827

Table 4.2.186 Final estimate of area, production and yield of Pulse crops of Gujarat state for the year 2013-14: -

(Area in "000" hectares P: - Production "000" Tonnes Y: - Yield in kgs. / Ha)

Crop		Kharif			Rabi			Summer			Total		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Tur (Red)	210	209	996	0	0	0	0	0	0	210	209	996
2	Mung (Green)	128	67	521	0	0	0	55	39	709	183	106	579
3	Udad	89	54	610	0	0	0	2	1	657	91	56	611
4	Math	30	15	485	0	0	0	0	0	0	30	15	485
5	Gram	0	0	0	247	309	1251	0	0	0	247	309	1251
6	Other Pulses	19	10	500	33	25	760	0	0	0	52	35	665
7	Total Pulses	476	354	745	280	334	1193	57	40	707	813	728	697

Table 4.2.187 Final estimate of area, production and yield of Pulse crops of Gujarat state for the year 2014-15

(Area in "000" hectares P: - Production "000" Tonnes Y: - Yield in kg/ha)

Crop		Kharif			Rabi			summer			Total		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Tur (Red)	214	235	1100	0	0	0	0	0	0	214	235	1100
2	Mung (Green)	83	56	674	1	0.45	524	33	16	503	117	73	625
3	Udad	67	46	685	0	0	0	1	1	646	68	47	684
4	Math	10	5	555	0	0	0	0	0	0	10	5	555
5	Gram	0	0	0	161	199	1240	0	0	0	161	199	240
6	Other	374	343	917	162	200	1236	34	17	508	569	560	983
7	Total	1776	3427	1930	1380	3441	2493	359	926	2579	3515	7795	2218

Table 4.2.188 Final estimate of area, production and yield of crops of Gujarat state for the year 2015-16

(Area in "000" hectares P : - Production "000" Tones Y : - Yield in kg/ha)

Crop		Kharif			Rabi			summer			Total		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Tur (Red	229	282	1228	0	0	0	0	0	0	229	282	1228
2	Mung (Green	104	53	504	0	0	0	25	14	570	129	53	517
3	Udad	61	36	595	0	0	0	3	2	653	64	36	598
4	Math	19	9	476	0	0	0	0	0	0	19	9	476
5	Gram	0	0	0	115	153	1332	0	0	0	115	0	1332
6	Other	5	2	441	23	17	760	0	0	0	28	2	703
7	Total	418	382	912	138	171	1237	28	16	578	585	382	973

Table 4.2.189 Final estimate of area, production and yield of crops of Gujarat state for the 2016-17

(Area in "000" hectares P: - Production "000" Tones Y : - Yield in kg/ha)

Crop		Kharif			Rabi			summer			Total		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Tur (Red	347	401	1154	0	0	0	0	0	0	347	401	1154
2	Mung (Green	152	69	454	0	0	0	27	15	533	180	84	466
3	Udad	193	117	607	0	0	0	4	2	629	196	119	607
4	Math	32	15	469	0	0	0	0	0	0	32	15	469
5	Gram	0	0	0	164	183	1116	0	0	0	164	183	1116
6	Other	5	2	471	18	14	760	0	0	0	23	16	700
7	Total	730	604	828	182	197	1080	31	17	544	942	818	868

Table 4.2.190 Final estimate of area, production and yield of crops of Gujarat state for the year 2017-18

(Area in "000" hectares P : - Production "000" Tonnes Y : - Yield in kg/ha)

Crop	Kharif			Rabi			summer			Total			
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	
1	Tur (Red	271	321	1182	0	0	0	0	0	0	271	321	1182
2	Mung (Green	130	94	725	0	0	0	3	3	753	133	97	726
3	Udad	126	72	573	0	0	0	27	16	594	153	88	577
4	Math	27	18	652	0	0	0	0	0	0	27	18	652
5	Gram	0	0	0	295	362	1226	0	0	0	295	362	1226
6	Other	6	3	462	21	15	735	0	0	0	27	18	673
7	Total	560	507	906	316	377	1193	30	18	612	906	903	996

4.2.7.5 Major Varieties in Pulses of the State:

The major kharif pulses are Pigeon pea, Mung bean, Urd bean, Cowpea, etc., while in *rabi* the major pulse crop is Gram. The summer cultivation of pulses is catching up wherever, irrigation facilities are available and Mung bean and Cowpea are cultivated in summer.

Table- 4.2.191 Major Varieties in Various Pulses

Pulses	Varieties/ Hybrids
Pigeonpea	GT-1, GT-100, GT-101, BANAS, Vaisali, AGT-2, BDN-2, GT-102, GT 103, GJP 1, Local, ICPL-87
Mungbean	GM-4, K-851, Co-4, GBM-1, Meha, GAM 5 and GNM 6
Urdbean	GU-1 and T-9
Chickpea	GG-1, GG-2, GJG-3, GG 5 and GJG 6
Cowpea	GC-3, GC-4, GC-5, GC 6
Mothbean	GMO-1 and GMO-2
Guar	GG-1 and GG-2
Rajmash	GR-1

Fieldpea	GFP-1
Horsegram	DHG-1
Indianbean	125-36, GW-1, GW-2 and local

Source: Directorate of Agriculture, Gandhinagar

4.2.7.6 Input Management:

4.2.7.6.1 Seed:

The seed replacement ratio (SRR) of pulses is between 10 to 15 percent. This situation warrants increasing seed replacement ratio as to achieve targeted higher productivity. Thus, the scope of SRR is ambient in future to enhance the productivity of self-pollinated crops like pulses in the state, especially through seed village concept.

Table- 4.2.192 Planning of Agriculture Inputs in the State – Seed Requirement in Pulses Crops

Sr. No.	Pulses Seed Quantity requirement and SRR							
	Crops	Area (^{'00} ha)	Seed rate kg/ha	Total Seed quantity	SRR (%)	Seed quantity Required, tons		
						2017-18	2018-19	2019-20
1	Tur (Red Gram)	2710	15	4065.0	33	1355	1355	1355
2	Mung (Green Gram)	1330	17.5	2327.5	33	776	776	776
3	Udad	1530	17.5	2677.5	33	893	893	893
4	Math	270	20	540.0	33	180	180	180
5	Gram	2950	60	17700	40	5900	5900	5900
6	Other Pulses	270	20	540	33	180	180	180
7	Total Pulses	9060		23785		9283	9283	9283

Table- 4.2.193 Recommended Seed Rate in Various Pulse Crops

Crop	Pigeonpea	Urdbean	Mungbean	Rajmash	Gram	Field pea	Cowpea	Mothbean	Guar
Seed rate	15 kg/ha	17.5 kg/ha	17.5 kg/ha	100-120 kg/ha	60 kg/ha	100 kg/ha	15 kg/ha	20 kg/ha	15 kg/ha

4.2.7.6.2 Fertilizer:

District-wise consumption of fertilizers, NPK consumption and ratio in *rabi* crop and fertilizers requirement in pulses crops 2011-12 is given in bellow Tables.

Table- 4.2.194 Districtwise Consumption of Fertilizers in *Rabi* Pulse Crops 2011-12 (in term of Materials, in T)

Sr.	District	Urea	DAP	MoP	TSP	SSP	AS	Can	20:20:00	15:15:15	24:24:00	12:32:1	10:26:2	16:16:1	16:20:0
1	Ahmedabad	63460	10081	1818	937	7381	1044	645	3456	66	21	481	0	31	495
2	Anand	36140	18667	1467	213	3632	1895	414	3854	36	550	4316	350	5	235
3	Banaskantha	75783	2953	4985	613	3286	7336	976	5676	398	166	263	0	174	15
4	Bharuch	78973	14152	6076	998	5027	7941	396	10373	0	369	1887	1185	0	3283
5	Dahod	26108	2182	3923	174	4187	2394	374	3514	36	204	1378	875	45	232
6	Dang	37121	18193	3672	47	8204	5302	1827	5838	44	514	3287	84	0	0
7	Gandhinagar	15020	1855	479	232	563	657	0	1970	45	0	79	0	0	119
8	Kheda	24180	3275	2196	78	2323	1401	290	2560	0	83	695	423	0	594
9	Mehsana	30562	17794	1215	490	7008	1561	1250	4694	111	133	6844	0	0	361
10	Narmada	52933	20141	2534	924	5417	1658	2102	8337	94	226	4589	711	177	1041
11	Navsari	62780	3640	4792	1504	2566	5111	725	3129	147	54	158	0	78	57
12	Panchmahal	46717	10566	335	0	1463	910	204	2803	481	0	422	0	0	281
13	Patan	55318	7962	1750	198	1962	3049	661	4004	22	215	1090	353	85	914
14	Sabarkantha	10103	585	2343	102	1082	871	40	884	73	92	234	271	0	204
15	Surat	16320	4911	6145	659	4433	3826	186	2935	1198	415	839	773	0	288
16	Tapi	42995	1731	576	576	586	995	204	3414	256	0	408	0	39	163
17	Vadodara	34029	4847	182	160	684	1325	227	2720	0	20	455	81	11	564
18	Valsad	7026	4623	78	73	535	221	317	1377	0	0	887	371	0	52
19	Amreli	68553	25418	3097	766	10383	3668	2418	7693	294	599	17516	310	0	3745
20	Bhavnagar	64407	8627	9803	525	3847	3057	1079	8656	47	850	2703	562	40	2140
21	Jamnagar	34656	9241	14906	466	12455	8007	1369	7770	374	791	5003	5154	0	950
22	Junagadh	55279	15503	1125	116	2695	721	1260	5402	150	62	783	996	0	26
23	Kutch	5400	1386	1585	191	1010	2377	382	1730	60	106	266	792	0	222
24	Porbandar	65	5	12	0	0	101	0	39	0	0	0	0	0	0
25	Rajkot	79342	3850	7822	1246	5367	3229	897	3804	42	142	1119	55	115	0
26	Surendranagar	5104	1458	2192	23	505	1235	85	1735	492	278	148	124	0	54
Total		1028374	213646	85108	11311	96601	69892	18328	108367	4466	5890	55850	13470	800	16035

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar

Table- 4.2.195 District-wise NPK Consumption and Ratio in *Kharif* Crop in 2011-12

Sr.No.	District	N	P	K	Total NPK
1	Ahmedabad	127236	30636	6749	164621
2	Amreli	4860	11720	560	17140
3	Anand	125502	10773	1508	137783
4	Banaskantha	138355	34356	6925	179636
5	Bharuch	63423	10148	7517	81088
6	Bhavnagar	73244	40816	7603	121663
7	Dahod	34579	10528	4103	49210
8	Dang	600	300	50	950
9	Gandhinagar	55282	9760	4166	69208
10	Jamnagar	67052	34137	2822	104011
11	Junagadh	72051	42401	8009	122461
12	Kheda	90749	32479	4404	127632
13	Kutch	72232	29909	3126	105267
14	Mehsana	9059	17994	2515	112568
15	Narmada	28476	3473	3437	35386
16	Navsari	35522	16278	12810	64610
17	Panchmahal	18974.15	7630	3726.95	30331.1
18	Patan	50565	14283	4122	68970
19	Porbandar	7419	4291	1958	13668
20	Rajkot	94167	60727	18448	173342
21	Sabarkantha	75612	12105	4603	92320
22	Surat	41686	14853	8306	64845
23	Surendranagar				0
24	Tapi	41687.7	14853	8306.6	64847.3
25	Vadodara	139278	32566	21302	193146
26	Valsad	600	300	50	950
Total		1277693	443174	131720.6	1852587.4

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar

The chemical fertilizers requirement for pulses is generally 20kg/ha of Nitrogen and 40 kg/ha of Phosphate which is ideally obtained from one quintal of DAP (diamunium phosphate). Considering the area of various pulse crops, the total requirement of NPK is given as under.

Table- 4.2.196 Fertilizers Requirement for *Kharif* Pulses (2012-13)

Sr.No.	District	Area ('00	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total	Urea	DAP	MoP	ZnSO4	FeSO4
1	Ahmedabad	76	152	304	0	456	83.6	661.2	0	76	76
2	Anand	24	48	96	0	144	26.4	208.8	0	24	24
3	Banaskantha	257	514	1028	0	1542	282.7	2235.9	0	257	257
4	Bharuch	598	1196	2392	0	3588	657.8	5202.6	0	598	598
5	Dahod	250	500	1000	0	1500	275	2175	0	250	250
6	Dang	90	180	360	0	540	99	783	0	90	90
7	Gandhinagar	28	56	112	0	168	30.8	243.6	0	28	28
8	Kheda	31	62	124	0	186	34.1	269.7	0	31	31
9	Mehsana	122	244	488	0	732	134.2	1061.4	0	122	122
10	Narmada	226	452	904	0	1356	248.6	1966.2	0	226	226
11	Navsari	54	108	216	0	324	59.4	469.8	0	54	54
12	Panchmahal	235	470	940	0	1410	258.5	2044.5	0	235	235
13	Patan	226	452	904	0	1356	248.6	1966.2	0	226	226
14	Sabarkantha	283	566	1132	0	1698	311.3	2462.1	0	283	283
15	Surat	117	234	468	0	702	128.7	1017.9	0	117	117
16	Tapi	192	384	768	0	1152	211.2	1670.4	0	192	192
17	Vadodara	799	1598	3196	0	4794	878.9	6951.3	0	799	799
18	Valsad	152	304	608	0	912	167.2	1322.4	0	152	152
19	Amreli	50	100	200	0	300	55	435	0	50	50
20	Bhavnagar	31	62	124	0	186	34.1	269.7	0	31	31
21	Jamnagar	81	162	324	0	486	89.1	704.7	0	81	81
22	Junagadh	126	252	504	0	756	138.6	1096.2	0	126	126

23	Kutch	339	678	1356	0	2034	372.9	2949.3	0	339	339
24	Porbandar	18	36	72	0	108	19.8	156.6	0	18	18
25	Rajkot	35	70	140	0	210	38.5	304.5	0	35	35
26	Surendranagar	23	46	92	0	138	25.3	200.1	0	23	23
	Total	4463	8926	17852	0	26778	4909.3	38828.1	0	4463	4463

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar (2013)

Table- 4.2.197 Fertilizers Requirement for Rabi Pulses

Sr.No.	District	Area ('00	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total	Urea	DAP	MoP	ZnSO4	FeSO4
1	Ahmedabad	157	314	628	0	942	172.7	1365.9	0	157	157
2	Anand	27	54	108	0	162	29.7	234.9	0	27	27
3	Banaskantha	2	4	8	0	12	2.2	17.4	0	2	2
4	Bharuch	83	166	332	0	498	91.3	722.1	0	83	83
5	Dahod	488	976	1952	0	2928	536.8	4245.6	0	488	488
6	Dang	6	12	24	0	36	6.6	52.2	0	6	6
7	Gandhinagar	0	0	0	0	0	0	0	0	0	0
8	Kheda	8	16	32	0	48	8.8	69.6	0	8	8
9	Mehsana	4	8	16	0	24	4.4	34.8	0	4	4
10	Narmada	23	46	92	0	138	25.3	200.1	0	23	23
11	Navsari	46	92	184	0	276	50.6	400.2	0	46	46
12	Panchmahal	120	240	480	0	720	132	1044	0	120	120
13	Patan	99	198	396	0	594	108.9	861.3	0	99	99
14	Sabarkantha	15	30	60	0	90	16.5	130.5	0	15	15
15	Surat	7	14	28	0	42	7.7	60.9	0	7	7
16	Tapi	45	90	180	0	270	49.5	391.5	0	45	45
17	Vadodara	14	28	56	0	84	15.4	121.8	0	14	14
18	Valsad	53	106	212	0	318	58.3	461.1	0	53	53
19	Amreli	23	46	92	0	138	25.3	200.1	0	23	23

Sr.No.	District	Area ('00)	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total	Urea	DAP	MoP	ZnSO4	FeSO4
20	Bhavnagar	5	10	20	0	30	5.5	43.5	0	5	5
21	Jamnagar	72	144	288	0	432	79.2	626.4	0	72	72
22	Junagadh	82	164	328	0	492	90.2	713.4	0	82	82
23	Kutch	3	6	12	0	18	3.3	26.1	0	3	3
24	Porbandar	15	30	60	0	90	16.5	130.5	0	15	15
25	Rajkot	21	42	84	0	126	23.1	182.7	0	21	21
26	Surendranagar	136	272	544	0	816	149.6	1183.2	0	136	136
	Total	1554	3108	6216	0	9324	1709.4	13519.8	0	1554	1554

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar (2013)

Table- 4.2.198 Fertilizers requirement in for *summer pulses (2012-13)*

Sr.No.	District	Area ('00)	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total	Urea	DAP	MoP	ZnSO4	FeSO4
1	Ahmedabad	5	10	20	0	30	5.5	43.5	0	5	5
2	Anand	1	2	4	0	6	1.1	8.7	0	1	1
3	Banaskantha	29	58	116	0	174	31.9	252.3	0	29	29
4	Bharuch	12	24	48	0	72	13.2	104.4	0	12	12
5	Dahod	38	76	152	0	228	41.8	330.6	0	38	38
6	<u>Dang</u>	4	8	16	0	24	4.4	34.8	0	4	4
7	Gandhinagar	1	2	4	0	6	1.1	8.7	0	1	1
8	Kheda	8	16	32	0	48	8.8	69.6	0	8	8
9	Mehsana	1	2	4	0	6	1.1	8.7	0	1	1
10	Narmada	14	28	56	0	84	15.4	121.8	0	14	14
11	Navsari	0	0	0	0	0	0	0	0	0	0
12	Panchmahal	12	24	48	0	72	13.2	104.4	0	12	12
13	Patan	0	0	0	0	0	0	0	0	0	0

14	Sabarkantha	65	130	260	0	390	71.5	565.5	0	65	65
15	Surat	0	0	0	0	0	0	0	0	0	0
16	<u>Tapi</u>	24	48	96	0	144	26.4	208.8	0	24	24
17	Vadodara	4	8	16	0	24	4.4	34.8	0	4	4
18	Valsad	0	0	0	0	0	0	0	0	0	0
19	Amreli	1	2	4	0	6	1.1	8.7	0	1	1
20	Bhavnagar	1	2	4	0	6	1.1	8.7	0	1	1
21	Jamnagar	2	4	8	0	12	2.2	17.4	0	2	2
22	Junagadh	11	22	44	0	66	12.1	95.7	0	11	11
23	Kutch	4	8	16	0	24	4.4	34.8	0	4	4
24	Porbandar	1	2	4	0	6	1.1	8.7	0	1	1
25	Rajkot	1	2	4	0	6	1.1	8.7	0	1	1
26	Surendranagar	1	2	4	0	6	1.1	8.7	0	1	1
	Total	240	480	960	0	1440	264	2088	0	240	240

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar (2013)

Table 4.2.199 Total fertilizers requirement for total pulses (2012-13)

Sr.No.	District	Area ('00 ha)	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total	Urea	DAP	MoP	ZnSO4	FeSO4
1	Ahmedabad	239	478	956	0	1434	262.9	2079.3	0	239	239
2	Anand	52	104	208	0	312	57.2	452.4	0	52	52
3	Banaskantha	288	576	1152	0	1728	316.8	2505.6	0	288	288
4	Bharuch	693	1386	2772	0	4158	762.3	6029.1	0	693	693
5	Dahod	776	1552	3104	0	4656	853.6	6751.2	0	776	776
6	Dang	100	200	400	0	600	110	870	0	100	100
7	Gandhinagar	29	58	116	0	174	31.9	252.3	0	29	29
8	Kheda	47	94	188	0	282	51.7	408.9	0	47	47
9	Mehsana	127	254	508	0	762	139.7	1104.9	0	127	127
10	Narmada	263	526	1052	0	1578	289.3	2288.1	0	263	263

Sr.No.	District	Area (‘00 ha)	Nutrient requirement (MT/ha)				Fertilizer requirement (MT/ha)				
			N	P	K	Total	Urea	DAP	MoP	ZnSO4	FeSO4
11	Navsari	100	200	400	0	600	110	870	0	100	100
12	Panchmahal	366	732	1464	0	2196	402.6	3184.2	0	366	366
13	Patan	325	650	1300	0	1950	357.5	2827.5	0	325	325
14	Sabarkantha	363	726	1452	0	2178	399.3	3158.1	0	363	363
15	Surat	124	248	496	0	744	136.4	1078.8	0	124	124
16	Tapi	261	522	1044	0	1566	287.1	2270.7	0	261	261
17	Vadodara	817	1634	3268	0	4902	898.7	7107.9	0	817	817
18	Valsad	205	410	820	0	1230	225.5	1783.5	0	205	205
19	Amreli	74	148	296	0	444	81.4	643.8	0	74	74
20	Bhavnagar	37	74	148	0	222	40.7	321.9	0	37	37
21	Jamnagar	155	310	620	0	930	170.5	1348.5	0	155	155
22	Junagadh	219	438	876	0	1314	240.9	1905.3	0	219	219
23	Kutch	346	692	1384	0	2076	380.6	3010.2	0	346	346
24	Porbandar	34	68	136	0	204	37.4	295.8	0	34	34
25	Rajkot	56	112	224	0	336	61.6	487.2	0	56	56
26	Surendranagar	160	320	640	0	960	176	1392	0	160	160
Total		6256	12512	25024	0	37536	6881.6	54427.2	0	6256	6256

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar (2013)

Weeds are a major problem and compete with major crops for nutrients and moisture, as a result, the yield realization is low. The yield losses due to weeds ranges from 17-20 percent. The major weeds affecting pulse crops in kharif and rabi are *Saccharimi spontaneity*, *Cynodon dech'ione*, *Boerharia diffusa*, *panicuiu crusgalli*, *Digra arvensis*, *Dechloctemnu aegypticinu*, *Cyprus rotimodus* and *Chinopodiuin album*, *Chinopodiuin murale* *Mel Hot us indica* and *Anagallis arverms*. In pulse crop pre emergence weedicides are recommended and effectively control weeds. Chemical control of weeds is necessary as acute shortage of labor during peak seasons. The following pre emergence weedicides required in the

Table- 4.2.200 Districtwise Requirement of Weedicide for Control of Weeds in Pulses (2012-13)

Sr.No.	District	Area	For weed Pendimithiline (lit.)
1	Ahmedabad	239	597.5
2	Anand	52	130
3	Banaskantha	288	720
4	Bharuch	693	1732.5
5	Dahod	776	1940
6	<u>Dang</u>	100	250
7	Gandhinagar	29	72.5
8	Kheda	47	117.5
9	Mehsana	127	317.5
10	Narmada	263	657.5
11	Navsari	100	250
12	Panchmahal	366	915
13	Patan	325	812.5
14	Sabarkantha	363	907.5
15	Surat	124	310
16	<u>Tapi</u>	261	652.5
17	Vadodara	817	2042.5
18	Valsad	205	512.5
19	Amreli	74	185
20	Bhavnagar	37	92.5
21	Jamnagar	155	387.5
22	Junagadh	219	547.5
23	Kutch	346	865
24	Porbandar	34	85
25	Rajkot	56	140
26	Surendranagar	160	400
	Total	6256	15640

Recommended rate for weedicide Pendimethiline 0.75 Kg/ha (2.5 lit/ha formulated product)

4.2.7.6.3 Pesticides:

In pulse crops the damage due to various pests' ranges from 10 to 100 per cent. Various control majors for pulse crops including integrated pest control majors are available. Use of integrated majors including production of bio-control organism in required quantity is major hurdle. The biological agents like HaKPV *Bt.* powder Lady bird beetle, Chrysopa are very effective for control of various pests. The major pests in different pulses are Podboter. Mamca. Blue butterfly. Podfly, Tur podbue. Aphid| Jassid. Whitefly. Losses are also incurred by diseases. The major diseases are Wilt / Root, Ascochyta blight, Botrytis greyniould, Wilt, Phytophthora blight, Sterility Mosaic, Altenaria blight, Yellow Mosaic, Powdery Mildew and leaf spots.

Table - 4.2.201 Districtwise Requirement of Pesticides for Pest Control and Weedicide in Pulses (2012-13)

Sr.No.	District	Area ('000 ha)	Seed rate kg/ha	Total Seed quantity tonne	Pesticides quantity Required, tonne			
					Seed	Spray (lit.)		For weed Pendimithiline (lit.)
					Bifenthrin	Profenophos	Indoxacarb	
1	Ahmedabad	239	20	4780	23.9	143.4	71.7	597.5
2	Anand	52	20	1040	5.2	31.2	15.6	130
3	Banaskantha	288	20	5760	28.8	172.8	86.4	720
4	Bharuch	693	20	13860	69.3	415.8	207.9	1732.5
5	Dahod	776	20	15520	77.6	465.6	232.8	1940
6	<u>Dang</u>	100	20	2000	10	60	30	250
7	Gandhinagar	29	20	580	2.9	17.4	8.7	72.5
8	Kheda	47	20	940	4.7	28.2	14.1	117.5
9	Mehsana	127	20	2540	12.7	76.2	38.1	317.5
10	Narmada	263	20	5260	26.3	157.8	78.9	657.5
11	Navsari	100	20	2000	10	60	30	250
12	Panchmahal	366	20	7320	36.6	219.6	109.8	915
13	Patan	325	20	6500	32.5	195	97.5	812.5
14	Sabarkantha	363	20	7260	36.3	217.8	108.9	907.5

Sr.No.	District	Area ('000 ha)	Seed rate kg/ha	Total Seed quantity tonne	Pesticides quantity Required, tonne			
					Seed	Spray (lit.)		For weed Pendimithiline (lit.)
						Bifenthrin	Profenophos	
15	Surat	124	20	2480	12.4	74.4	37.2	310
16	Tapi	261	20	5220	26.1	156.6	78.3	652.5
17	Vadodara	817	20	16340	81.7	490.2	245.1	2042.5
18	Valsad	205	20	4100	20.5	123	61.5	512.5
19	Amreli	74	20	1480	7.4	44.4	22.2	185
20	Bhavnagar	37	20	740	3.7	22.2	11.1	92.5
21	Jamnagar	155	20	3100	15.5	93	46.5	387.5
22	Junagadh	219	20	4380	21.9	131.4	65.7	547.5
23	Kutch	346	20	6920	34.6	207.6	103.8	865
24	Porbandar	34	20	680	3.4	20.4	10.2	85
25	Rajkot	56	20	1120	5.6	33.6	16.8	140
26	Surendranagar	160	20	3200	16	96	48	400
	Total	6256	520	125120	625.6	3753.6	1876.8	15640

Recommended rate for weedicide (Pendimethiline) is 2.5 lit/ha

For pesticide - Profenophos* @ 10ml/ 10lit of water

Indoxacarb** - @ 5ml/10lit of water

4.2.7.7 Constraints Analysis and Recommended Interventions for Pulses:

In Gujarat, yield gaps were seen between Front Line Demonstrations and average farmer fields. Demonstration on production technologies like high yielding varieties, Sulphur application, Zinc application, foliar application of 2 % urea, insect pest management, seeds and soil treatment with Rhizobium + PSB, resulted higher yields than farmer's practices. The yield gaps in pulse crops are given as under.

Table- 4.2.202 Yield Gap Analysis of Pulses

Sr.No.	Name of zone	Crop	Average yield (kg/ha)			Yield gap (%)	Reasons for gap
			State	Zone/District	FLD		
1.	South Gujarat						
		Pigeonpea	906	907	1500	31.00	Technology & input
		Greengram	361	388	1165	200	
2.	Middle Gujarat						
		Pigeonpea					
		Greengram					
3.	North Gujarat						
		Greengram	361	343	503	46.6	Technology & input
		Blackgram	516	477	543	13.8	
		Gram*	1042	947	1211	27.8	
		Pigeonpea	906	725	1388	91.4	
		Mothbean	258	286	481	68.1	
4.	Sourashtra						
		Gram					
		Pigeonpea					
		Greengram					
		Blackgram					

Source: Department of agriculture-Gandhinagar (base year 2012-13)

4.2.7.7.1 Reason for Yield Gap:

The reasons for yield gap is mainly attributed to varied reasons like time of sowing application of imbalanced fertilizers and crop protection measures. Farmer's are not aware of Rhizobacterial cultural treatment to the seed which also enhances the yield potentiality. Therefore, it is required to bring awareness on use of Biofertilizers and crop management.

4.2.7.7.2 Production Constrains:

In Gujarat the pulse crops are grown by farmer's in poor fertile soils. The productivity of pulse crops is influenced by extreme temperature and adverse condition. Generally, farmers do not follow seed treatment with Rhizobium culture which favours better nodulation and maintenance of organic matter in soil. The major factors that influence the productivity of pulse are as under.

- Pigeonpea, Redgram, Balckgram and Greengram are mostly grown as rainfed crops.
- Pigeonpea and other crops are grown as mixed crops.
- Poor plant stands and moisture stress.
- Diseases problems especially yellow mosaic virus (YMV) in Greengram, Mothbean, Cowpea and powdery mildew in Urdbean.
- Wilt and SMD is major problem in South Gujarat.
- Non availability of seed of high yielding varieties is one of the major constrains.
- Irregular monsoon and prolonged drought like situations.
- Imbalanced fertilizers application.
- Non-application of *Rhizobium* cultures.
- Losses due to diseases and pest.
- Lack of storage facilities and storage pest problem.

- Less remunerative and unstable prices for pulses.
- High sensitivity of pulses against environmental changes.
- In rabi pulses like Gram the water management is not followed proper. Fertilizer management and diseases and pest problems especially in Gram.

Table 4.2.203 Regionwise constraints for low productivity for irrigated pulses

Sr.No.	Region	Constraints
1.	North Gujarat	<ul style="list-style-type: none"> ➤ Pulses as a mixed crop. ➤ Pigeonpea area is mainly Sabarkantha district. ➤ YMV in Greengram and Mothbean. ➤ Imbalance use fertilizer. ➤ Infestation of weeds.
2.	Middle Gujarat	<ul style="list-style-type: none"> ➤ Improper plant stand ➤ YMV in Greengram in summer season. ➤ Pest problem in Pigeonpea. ➤ Soil salinity / alkalinity ➤ Imbalance use of fertilizer.
3.	South Gujarat	<ul style="list-style-type: none"> ➤ Improper plant stand ➤ YMV in Greengram in summer season. ➤ Wilt and SMD problem in Pigeonpea.

		➤ Imbalance use of fertilizer.
4.	Saurashtra	<ul style="list-style-type: none"> ➤ Moisture stress during growing seasons. ➤ Diseases and pest problem. ➤ Pulses as a mixed crops. ➤ Imbalance use of fertilizer.

Besides above constrains the seed replacement ratio is abysmally low in all pulse crops. Though the fertilizer requirement in pulses is low when compared to other major crops, farmers do not follow recommended dose of fertilizers.

Table- 4.2.204 Sustainability Issues and Gap Analysis of Productivity of Pulses Crop and Resources

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
Pigeonpea						
i	High incidence of pod borer,	Problem in doing spray due to plants height	Adoption of spray schedule	Training result & method demonstrations	10% Growth in area under control of pod borer every year	Increased yield
ii.	Less use of phosphatic fertilizers & bio-fertilizers,	Grown on marginal lands, farmers do not use fertilizers due to uncertainty of the crop	Creative awareness regarding the role of phosphatic and bio fertilizers in increasing yield	Training demonstrations, field day	20% Growth in area every year	Increased in productivity
iii.	Non availability high yielding, and short duration varieties	Non availability of high yielding short duration variety, Low yield, low income per unit area.	Intercropping of moong in pigeon pea	Farmers participatory approach	10% Growth in area under inter cropping every year	Multiple land use Increase in profitability
iv.	Local seed selection without seed treatment	Less awareness about different varieties Poor quality seed	Popularize the importance of seed treatments and seed improved	Educating farmers on importance of seed & quality through demonstration & training	Yield increase with reduced pest disease	Yield increase with reduced pest disease problem
v.	Low usage of bi fertilizer. Injudicious use of nitrogen	Less awareness regarding use of bio fertilizer	Popularize the method & advantage of bio fertilizer through training &	Demonstration & training of usage of bio fertilizer & also recommended dose of chemical fertilizer.	30 to 40 % growth in area under use of bio fertilizer & recommended lose	Increase crop yield and reduce cost of cultivation.

vi.	Poor fertilizer management	Farmers do not follow recommended dose of fertilizers	Application of recommended dose of fertilizers. Use of organic manure and use of site specific micro-nutrient	Technology transfer through field demonstrations, trainings and extension literature	Entire Pigeonpea growing area	Increase in productivity with sustainable soil health
vii.	High incidence of weeds	Different spp. weeds that competes with main crop	Application of pre emergence weedicide that is pendimithalin	Technology transfer through field demonstrations, trainings and extension literature	Entire Pigeonpea growing area	Increase in production and availability of pulses
viii.	Growing Pigeonpea as a inter crop	Insufficient plant stand per unit area	Development of package of practice for mixed cropping	Technology transfer through field demonstrations, trainings and extension literature	Entire Pigeonpea growing area	Increase in production and availability of pulses
Greengram, Urdbean, Mothbean, Cowpea and Horsegram						
i.	Moisture stress	Cultivated as a rainfed crop in kharif. Uncertain and unpredictable precipitation	Avoid moisture stress. Use of compost and FYM	Timely sowing and supplementation of irrigation at flowering and podding stage in case of prolonged drought.	Irrigation infrastructure improvement	
ii.	Diseases and pests	YMV and pod borers are major constrains.	Diseases and pests control measures.	Cultivation of resistance varieties and plant protection measures.	Yield improvement	Minimum increase of total production to the tune of 5 per cent

iii.	Poor fertilizer management	Farmers do not follow recommended dose of fertilizers	Application of recommended dose of fertilizers. Use of organic manure and use of site specific micro-nutrient	Technology transfer through field demonstrations, trainings and extension literature	Entire pulses growing area	Increase in productivity with sustainable soil health
iv.	High incidence of weeds	Different spp. weeds that competes with main crop	Application of pre emergence weedicide that is pendimethalin	Technology transfer through field demonstrations, trainings and extension literature	Entire Pulses growing area	Increase in production and availability of pulses
v.	Growing Pigeonpea as a inter crop	Insufficient plant stand per unit area	Development of package of practice for mixed cropping	Technology transfer through field demonstrations, trainings and extension literature	Entire Pulses growing area	Increase in production and availability of pulses

Table- 4.2.204 Sustainability Issues and Gap Analysis of Productivity of Pulses Crop and Resources *Continue...*

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
Chickpea						
ii.	Less use of phosphatic fertilizers & bio-fertilizers,	Grown on marginal lands, farmers do not use fertilizers due to uncertainty of the crop	Creative awareness regarding the role of phosphatic and	Training demonstrations, field day	20% Growth in area every year	Increased in productivity

iv.	Local seed selection without seed treatment	Less awareness about different varieties Poor quality seed	Popularize the importance of seed treatments and seed improved	Educating farmers on importance of seed & quality through demonstration & training	Yield increase with reduced pest disease	Yield increase with reduced pest disease problem
v.	Low usage of bio fertilizer. Injudicious use of nitrogen	Less awareness regarding use of bio fertilizer	Popularize the method & advantage of bio fertilizer through training &	Demonstration & training of usage of bio fertilizer & also recommended dose of chemical fertilizer.	30 to 40 % growth in area under use of bio fertilizer & recommended lose	Increase crop yield and reduce cost of cultivation.
vi.	Poor fertilizer management	Farmers do not follow recommended dose of fertilizers	Application of recommended dose of fertilizers. Use of organic manure and use of site specific micro-nutrient	Technology transfer through field demonstrations, trainings and extension literature	Entire chickpea growing area	Increase in productivity with sustainable soil health
vii.	High incidence of weeds	Different spp. weeds that competes with main crop	Application of pre emergence weedicide that is pendimethalin	Technology transfer through field demonstrations, trainings and extension literature	Entire Pigeonpea growing area	Increase in production and availability of pulses
i.	Moisture stress	Cultivated as a rainfed crop in Rabi.	Cultivate early variety and sowing at right time	Timely sowing and supplementation of irrigation at flowering and podding stage in case of prolonged drought.	Irrigation infrastructure improvement	
ii.	Diseases and pests	YMV and pod borers are major constrains.	Diseases and pests control measures.	Cultivation of resistance varieties and plant protection measures.	Yield improvement	Minimum increase of total production to the tune of 5 per cent

Table- 4.2.205 Closing the Gaps for Realizing the Pulse Crop Vision

Activity Output Matrix				
Activity/Crop/Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
PULSES Production technologies	Late maturing pigeonpea and reduction in pulses yield, late plating of pigeon pea, problem of helicoverpa, pod borer problem, less use of phosphatic fertilizers. Chickpea Management of pod borer	New varieties with short maturity will be tested with the help of KVK. Inter cropping of other crops viz sorghum / maize or bajra under bed planting system. Management of pod borer will be demonstrated. Management strategies will be demonstrated at farmer, field	DDA will facilitate the demonstrations on new varieties, early planting, pod borer management Action DDA	Demonstrations proposed in plan.
1. Water Management	Moisture stress in rainfed pulses	Supply of irrigation at critical crop growth	Development of irrigations facilities	Demonstration proposed
	Salinity stress mitigation at farmers' fields	Green manuring of sun hemp and gypsum use. Tolerant varieties.	Subsidy on gypsum (@ 75 per cent) and its availability be ensured.	Demonstration on green manuring and gypsum proposed.
	Water harvesting and recharging	Construction of water harvesting structures near catchment area of drain, panchayati / farmers land.	DDA/concerned departments in consultation with SAUs scientist	Project on water harvesting proposed.

	Watershed development in rainfed areas	Sprinkler/drip irrigation after creating facility of community ponds/ water harvesting structure.	DDA/concerned departments in consultation with GGRC	Project proposed.
	Ground water testing for fluoride contamination	Survey of marked sites for nitrate contamination and characterization of nitrate contaminated areas.	DDA will conduct survey and identify the areas of high fluoride containing waters.	Survey for study of ground water quality proposed.
2. Management of Salinity	problem in rabi and summer pulses when irrigated with poor quality water.	Cropping pattern will be studied.	Dept. of Agriculture / KVK Survey and soil sampling will be done by DDA and KVK. Demonstrations will be laid out by DDA in collaboration with KVK scientist	Demonstrations required
Weed Control	Annual weeds, biennial weed and perennial weeds	Mechanical control and chemical control	SAUs and departments	To be workout
Mechanizations of Pulses Cultivation and Production	Tractor operated zero till drill and harvesting and threshing equipments	Demonstrations of this equipment for suitability.	SAUs and departments	To be workout
Seed Production	1. Seed planning	1. Selection of improved variety at farmer's field. 2. Motivating farmers to produce the seed of best variety 3. Mandatory testing of new variety through SAUs.	DDAs in consultation with KVKs.	Project proposed.

	2. Best quality seed	Seed production at farmers' field with farmer's participatory	DDA and KVK.	Project proposed.
	3. Seed treatment	1. Motivating farmers to seed treatment 2. Demonstrations will be laid out by DDA in collaboration with KVK scientist	DDA's Data for all activities will be presented in the officers workshop	Survey proposed.
Mechanizations of Pulses Cultivation and Production	Tractor operated zero till drill and harvesting and threshing equipments	Demonstrations of this equipment for suitability.	SAUs and departments	To be workout
Integrated Pest Management and Diseases Management	Wilt, SMD, Pod borer, Maruca, Powdery mildew and YMV etc.	Demonstration of IDM and IPM and supply of extension literature	SAUs and departments	To be workout

4.2.7.8 Recommended Interventions for the State, with Detailed Action Plan with costs:

Table- 4.2.206 Training Proposed for Capacity Building of Agriculture Staff at State Level

Crop	Training for Agricultural staff (state level) (Phy-No. Fin- Rs. In Lakh)						Total	
	2017-18		2018-19		2019-20			
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	11910	73.46	11910	73.5	11910	73.5	35730	220.46
Cooperative & NGOs	6560	39.4	6560	39.4	6560	39.4	19680	118.2
PRI Staff & Others	3325	20.5	3325	20.5	3325	20.5	9975	61.5
Total	21795	133.36	21795	133.4	21795	133.4	65385	400.16

Table 4.2.207 Districtwise Training Proposed for Capacity Building of Agriculture Staff

Sr No	Name of the Districts	Training for Agricultural staff (Phy-No. Fin- Rs. In Lakh)							
		Agriculture							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	500	3	500	3	500	3	1500	9
2	Amreli	450	2.7	450	2.7	450	2.7	1350	8.1
3	Anand	400	2.4	400	2.4	400	2.4	1200	7.2
4	Banaskantha	600	3.6	600	3.6	600	3.6	1800	10.8
5	Bharuch	500	2.5	500	2.5	500	2.5	1500	7.5
6	Bhavnagar	550	5.5	550	5.5	550	5.5	1650	16.5
7	Dahod	500	3	500	3	500	3	1500	9
8	Dang	250	1.5	250	1.5	250	1.5	750	4.5
9	Gandhinagar	400	2.4	400	2.4	400	2.4	1200	7.2
10	Jamnagar	200	1.2	200	1.2	200	1.2	600	3.6
11	Junagadh	700	5.6	700	5.6	700	5.6	2100	16.8
12	Kutch	600	4.2	600	4.2	600	4.2	1800	12.6
13	Kheda	510	3.06	510	3.06	510	3.06	1530	9.18
14	Mehsana	450	2.7	450	2.7	450	2.7	1350	8.1
15	Narmada	200	1.2	200	1.2	200	1.2	600	3.6
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	500	3	500	3	500	3	1500	9
18	Patan	350	2.1	350	2.1	350	2.1	1050	6.3
19	Porbandar	150	1.2	150	1.2	150	1.2	450	3.6
20	Rajkot	500	3	500	3	500	3	1500	9
21	Sabarkantha	600	3.6	600	3.6	600	3.6	1800	10.8
22	Surat	500	3	500	3	500	3	1500	9
23	Surendranagar	500	1	500	1	500	1	1500	3

Sr No	Name of the Districts	Training for Agricultural staff (Phy-No. Fin- Rs. In Lakh)							
		Agriculture							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Tapi	500	3	500	3	500	3	1500	9
25	Vadodara	1500	9	1500	9	1500	9	4500	27
26	Valsad	0	0	0	0	0	0	0	0
	Total	11910	73.46	11910	73.46	11910	73.46	35730	220.38

Cost Norms: 600/ Trainee / Day

Table 4.2.207 District wise Training Proposed for Capacity Building of Agriculture Staff Conti.....

Sr No	Name of the Districts	Training for Agricultural staff (Phy-No. Fin- Rs. In Lakh)							
		Cooperative & NGOs							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	250	1.5	250	1.5	250	1.5	750	4.5
2	Amreli	0	0	0	0	0	0	0	0
3	Anand	400	2.4	400	2.4	400	2.4	1200	7.2
4	Banaskantha	600	3.6	600	3.6	600	3.6	1800	10.8
5	Bharuch	300	1.5	300	1.5	300	1.5	900	4.5
6	Bhavnagar	0	0	0	0	0	0	0	0
7	Dahod	250	1.5	250	1.5	250	1.5	750	4.5
8	Dang	250	1.5	250	1.5	250	1.5	750	4.5
9	Gandhinagar	400	2.4	400	2.4	400	2.4	1200	7.2
10	Jamnagar	150	0.9	150	0.9	150	0.9	450	2.7
11	Junagadh	0	0	0	0	0	0	0	0
12	Kutch	300	2.1	300	2.1	300	2.1	900	6.3
13	Kheda	510	3.06	510	3.06	510	3.06	1530	9.18
14	Mehsana	450	2.7	450	2.7	450	2.7	1350	8.1

Sr No	Name of the Districts	Training for Agricultural staff (Phy-No. Fin- Rs. In Lakh)							
		Cooperative & NGOs							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
15	Narmada	100	0.6	100	0.6	100	0.6	300	1.8
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	200	1.2	200	1.2	200	1.2	600	3.6
18	Patan	350	2.1	350	2.1	350	2.1	1050	6.3
19	Porbandar	0	0	0	0	0	0	0	0
20	Rajkot	250	1.5	250	1.5	250	1.5	750	4.5
21	Sabarkantha	300	1.8	300	1.8	300	1.8	900	5.4
22	Surat	250	1.5	250	1.5	250	1.5	750	4.5
23	Surendranagar	0	0	0	0	0	0	0	0
24	Tapi	250	1.5	250	1.5	250	1.5	750	4.5
25	Vadodara	1000	6	1000	6	1000	6	3000	18
26	Valsad	0	0	0	0	0	0	0	0
	Total	6560	39.36	6560	39.36	6560	39.36	19680	118.08

Table 4.2.207 District wise Training Proposed for Capacity Building of Agriculture Staff *Conti.....*

Sr No	Name of the Districts	Training for Agricultural staff (Phy-No. Fin- Rs. In Lakh)							
		PRI Staff & Others							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	100	0.6	100	0.6	100	0.6	300	1.8
2	Amreli	0	0	0	0	0	0	0	0
3	Anand	200	1.2	200	1.2	200	1.2	600	3.6
4	Banaskantha	300	1.8	300	1.8	300	1.8	900	5.4
5	Bharuch	100	0.5	100	0.5	100	0.5	300	1.5

Sr No	Name of the Districts	Training for Agricultural staff (Phy-No. Fin- Rs. In Lakh)							
		PRI Staff & Others							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
6	Bhavnagar	0	0	0	0	0	0	0	0
7	Dahod	100	0.6	100	0.6	100	0.6	300	1.8
8	Dang	100	0.6	100	0.6	100	0.6	300	1.8
9	Gandhinagar	200	1.2	200	1.2	200	1.2	600	3.6
10	Jamnagar	150	0.9	150	0.9	150	0.9	450	2.7
11	Junagadh	0	0	0	0	0	0	0	0
12	Kutch	100	0.7	100	0.7	100	0.7	300	2.1
13	Kheda	200	1.2	200	1.2	200	1.2	600	3.6
14	Mehsana	225	1.4	225	1.4	225	1.4	675	4.2
15	Narmada	100	0.6	100	0.6	100	0.6	300	1.8
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	0	0	0	0	0	0	0	0
18	Patan	175	1.5	175	1.5	175	1.5	525	4.5
19	Porbandar	0	0	0	0	0	0	0	0
20	Rajkot	250	1.5	250	1.5	250	1.5	750	4.5
21	Sabarkantha	325	1.95	325	1.95	325	1.95	975	5.85
22	Surat	100	0.6	100	0.6	100	0.6	300	1.8
23	Surendranagar	0	0	0	0	0	0	0	0
24	Tapi	100	0.6	100	0.6	100	0.6	300	1.8
25	Vadodara	500	3	500	3	500	3	1500	9
26	Valsad	0	0	0	0	0	0	0	0
	Total	3325	20.5	3325	20.5	3325	20.5	9975	61.5

Table 4.2.208 Training Proposed for Capacity Building of farmers at district level

Sr No	Name of the Districts	Year wise No. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)						TOTAL	
		2017-18		2018-19		2019-20		Phy	Fin
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	5000	10	5000	10	5000	10	15000	30
2	Amreli	5500	11	5500	11	5500	11	16500	33
3	Anand	4000	8	4000	8	4000	8	12000	24
4	Banaskantha	6000	12	6000	12	6000	12	18000	36
5	Bharuch	4000	8	4000	8	4000	8	12000	24
6	Bhavnagar	5500	11	5500	11	5500	11	16500	33
7	Dahod	3500	7	3500	7	3500	7	10500	21
8	Dang	500	1	500	1	500	1	1500	3
9	Gandhinagar	2000	4	2000	4	2000	4	6000	12
10	Jamnagar	5000	10	5000	10	5000	10	15000	30
11	Junagadh	7000	14	7000	14	7000	14	21000	42
12	Kutch	5000	10	5000	10	5000	10	15000	30
13	Kheda	5000	10	5000	10	5000	10	15000	30
14	Mehsana	4500	9	4500	9	4500	9	13500	27
15	Narmada	2000	4	2000	4	2000	4	6000	12
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	5500	11	5500	11	5500	11	16500	33
18	Patan	4000	8	4000	8	4000	8	12000	24
19	Porbandar	1500	3	1500	3	1500	3	4500	9
20	Rajkot	7000	14	7000	14	7000	14	21000	42
21	Sabarkantha	6500	13	6500	13	6500	13	19500	39
22	Surat	5000	10	5000	10	5000	10	15000	30
23	Surendranagar	5000	10	5000	10	5000	10	15000	30
24	Tapi	2500	5	2500	5	2500	5	7500	15

Sr No	Name of the Districts	Year wise No. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)						TOTAL	
		2017-18		2018-19		2019-20		Phy	Fin
		Phy	Fin	Phy	Fin	Phy	Fin		
25	Vadodara	6000	12	6000	12	6000	12	18000	36
26	Valsad	0	0	0	0	0	0	0	0
	Total	107500	215	107500	215	107500	215	322500	645

Cost Norms: 200/ Trainee / Day

Table 4.2.209 Training Proposed for Capacity Building of Farmers at state level on different technologies

Name of technology to be transferred	Year wise no. of farmers to be trained (Phy-No. Fin- Rs. In Lakh)						TOTAL	
	2017-18		2018-19		2019-20		Phy	Fin
	Phy	Fin	Phy	Fin	Phy	Fin		
INM	37090	130.8	37090	130.8	37090	130.8	111270	392.78
NRM	19960	73.58	19960	73.58	19960	73.58	59880	211.38
IPM	30660	114.68	30660	114.7	30660	114.7	91980	324.69
RCTs	27310	100.28	27310	100.3	27310	100.3	81930	289.21
Water management	24680	88.55	24680	88.55	24680	88.55	74040	261.36
Post Harvest Management	13480	48.63	13480	48.63	13480	48.63	40440	142.75
Women empowerment	6090	24.26	6090	24.26	6090	24.26	18270	64.493
Credit & marketing	17840	67.52	17840	67.52	17840	67.52	53520	214.08
Seed Production	21850	79.72	21850	79.72	21850	79.72	65550	231.39
Farm waste managt.	13340	45.03	13340	45.03	13340	45.03	40020	141.27
Vermicomposting	6500	22.51	6500	22.51	6500	22.51	19500	68.835
Farm Mechanization	17650	65.9	17650	65.9	17650	65.9	52950	186.91
Renewable energy	2990	12.37	2990	12.37	2990	12.37	73590	259.77
Total	239440	873.83	239440	873.87	239440	873.87	782940	2788.9

Rs 353/- per farmer

Table 4.2.210 Districtwise Training Proposed for Capacity Building of Farmers at District level on different technologies

(Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	INM				NRM				IPM				RCTs			
		2017-18		2017-2020		2017-18		2017-2020		2017-18		2017-2020		2017-18		2017-2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2100	8.40	6300	25.2	2100	8.40	6300	25.2	2100	8.40	6300	25.2	2100	8.40	6300	25.2
2	Amreli	3300	9.90	9900	29.7	1650	4.95	4950	14.85	1650	4.95	4950	14.85	1100	3.30	3300	9.9
3	Anand	960	3.84	2880	11.5	640	2.56	1920	7.68	960	3.84	2880	11.52	960	3.84	2880	11.52
4	Banaskantha	1440	5.76	4320	17.2	960	3.84	2880	11.52	1440	5.76	4320	17.28	1440	5.76	4320	17.28
5	Bharuch	1260	3.78	3780	11.3	1260	3.78	3780	11.34	1260	3.78	3780	11.34	1260	3.78	3780	11.34
6	Bhavnagar	3300	9.90	9900	29.7	1650	4.95	4950	14.85	1650	4.95	4950	14.85	1100	3.30	3300	9.9
7	Dahod	1050	4.20	3150	12.6	700	2.80	2100	8.4	1050	4.20	3150	12.6	1050	4.20	3150	12.6
8	Dang	550	2.20	1650	6.6	500	2.80	1500	8.4	550	2.20	1650	6.6	550	2.20	1650	6.6
9	Gandhinagar	480	1.92	1440	5.76	350	1.40	1050	4.2	550	2.20	1650	6.6	550	2.20	1650	6.6
10	Jamnagar	3000	9.00	9000	27	0	0.00	0	0	1500	4.50	4500	13.5	0	0.00	0	0
11	Junagadh	4000	12.00	12000	36	700	2.00	2100	6	2000	6.00	6000	18	0	0.00	0	0
12	Kutch	800	2.40	2400	7.2	600	1.80	1800	5.4	800	2.40	2400	7.2	700	2.10	2100	6.3
13	Kheda	1020	4.08	3060	12.2	540	2.16	1620	6.48	1020	4.08	3060	12.24	1020	4.08	3060	12.24
14	Mehsana	1080	4.32	3240	12.9	720	2.88	2160	8.64	1080	4.32	3240	12.96	1080	4.32	3240	12.96
15	Narmada	1000	3.00	3000	9	500	1.50	1500	4.5	100	3.00	300	9	1000	3.00	3000	9
16	Navsari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Panchmahal	1500	6.00	4500	18	0	0.00	0	0	1500	6.00	4500	18	0	0.00	0	0
18	Patan	1500	6.00	4500	18	1000	4.00	3000	12	1200	5.50	3600	16.5	1400	5.70	4200	17.1
19	Porbandar	250	1.00	750	3	250	1.00	750	3	250	1.00	750	3	500	2.00	1500	6
20	Rajkot	2500	7.50	7500	22.5	1500	4.50	4500	13.5	3000	9.00	9000	27	3000	9.00	9000	27

Sr No	Name of the Districts	INM				NRM				IPM				RCTs			
		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017-2020		2017-18		2017-2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Sabarkantha	1300	5.20	3900	15.6	1040	4.16	3120	12.48	1300	5.20	3900	15.6	1300	5.20	3900	15.6
22	Surat	1050	4.20	3150	12.6	700	2.80	2100	8.4	1050	4.20	3150	12.6	1050	4.20	3150	12.6
23	Surendranaga	500	1.50	1500	4.5	500	1.50	1500	4.5	1500	4.50	4500	13.5	3000	9.00	9000	27
24	<u>Tapi</u>	1050	4.20	3150	12.6	700	2.80	2100	8.4	1050	4.20	3150	12.6	1050	4.20	3150	12.6
25	Vadodara	2100	10.50	6300	31.5	1400	7.00	4200	21	2100	10.50	6300	31.5	2100	10.50	6300	31.5
26	Valsad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	37090	130.80	11127	392.	1996	73.5	5988	220.7	3066	114.6	9198	344.0	2731	100.2	8193	300.8

Table 4.2.210 Districtwise Training Proposed for Capacity Building of Farmers at District level on different technologies

...continue (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Water management				Post-Harvest Management				Women empowerment			
		2017-18		2017 -2020		2017-18		2017 -2022		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1750	7.00	5250	21	700	2.8	2100	8.4	200	0.8	600	2.4
2	Amreli	1650	4.95	4950	14.85	700	2.8	2100	8.4	200	0.8	600	2.4
3	Anand	640	2.56	1920	7.68	640	2.56	1920	7.68	200	0.8	600	2.4
4	Banaskantha	960	3.84	2880	11.52	600	2.4	1800	7.2	250	1	750	3
5	Bharuch	1050	3.15	3150	9.45	700	2.8	2100	8.4	150	0.6	450	1.8
6	Bhavnagar	1650	4.95	4950	14.85	700	2.8	2100	8.4	200	0.8	600	2.4
7	Dahod	700	2.80	2100	8.4	400	1.6	1200	4.8	250	1	750	3
8	<u>Dang</u>	500	2.80	1500	8.4	500	2	1500	6	250	1	750	3
9	Gandhinagar	350	1.40	1050	4.2	350	1.4	1050	4.2	250	1	750	3
10	Jamnagar	1500	4.50	4500	13.5	800	3.2	2400	9.6	250	1	750	3

Sr No	Name of the Districts	Water management				Post-Harvest Management				Women empowerment			
		2017-18		2017 -2020		2017-18		2017 -2022		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Junagadh	1500	4.50	4500	13.5	700	2.8	2100	8.4	250	1	750	3
12	Kutch	600	1.80	1800	5.4	600	2.4	1800	7.2	290	1.16	870	3.48
13	Kheda	540	2.16	1620	6.48	540	2.16	1620	6.48	250	1	750	3
14	Mehsana	720	2.88	2160	8.64	620	2.48	1860	7.44	300	1.2	900	3.6
15	Narmada	500	1.50	1500	4.5	500	2	1500	6	250	1	750	3
16	Navsari	--	--	0	0	0	0	0	0	0	0	0	0
17	Panchmahal	1000	4.00	3000	12	500	2	1500	6	250	1	750	3
18	Patan	980	4.00	2940	12	480	1.92	1440	5.76	250	1	750	3
19	Porbandar	250	1.00	750	3	250	1	750	3	250	1	750	3
20	Rajkot	1500	4.50	4500	13.5	500	2	1500	6	250	1	750	3
21	Sabarkantha	1040	4.16	3120	12.48	500	2	1500	6	250	1	750	3
22	Surat	700	2.80	2100	8.4	700	2.8	2100	8.4	250	1	750	3
23	Surendranagar	2500	7.50	7500	22.5	500	2	1500	6	250	1	750	3
24	Tapi	700	2.80	2100	8.4	500	2	1500	6	400	1.6	1200	4.8
25	Vadodara	1400	7.00	4200	21	500	2	1500	6	400	1.6	1200	4.8
26	Valsad	--	--	0	0	0	0	0	0	0	0	0	0
	Total	24680	88.55	74040	265.65	13480	53.92	40440	161.76	6090	24.36	18270	73.08

Table 4.2.210 Districtwise Training Proposed for Capacity Building of Farmers District level on different technologies....continue (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Credit & marketing				Seed Production				Farm waste managt.				Vermi composting			
		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1400	5.6	4200	16.8	1400	4.94	4200	14.8	1750	6.18	5250	18.5	350	1.24	1050	3.70
2	Amreli	1650	6.6	4950	19.8	1650	5.82	4950	17.4	1100	3.88	3300	11.6	110	3.88	3300	11.6
3	Anand	640	2.56	1920	7.68	640	2.26	1920	6.78	320	1.13	960	3.39	160	0.56	480	1.69
4	Banaskantha	960	3.84	2880	11.5	960	3.39	2880	10.1	480	1.69	1440	5.08	240	0.85	720	2.54
5	Bharuch	640	2.56	1920	7.68	640	2.26	1920	6.78	250	0.88	750	2.65	250	0.88	750	2.64
6	Bhavnagar	1650	6.6	4950	19.8	1650	5.82	4950	17.4	1100	3.88	3300	11.6	110	3.88	3300	11.6
7	Dahod	700	2.8	2100	8.4	700	2.47	2100	7.41	250	0.88	750	2.65	100	0.35	300	1.05
8	Dang	500	2	1500	6	500	1.77	1500	5.30	250	0.88	750	2.65	100	0.35	300	1.05
9	Gandhinagar	350	1.4	1050	4.2	350	1.24	1050	3.71	130	0.46	390	1.38	50	0.18	150	0.52
10	Jamnagar	250	1	750	3	1000	3.53	3000	10.5	0	0.00	0	0.00	0	0.00	0	0
11	Junagadh	250	1	750	3	1400	4.94	4200	14.8	1400	4.94	4200	14.8	700	2.47	2100	7.41
12	Kutch	600	2.4	1800	7.2	600	2.12	1800	6.35	300	1.06	900	3.18	200	0.71	600	2.11
13	Kheda	540	2.16	1620	6.48	540	1.91	1620	5.72	280	0.99	840	2.97	140	0.49	420	1.48
14	Mehsana	720	2.88	2160	8.64	720	2.54	2160	7.62	360	1.27	1080	3.81	180	0.64	540	1.90
15	Narmada	250	1	750	3	500	1.77	1500	5.30	500	1.77	1500	5.30	500	1.77	1500	5.29
16	Navsari	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
17	Panchmahal	1000	4	3000	12	1000	3.53	3000	10.5	200	0.71	600	2.12	0	0.00	0	0
18	Patan	900	3.6	2700	10.8	1000	3.53	3000	10.5	400	1.41	1200	4.24	210	0.74	630	2.22
19	Porbandar	0	0	0	0	250	0.88	750	2.65	250	0.88	750	2.65	0	0.00	0	0
20	Rajkot	750	3	2250	9	1250	4.41	3750	13.2	1500	5.30	4500	15.8	0	0.00	0	0
21	Sabarkantha	1040	4.16	3120	12.4	1300	4.59	3900	13.7	520	1.84	1560	5.51	520	1.84	1560	5.50
22	Surat	700	2.8	2100	8.4	700	2.47	2100	7.41	250	0.88	750	2.65	100	0.35	300	1.05

Sr No	Name of the Districts	Credit & marketing				Seed Production				Farm waste managt.				Vermi composting			
		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
23	Surendranag	250	1	750	3	1000	3.53	3000	10.5	1000	3.53	3000	10.5	0	0.00	0	0
24	Tapi	700	2.8	2100	8.4	700	2.47	2100	7.41	250	0.88	750	2.65	100	0.35	300	1.05
25	Vadodara	1400	5.6	4200	16.8	1400	4.94	4200	14.8	500	1.77	1500	5.30	400	1.41	1200	4.23
26	Valsad	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0
	Total	1784	71.3	5352	214.	2185	77.1	6555	231.	1334	47.0	4002	141.	650	22.9	1950	68.8

Cost Norms: 400/ Trainee / Day

Table 4.2.210 Districtwise Training Proposed for Capacity Building of Farmers District level on different technologies

Continue (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Farm Mech.				Renewable energy				Total			
		2017-18		2017 -2020		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	350	1.4	1050	4.2	350	1.24	1050	3.71	16650	64.63	49950	193.88
2	Amreli	1650	4.95	4950	14.85	1650	5.82	4950	17.47	19050	63.49	57150	190.47
3	Anand	640	2.56	1920	7.68	640	2.26	1920	6.78	8040	31.03	24120	93.10
4	Banaskantha	960	3.84	2880	11.52	960	3.39	2880	10.17	11650	44.91	34950	134.72
5	Bharuch	700	2.1	2100	6.3	700	2.47	2100	7.41	10120	33.20	30360	99.59
6	Bhavnagar	1650	4.95	4950	14.85	1650	5.82	4950	17.47	19050	63.49	57150	190.47
7	Dahod	700	2.8	2100	8.4	700	2.47	2100	7.41	8350	32.25	25050	96.75
8	Dang	500	2.8	1500	8.4	500	1.77	1500	5.30	5750	23.73	17250	71.19
9	Gandhinagar	350	1.4	1050	4.2	350	1.24	1050	3.71	4460	17.26	13380	51.79
10	Jamnagar	0	0	0	0	0	0.00	0	0.00	8300	26.73	24900	80.19
11	Junagadh	1000	3	3000	9	1000	3.53	3000	10.59	14900	48.72	44700	146.15
12	Kutch	550	1.65	1650	4.95	550	1.94	1650	5.82	7190	24.23	21570	72.68

13	Kheda	540	2.16	1620	6.48	540	1.91	1620	5.72	7510	29.08	22530	87.24
14	Mehsana	720	2.88	2160	8.64	720	2.54	2160	7.62	9020	34.81	27060	104.43
15	Narmada	250	0.75	750	2.25	250	0.88	750	2.65	6100	23.06	18300	69.18
16	Navsari	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00
17	Panchmahal	1000	4	3000	12	1000	3.53	3000	10.59	8950	34.30	26850	102.89
18	Patan	1200	4.5	3600	13.5	1200	4.24	3600	12.71	11720	45.88	35160	137.63
19	Porbandar	0	0	0	0	0	0.00	0	0.00	2500	9.77	7500	29.30
20	Rajkot	750	2.5	2250	7.5	750	2.65	2250	7.94	17250	55.50	51750	166.51
21	Sabarkantha	1040	4.16	3120	12.48	1040	3.67	3120	11.01	12190	46.68	36570	140.05
22	Surat	700	2.8	2100	8.4	700	2.47	2100	7.41	8650	33.45	25950	100.35
23	Surendranagar	300	0.9	900	2.7	300	1.06	900	3.18	11600	37.18	34800	111.53
24	<u>Tapi</u>	700	2.8	2100	8.4	700	2.47	2100	7.41	8600	33.25	25800	99.75
25	Vadodara	1400	7	4200	21	1400	4.94	4200	14.83	16500	72.70	49500	218.11
26	Valsad	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00
	Total	17650	65.9	52950	197.7	17650	62.30	52950	186.91	254100	929.30	762300	2787.91

Cost Norms: 400/ Trainee / Day

Table 4.2.211 District wise Varietal Demonstration (Phy-No. Fin- Rs. In Lakh)

Sr No	Name of the Districts	Year wise Varietal Demonstration						Total	
		2017-18		2018-19		2019-20		Phy	Fin
		Phy	Fin	Phy	Fin	Phy	Fin		
Pigeonpea									
1	Bharuch	400	20.0	400	20.0	400	20.0	1200	60.0
2	Dahod	400	20.0	400	20.0	400	20.0	1200	60.0
3	Narmada	400	20.0	400	20.0	400	20.0	1200	60.0
4	Panchmahal	400	20.0	400	20.0	400	20.0	1200	60.0
5	Sabarkantha	400	20.0	400	20.0	400	20.0	1200	60.0
6	Surat	400	20.0	400	20.0	400	20.0	1200	60.0
7	<u>Tapi</u>	300	15.0	300	15.0	300	15.0	900	45.0
8	Vadodara	400	20.0	400	20.0	400	20.0	1200	60.0
Mungbean									
	Banaskantha	400	20.0	400	20.0	400	20.0	1200	60.0
	Mahesana	300	15.0	300	15.0	300	15.0	900	45.0
	Patan	400	20.0	400	20.0	400	20.0	1200	60.0
	Kutch	400	20.0	400	20.0	400	20.0	1200	60.0
Urdbean									
	Patan	400	20.0	400	20.0	400	20.0	1200	60.0
	Vadodara	400	20.0	400	20.0	400	20.0	1200	60.0
	Mahesana	300	15.0	300	15.0	300	15.0	1500	75.0
	Banaskantha	400	20.0	400	20.0	400	20.0	1200	60.0
	Dahod	400	20.0	400	20.0	400	20.0	1200	60.0
	Dang	300	15.0	300	15.0	300	15.0	900	45.0
	Valsad	300	15.0	300	15.0	300	15.0	900	45.0
Chickpea									

	Dahod,	500	25.0	500	25.0	500	25.0	1500	75.0
	Jamnagar	300	15.0	300	15.0	300	15.0	900	45.0
	Ahemedabad	300	15.0	300	15.0	300	15.0	900	45.0
	Panchmahal	400	20.0	400	20.0	400	20.0	1200	60.0
	Porbandar	300	15.0	300	15.0	300	15.0	900	45.0
Mothbean									
	Kutch	500	25.0	500	25.0	500	25.0	1500	75.0
	Banaskantha	300	15.0	300	15.0	300	15.0	900	45.0
	Patan	300	15.0	300	15.0	300	15.0	900	45.0
	Mahesana	300	15.0	300	15.0	300	15.0	900	45.0
	Sabarkantha,	300	15.0	300	15.0	300	15.0	900	45.0
	Mahesana	300	15.0	300	15.0	300	15.0	900	45.0
	Gadhinar	300	15.0	300	15.0	300	15.0	900	45.0
Cowpea									
	Anand	100	05.0	100	05.0	100	05.0	500	25.0
	Mahesana	100	05.0	100	05.0	100	05.0	500	25.0
Indianbean									
	Navsari	300	15.0	300	15.0	300	15.0	900	45.0
	Surat	300	15.0	300	15.0	300	15.0	900	45.0
	Total	12000	600	12000	600	12000	600	36000	1800

Cost norms - Rs 5000/acre/demonstration

Table 4.2.212 Districtwise seed production Demonstrations (Phy Area covered in ha) (Fin - Rs. In lakh) in state

Cost norms – Rs 5000/ha/demonstration

Sr. No.	District	No. of Taluk a	No. of Villages/ District/	Seed rate kg/ha	Pulses Seed village programme (Seed production						Total	
					2017-18		2018-19		2019-20		Phy	Fin
					Phy	Fin	Phy	Fin	Phy	Fin		
1	Ahmedabad	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
2	Amreli	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
3	Anand	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
4	Banaskantha	10	40	20	200	5.0	200	5.0	200	5.0	600	15
5	Bharuch	10	40	20	200	5.0	200	5.0	200	5.0	600	15
6	Bhavnagar	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
7	Dahod	10	40	20	200	5.0	200	5.0	200	5.0	1000	15
8	Dang	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
9	Gandhinagar	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
10	Jamnagar	10	40	20	200	5.0	200	5.0	200	5.0	600	15
11	Junagadh	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
12	Kutch	10	40	20	200	5.0	200	5.0	200	5.0	600	15
13	Kheda	10	40	20	200	5.0	200	5.0	200	5.0	600	15
14	Mehsana	10	40	20	200	5.0	200	5.0	200	5.0	600	15
15	Narmada	10	40	20	200	5.0	200	5.0	200	5.0	600	15
16	Navsari	10	40	20	200	5.0	200	5.0	200	5.0	600	15
17	Panchmahal	10	40	20	200	5.0	200	5.0	200	5.0	600	15
18	Patan	10	40	20	200	5.0	200	5.0	200	5.0	600	15
19	Porbandar	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
20	Rajkot	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
21	Sabarkantha	10	40	20	200	5.0	200	5.0	200	5.0	600	15
22	Surat	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5

Sr. No.	District	No. of Taluk a	No. of Villages/ District/	Seed rate kg/ha	Pulses Seed village programme (Seed production						Total	
					2017-18		2018-19		2019-20		Phy	Fin
					Phy	Fin	Phy	Fin	Phy	Fin		
23	Surendranaga	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
24	Tapi	10	40	20	200	5.0	200	5.0	200	5.0	600	15
25	Vadodara	10	40	20	200	5.0	200	5.0	200	5.0	600	15
26	Valsad	5	20	20	100	2.5	100	2.5	100	2.5	300	7.5
	Total	200	800	520	4000	100	4000	100	4000	100	2000	50

Table 4.2.213 District wise INM Demonstrations (Phy Area covered in ha) (Fin – Rs. In lakh) in state Cost norms – Rs 5000/ha/demonstration

Sr	Name of the Districts	Year wise INM Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	250	12.5	250	12.5	250	12.5	750	37.5
2	Anand	200	10	200	10	200	10	600	30
3	Banaskantha	150	7.5	150	7.5	150	7.5	450	22.5
4	Bharuch	225	11.25	225	11.25	225	11.25	675	33.75
5	Dahod	250	12.5	250	12.5	250	12.5	750	37.5
6	Dang	70	3.5	70	3.5	70	3.5	210	10.5
7	Gandhinagar	40	2	40	2	40	2	120	6
8	Kheda	150	7.5	150	7.5	150	7.5	450	22.5
9	Mehsana	450	22.5	450	22.5	450	22.5	1350	67.5
10	Narmada	125	6.25	125	6.25	125	6.25	375	18.75
11	Navsari	100	5	100	5	100	5	300	15
12	Panchmahal	345	17.25	345	17.25	345	17.25	1035	51.75
13	Patan	250	12.5	250	12.5	250	12.5	750	37.5

Sr	Name of the Districts	Year wise INM Demonstration							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
14	Sabarkantha	350	17.5	350	17.5	350	17.5	1050	52.5
15	Surat	250	12.5	250	12.5	250	12.5	750	37.5
16	Tapi	350	17.5	350	17.5	3150	17.5	3850	52.5
17	Vadodara	420	21	420	21	420	21	1260	63
18	Valsad	1	10	200	10	200	10	401	30
19	Amreli	300	15	300	15	300	15	900	45
20	Bhavnagar	100	5	100	5	100	5	300	15
21	Jamnagar	100	5	100	5	100	5	300	15
22	Junagadh	450	22.5	450	22.5	450	22.5	1350	67.5
23	Kutch	60	3	60	3	60	3	180	9
24	Porbandar	50	2.5	50	2.5	50	2.5	150	7.5
25	Rajkot	350	17.5	350	17.5	350	17.5	1050	52.5
26	Surendranagar	100	5	100	5	100	5	300	15
	Total	5685	284.25	5685	284.25	5685	284.25	17055	852.75

Table 4.2.214 Demonstrations on Resource Conservation Technologies (Phy Area covered in ha) (Fin – Rs. In lakh) in the state

Resources management	Year wise no. of Demonstrations							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Nutrient (Micro/Macro)	5685	284.25	5385	269.25	5385	269.25	16455	822.75
Weedicides	3500	175	3500	175	3500	175	10500	525
Rhizobium culture	3000	150	3000	150	3000	150	9000	450
Total	12185	609.25	11885	594.25	11885	594.25	35955	1797.75

Cost norms – Rs 5000/ha demonstration area 0.40 ha

Table 4.2.215 District wise Demonstrations on Resource Conservation Technologies (Phy Area covered in ha) (Fin – Rs. In lakh)

Sr No	Name of the Districts	Laser levelling							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	300	15	300	15	300	15	900	45
2	Amreli	320	16	320	16	320	16	960	48
3	Anand	320	16	320	16	320	16	960	48
4	Banaskantha	600	30	600	30	600	30	1800	90
5	Bharuch	250	12.5	250	12.5	250	12.5	750	37.5
6	Bhavnagar	320	16	320	16	320	16	960	48
7	Dahod	200	10	200	10	200	10	600	30
8	Dang	300	15	300	15	300	15	900	45
9	Gandhinagar	150	7.5	150	7.5	150	7.5	450	22.5
10	Jamnagar	250	12.5	250	12.5	250	12.5	750	37.5
11	Junagadh	350	17.5	350	17.5	350	17.5	1050	52.5
12	Kutch	1000	50	1000	50	1000	50	3000	150
13	Kheda	200	10	200	10	200	10	600	30
14	Mehsana	450	22.5	450	22.5	450	22.5	1350	67.5
15	Narmada	250	12.5	250	12.5	250	12.5	750	37.5

Sr No	Name of the Districts	Laser levelling							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	300	15	300	15	300	15	900	45
18	Patan	400	20	400	20	400	20	1200	60
19	Porbandar	150	7.5	150	7.5	150	7.5	450	22.5
20	Rajkot	320	16	320	16	320	16	960	48
21	Sabarkantha	650	32.5	650	32.5	650	32.5	1950	97.5
22	Surat	300	15	300	15	300	15	900	45
23	Surendranagar	320	16	320	16	320	16	960	48
24	Tapi	300	15	300	15	300	15	900	45
25	Vadodara	400	20	400	20	400	20	1200	60
26	Valsad	0	0	0	0	0	0	0	0
	Total	8400	420	8400	420	8400	420	25200	1260

Cost norms - Rs 5000/ha demonstration area 0.40 ha C-DAP

Table 4.2.215 Districtwise Demonstrations on Resource Conservation Technologies

.....continue

Sr No	Name of the Districts	Green manuring (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	500	25	500	25	500	25	1500	75
2	Amreli	320	16	320	16	320	16	960	48
3	Anand	400	20	400	20	400	20	1200	60
4	Banaskantha	600	30	600	30	600	30	1800	90
5	Bharuch	500	25	500	25	500	25	1500	75
6	Bhavnagar	320	16	320	16	320	16	960	48
7	Dahod	1000	50	1000	50	1000	50	3000	150
8	Dang	250	12.5	250	12.5	250	12.5	750	37.5
9	Gandhinagar	400	20	400	20	400	20	1200	60
10	Jamnagar	250	12.5	250	12.5	250	12.5	750	37.5
11	Junagadh	350	17.5	350	17.5	350	17.5	1050	52.5
12	Kutch	400	20	400	20	400	20	1200	60
13	Kheda	500	25	500	25	500	25	1500	75
14	Mehsana	650	32.5	650	32.5	650	32.5	1950	97.5
15	Narmada	250	12.5	250	12.5	250	12.5	750	37.5
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	500	25	500	25	500	25	1500	75
18	Patan	400	20	400	20	400	20	1200	60
19	Porbandar	150	7.5	150	7.5	150	7.5	450	22.5
20	Rajkot	320	16	320	16	320	16	960	48
21	Sabarkantha	320	16	320	16	320	16	960	48
22	Surat	500	25	500	25	500	25	1500	75

Sr No	Name of the Districts	Green manuring (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
23	Surendranagar	400	20	400	20	400	20	1200	60
24	Tapi	500	25	500	25	500	25	1500	75
25	Vadodara	400	20	400	20	400	20	1200	60
26	Valsad	0	0	0	0	0	0	0	0
	Total	10180	509	10180	509	10180	509	30540	1527

Cost norms – Rs 5000/ha demonstration area 0.40 ha

Table 4.2.216 Districtwise Farmer Field Schools covering identified critical technologies

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	2	10	2	10	2	30	6
2	Amreli	32	6.4	32	6.4	32	6.4	96	19.2
3	Anand	40	8	40	8	40	8	120	24
4	Banaskantha	24	4.8	24	4.8	24	4.8	72	14.4
5	Bharuch	4	0.8	4	0.8	4	0.8	12	2.4
6	Bhavnagar	9	1.8	9	1.8	9	1.8	27	5.4
7	Dahod	20	4	20	4	20	4	60	12
8	Dang	2	0.4	2	0.4	2	0.4	6	1.2
9	Gandhinagar	20	4	20	4	20	4	60	12
10	Jamnagar	38	7.6	38	7.6	38	7.6	114	22.8
11	Junagadh	100	20	100	20	100	20	300	60
12	Kutch	20	4	20	4	20	4	60	12

Sr No	Name of the Districts	Year wise Farmers Field School (Phy-No. Fin- Rs. In Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
13	Kheda	50	10	50	10	50	10	150	30
14	Mehsana	90	18	90	18	90	18	270	54
15	Narmada	5	1	5	1	5	1	15	3
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	10	2	10	2	10	2	30	6
18	Patan	6	1.2	6	1.2	6	1.2	18	3.6
19	Porbandar	25	5	25	5	25	5	75	15
20	Rajkot	90	18	90	18	90	18	270	54
21	Sabarkantha	26	5.2	26	5.2	26	5.2	78	15.6
22	Surat	5	1	5	1	5	1	15	3
23	Surendranagar	40	8	40	8	40	8	120	24
24	Tapi	15	3	15	3	15	3	45	9
25	Vadodara	10	2	10	2	10	2	30	6
26	Valsad	0	0	0	0	0	0	0	0
	Total	691	138	691	138	691	138	2073	414

Cost norms Rs. 20,000/- per School

Table 4.2.217 Group formation /Commodity interest groups formation for specific activities (state)

Interest Group	Year wise no. of Group formation (Phy-No. Fin- Rs. In Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Seed production	926	185.2	926	185.2	926	185.2	2778	555.6
Organic Farming	407	80.8	407	80.8	407	80.8	1221	242.4
Value addition	395	79	395	79	395	79	1185	237
Specific Crop group	658	131.6	658	131.6	658	131.6	1974	394.8
Total	2371	474.2	2371	474.2	2371	474.2	7113	1422.6

Cost norms- Rs.0.20 lacs/group (for capacity building, input assistance, marketing and for group specific activities)

Table 4.2.218 Districtwise Group formation / Commodity interest groups formation for specific activities (Phy-No. Fin- Rs. In Lakh)

Sr. No.	Name of the Districts	Seed Production				Organic Farming				Value addition			
		2017-18		2017-2020		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	4	60	12	2	0.4	6	1.2	5	1	15	3
2	Amreli	40	8	120	24	16	3.2	48	9.6	8	1.6	24	4.8
3	Anand	40	8	120	24	16	3.2	48	9.6	8	1.6	24	4.8
4	Banaskantha	40	8	120	24	16	3.2	48	9.6	24	4.8	72	14.4
5	Bharuch	20	4	60	12	2	0.4	6	1.2	5	1	15	3
6	Bhavnagar	15	3	45	9	7	1.4	21	4.2	15	3	45	9
7	Dahod	15	3	45	9	7	1.4	21	4.2	15	3	45	9
8	Dang	20	4	60	12	5	1	15	3	5	1	15	3
9	Gandhinagar	20	4	60	12	8	1	24	3	4	0.8	12	2.4

Sr. No.	Name of the Districts	Seed Production				Organic Farming				Value addition			
		2017-18		2017-2020		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	Jamnagar	40	8	120	24	16	3.2	48	9.6	8	1.6	24	4.8
11	Junagadh	111	22.2	333	66.6	73	14.6	219	43.8	80	16	240	48
12	Kutch	30	6	90	18	20	4	60	12	10	2	30	6
13	Kheda	50	10	150	30	20	4	60	12	10	2	30	6
14	Mehsana	111	22.2	333	66.6	73	14.6	219	43.8	80	16	240	48
15	Narmada	20	4	60	12	2	0.4	6	1.2	5	1	15	3
16	Navsari	0	0	0	0	0	0	0	0	0	0	0	0
17	Panchmahal	20	4	60	12	2	0.4	6	1.2	15	3	45	9
18	Patan	40	8	120	24	16	3.2	48	9.6	24	4.8	72	14.4
19	Porbandar	15	3	45	9	7	1.4	21	4.2	15	3	45	9
20	Rajkot	40	8	120	24	16	3.2	48	9.6	8	1.6	24	4.8
21	Sabarkantha	39	7.8	117	23.4	13	2.6	39	7.8	13	2.6	39	7.8
22	Surat	20	4	60	12	2	0.4	6	1.2	5	1	15	3
23	Surendranagar	40	8	120	24	16	3.2	48	9.6	8	1.6	24	4.8
24	Tapi	20	4	60	12	2	0.4	6	1.2	5	1	15	3
25	Vadodara	100	20	300	60	50	10	150	30	20	4	60	12
26	Valsad	0	0	0	0	0	0	0	0	0	0	0	0
	Total	926	185.2	2778	555.6	407	80.8	1221	242.4	395	79	1185	237

Cost norms- Rs.0.20 lacs/group (for capacity building, input assistance, marketing and for group specific activities)

Table 4.2.218 Districtwise Group formation / Commodity interest groups formation for specific activities conti..

(Phy-No. Fin- Rs. In Lakh)

Sr. No.	Name of the Districts	Specific Crop group				Total			
		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	2	30	6	37	7.4	111	22.2
2	Amreli	32	6.4	96	19.2	96	19.2	288	57.6
3	Anand	32	6.4	96	19.2	96	19.2	288	57.6
4	Banaskantha	32	6.4	96	19.2	112	22.4	336	67.2
5	Bharuch	10	2	30	6	37	7.4	111	22.2
6	Bhavnagar	15	3	45	9	52	10.4	156	31.2
7	Dahod	15	3	45	9	52	10.4	156	31.2
8	Dang	10	2	30	6	40	8	120	24
9	Gandhinagar	16	3.2	48	9.6	48	9	144	27
10	Jamnagar	32	6.4	96	19.2	96	19.2	288	57.6
11	Junagadh	72	14.4	216	43.2	336	67.2	1008	201.6
12	Kutch	30	6	90	18	90	18	270	54
13	Kheda	40	8	120	24	120	24	360	72
14	Mehsana	72	14.4	216	43.2	336	67.2	1008	201.6
15	Narmada	10	2	30	6	37	7.4	111	22.2
16	Navsari	0	0	0	0	0	0	0	0
17	Panchmahal	10	2	30	6	47	9.4	141	28.2

Sr. No.	Name of the Districts	Specific Crop group				Total			
		2017-18		2017 -2020		2017-18		2017 -2020	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
18	Patan	32	6.4	96	19.2	112	22.4	336	67.2
19	Porbandar	15	3	45	9	52	10.4	156	31.2
20	Rajkot	32	6.4	96	19.2	96	19.2	288	57.6
21	Sabarkantha	39	7.8	117	23.4	104	20.8	312	62.4
22	Surat	10	2	30	6	37	7.4	111	22.2
23	Surendranagar	32	6.4	96	19.2	96	19.2	288	57.6
24	Tapi	10	2	30	6	37	7.4	111	22.2
25	Vadodara	50	10	150	30	220	44	660	132
26	Valsad	0	0	0	0	0	0	0	0
	Total	658	131.6	1974	394.8	2386	476.6	7158	1429.8

4.2.7.8 Researchable Issues:

- Identification of native Rhizobial cultures and its response in various pulses
- Development of high yielding varieties coupled with biotic and abiotic stresses
- Identification of resistant genes for YMV and powdery mildew in Green gram and Urdbean respectively
- Development of farm equipment for mechanized pulses cultivation
- Development of IDM and IPM in pulses
- Post-harvest issues like storage, store grain pests and quality of pulses
- Pulses are consumed as split dal hence dal recovery and value addition

4.3 HORTICULTURE AND SPICES CROP:

4.3.1 FRUIT AND FLOWER CROPS:

4.3.1.1 Background:

The country's horticulture production rose by 5 per cent to touch an all-time high of 300 million tonnes during 2016-17 on the back of record output of fruits, vegetables, spices and plantation crops. According to government data, area under horticulture crops increased by 2.6 per cent to 25.1 million hectares in 2016-17 from 24.5 million hectares in the previous year. As per the latest estimates, fruit output is estimated to be record 93.7 million tonnes in 2016-17, up 3.9 per cent from the previous year. Production of flowers is estimated to be around 2.3 million tonnes which is 4.3 per cent higher than the previous year.

Gujarat has a strong contribution to the Indian horticulture sector. At all-India level, the State contributes from 14 percent to 20 percent share in major fruit and vegetable crops like; Papaya, Sapota, Onion, Banana and Lime. The state also enjoys leading position (1st rank to 4th rank) at all-India level in the productivity levels of major fruits and vegetables including onion, potato, banana, guava, tomato, lime, papaya, etc. The state being the world's largest producer of cumin, also has the highest productivity in custard and guava production in India.

Gujarat has also taken a lead in establishing Green House and producing high value flowers like Dutch Roses, Gerberas and Carnation. The production of flowers stood 1.3 lakh tonnes, over 15,000 hectares. Major flowers grown in the state are Roses, Lily, Marigold, Jasmine, and Tuberose. Flowers like Dutch Roses, Gerberas and Carnation are being grown. Gujarat is rightfully regarded as the growth engine of Indian agriculture wherein farmers and indusryielist are prospering side by side. The varied agroclimtic conditions prevailing in Gujarat offer an excellent opportunity for the development of horticulture.

Horticulture constitutes an important segment of agriculture which is recognized as a crop diversification option in Indian agriculture. In Gujarat, horticulture sector contributes about 29% to the GDP and 37% of export of the agricultural commodities which played an important role in ensuring food security, income generation and uplifting the socioeconomic status of farmers. Due to value addition and commercialization of horticultural produce globally, the demand of these have increased exponentially in the recent past. Accordingly, high priority has been accorded to development of horticulture. However, there is still a gap between demand and supply of many horticultural commodities.

The area under total horticultural crop have increased from 7.54 lakh ha (2002-03) to 16.10 lakh ha (2016-17) with the production of 67.16 lakh MT (2002-03) to 243.02 lakh MT (2016-17) with the forth position in country which indicates a significant growth of the sunrise sector in the state.

Banana, mango, citrus and sapota (*Chiku*) are the major fruit crops grown in Gujarat. Although, the area and production under fruit crops is increasing rapidly but the productivity is not increasing in same trend. Fruit crops are cultivated in all the districts of the state. However, the major fruit crops like mango and sapota are cultivated mainly in Valsad, Navsari and Junagadh districts, whereas, banana in Valsad, Navsari, Narmada and Baroda districts of the state. Acid lime is more growing in the districts of North Gujarat and Bhavanagar district of Saurashtra. Guava is also grown with higher acreage in Bhavanagar district. Pomegranate is emerging arid fruit of Saurashtra region and the area under cultivation is increasing with fast rate. At present, Gujarat is sharing with 23.11 % papaya, 20.22 % sapota and 13.36 % banana production of the India with second number in banana productivity and third in pomegranate

productivity with in India. Nearly 19.50 percentage cropped area of the state is occupied by the fruit crops which played pivotal role in economy of the state and providing employment to rural people.

Floriculture has also paved fast and flourishing well with the production of 195.98 thousand MT flowers under 20641 ha area in the state (2016-17) with fifth rank in country regarding production (8.0%). Country rose, marigold, spider lily, jasmine, gaillardia, annual chrysanthemum, tuberose occupy maximum area under floriculture in Gujarat. Navsari and Valsad districts emerged as hub of spider lily flower with the major markets of Mumbai, Ahmedabad, Surat, Vadodara, etc. Vadodara, Bharuch and Ahmedabad are districts in jasmine production while Central and South Gujarat are leading in marigold production. Because of favourable agroclimatic conditions, high value flower crop like orchid (*Dendrobium*) is also becoming popular among farmers in Surat and Navsari districts. The South Gujarat has also emerged as flower basket because of favourable climatic condition for protected cultivation of gerbera and many units established.

Florists of the cities purchase cut flowers like orchids, cut roses, gladiolus, etc from neighbouring state Maharastra therefore a bright future of this sector in the state. Periurban areas of Gujarat

Vision:

- To augment the share of horticulture sector in GDP of Gujarat
- Gujarat state will be the corner stone of fruit and flower crop production and productivity through adaptation of innovative technologies.

Mission:

- ✓ To improve the yield and quality of fruit and flower crops through cost effective techniques
- ✓ Narrow the yield gap without risking natural resources
- ✓ Accelerate technology development process to meet ensuing climate change as also the needs/expectation of all stake holders

4.3.1.2 Crop/Area Issues:

- Area expansion rate under floriculture is slower than fruits.
- Minimize area-wise fluctuation for yield between zones.
- Scattered / uneven distribution of rainfall, often flood and drought situation risk in some pockets.
- Climatic change induced temperature fluctuation during flowering and fruit setting stage threaten some fruit crops like mango, acid lime, guava, etc.
- Scarcity, illegal supply, uncertified or non availability of accredited plant propagules in the state.
- Poor mechanization and acute labour shortage for major fruit crops
- Under developed mechanization for fruit harvesting
- Emerging pests and diseases and injudicious use of insecticides reduced export potentiality of high valued fruit and flower crops.
- Poor waste management
- Quality of product not synchronizing with international standard as well as for domestic trade

- Weed management
- Macro/ micro nutrient management
- Development of salt tolerant and thermo resilient genotype
- Research for emerging/ new issues related to fruit and flower crops

Post Harvest Technology:

- Accessibility to pack house, pre-cooling chamber, ripening chamber, conditional storage and transportation for enhancing shelf life of fruits and flowers
- Irradiation as well as vapor heat treatment (VHT) facility should be available
- Establishment of strong market link for accruing profit from fruit and flower crops
- Minimizing the price fluctuations of major fruit and flower crops

4.3.1.3 Priority for Comprehensive Fruit and Flower Cultivation:

- Yield stability or improving productivity and narrowing gap in yield level between different districts
- Use of micro irrigation and adaptability of fertigation system in fruit and flower
- Adoption of high density planting as well as rejuvenation of senile orchards
- Use of recommended production technologies or modern agro techniques
- Use of micro irrigation/ water harvesting structure in water deficit area and effective drainage structure in flood prone/ low lying area
- Promoting contract farming for organic mango cultivation and establishing organic input supply chain and collection centre
- Strengthening of research on burning issues of various fruit crops
- Provide availability of seed and planting materials
- Crop residue management for improvement of soil organic carbon content/ soil health
- High tech green house for floriculture development
- Modern post-harvest techniques for fruit and flower crops

4.3.1.4 Current Status of Area, Production and Productivity:

Area, production and productivity of fruit and flower crops (2014-2017)

The fruit and flower crops are grown in all four zones of Gujarat, south Gujarat, middle Gujarat, north Gujarat and Saurashtra region. During last three years, the area under fruit crops increased with increase in production. However, the productivity of fruit crops in various districts of the state had increased initially but now has remained stable in last few years. The District-wise area, production and productivity are given in Tables 4.3.1 and 4.3.2 respectively.

Table- 4.3.1 District-wise Area, Production and Productivity of Fruit Crops

Sr. No.	Districts	2014-2015			2015-2016			2016-2017		
		A	P	Y	A	P	Y	A	P	Y
1	Ahmedabad	4289.00	60225.00	14.04	4054	58402.35	14.41	4152	60362.9	14.54
2	Amreli	8847.00	79170.00	8.95	9052	87273.17	9.64	9201	91957.4	9.99
3	Anand	22915.00	923258.00	40.29	23028	926286.15	40.22	23030	925091.9	40.17
4	Arvalli	--	--	--	4618	112946.24	24.46	4701	115680.6	24.61
5	Banaskantha	8492.00	122900.00	14.47	10207	191756.85	18.79	10643	203092.9	19.08
6	Bharuch	21612.00	1176536.00	54.44	18777	986550.1	52.54	18875	992261.3	52.57
7	Bhavnagar	26975.00	371804.00	13.78	26215	381405.8	14.55	26236	386900.8	14.75
8	Botad	--	--	--	1226	19826.41	16.17	1306	16129.39	12.35
9	ChhotaUdepur	--	--	--	10389	449570.32	43.27	10701	470909.5	44.01
10	Dahod	6443.00	45891.00	7.12	6211	52361.85	8.43	6014	51353.22	8.54
11	Dang	6250.00	35449.00	5.67	6401	36568.1	5.71	6498	38728.48	5.96
12	Devbhumi Dwarka	--	--	--	1015	25473.68	25.10	1023	25655.75	25.08
13	Gandhinagar	6407.00	90646.00	14.15	6483	93076.25	14.36	6519	92317.88	14.16
14	GirSomnath	--	--	--	16669	156423.3	9.38	17340	195820.5	11.29
15	Jamnagar	2803.00	50733.00	18.10	2015	34135.13	16.94	2124	33616.59	15.83
16	Junagadh	30793.00	333790.00	10.84	14482	151048.69	10.43	14909	178132.9	11.95
17	Kheda	9105.00	181846.00	19.97	7898	151158.3	19.14	7950	150651.2	18.95
18	Kutch	38767.00	724752.00	18.70	40121	737621.9	18.38	44743	813258.7	18.18
19	Mahisagar	--	--	--	3231	50327.1	15.58	3725	63630.77	17.08
20	Mehsana	19225.00	226730.00	11.79	20275	292348.26	14.42	20752	300396.9	14.48
21	Morbi	--	--	--	2746	40396.91	14.71	3664	53299.97	14.55
22	Narmada	12950.00	638453.00	49.30	12528	606692.37	48.43	12610	614938.5	48.77
23	Navsari	39953.00	523244.00	13.10	40828	549081.52	13.45	44321	602332	13.59
24	Panchmahal	5858.00	79993.00	13.66	4967	63140.94	12.71	5004	66428.83	13.28
25	Patan	2192.00	23227.00	10.60	2283	27669.5	12.12	2583	32415	12.55
26	Porbandar	788.00	7093.00	9.00	828	7507.42	9.07	855	8164.72	9.55
27	Rakot	4134.00	44999.00	10.89	2789	33430.52	11.99	2799	33260.29	11.88
28	Sabarkantha	10066.00	203522.00	20.22	5790	111888.92	19.32	6081	124001	20.39
29	Surat	19835.00	665494.00	33.55	20301	697249.77	34.35	21725	779552.5	35.88
30	Surendranagar'	6027.00	74878.00	12.42	4562	65383.68	14.33	4997	72355.23	14.48

Sr. No.	Districts	2014-2015			2015-2016			2016-2017		
		A	P	Y	A	P	Y	A	P	Y
31	Tapi	9590.00	249124.00	25.98	9948	271267	27.27	10077	278179.1	27.61
32	Vadodara	28136.00	1008180.00	35.83	18896	617931.47	32.70	19076	631337.7	33.10
33	Valsad	40394.00	387671.00	9.60	42240	419072.2	9.92	45734	450895.6	9.86
	Total	392846.00	8328302.00	21.20	401073	8505272.17	21.21	419968	8953110	21.32

Source: Department of Horticulture, Gujarat state (A-Area in '00'ha, P-Production '00; T and Y- Yield in q/ha)

Table -4.3.2 District-wise Area, Production and Productivity of Flower Crops

Sr. No.	Districts	2014-2015			2015-2016			2016-2017		
		A	P	Y	A	P	Y	A	P	Y
1	Ahmedabad	1776.00	16747.00	9.43	1828	17357.69	9.50	1866	17775.37	9.53
2	Amreli	26.00	201.00	7.73	28	217.2	7.76	30	233.11	7.77
3	Anand	263.00	2725.00	10.36	1811	17958.6	9.92	2103	20953.06	9.96
4	Arvalli	--	--	--	92	894.47	9.72	103	995.09	9.66
5	Banaskantha	1499.00	13810.00	9.21	319	3024.5	9.48	276	2620.00	9.49
6	Bharuch	300.00	2572.00	8.57	1503	13679.65	9.10	1546	14128.90	9.14
7	Bhavnagar	174.00	1481.00	8.51	281	2449.65	8.72	285	2484.35	8.72
8	Botad	--	--	--	38	310.56	8.17	41	344.08	8.39
9	ChhotaUdepur	--	--	--	444	4263.75	9.60	481	4614.33	9.59
10	Dahod	853.00	8257.00	9.68	559	4880.08	8.73	566	5116.84	9.04
11	Dang	376.00	3268.00	8.69	197	1678.16	8.52	205	1746.60	8.52
12	DevbhumiDwarka	--	--	--	87	758.4	8.72	91	796.12	8.75
13	Gandhinagar	275.00	2438.00	8.87	883	8540.98	9.67	881	8523.54	9.67
14	GirSomnath	--	--	--	69	613.62	8.89	83	736.80	8.88
15	Jamnagar	95.00	793.00	8.35	291	2532.22	8.70	347	3014.18	8.69
16	Junagadh	333.00	2909.00	8.74	227	2007.35	8.84	250	2210.80	8.84
17	Kheda	1678.00	16125.00	9.61	1595	15235.53	9.55	1648	15778.59	9.57
18	Kutch	1797.00	17804.00	9.91	338	2976.17	8.81	362	3244.50	8.96
19	Mahisagar	--	--	--	186	1828.68	9.83	223	2218.24	9.95
20	Mehsana	141.00	1227.00	8.70	165	1446.82	8.77	173	1531.89	8.85
21	Morbi	--	--	--	48	471.19	9.82	61	605.30	9.92
22	Narmada	41.00	364.00	8.88	171	1423.37	8.32	166	1391.82	8.38

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Sr. No.	Districts	2014-2015			2015-2016			2016-2017		
		A	P	Y	A	P	Y	A	P	Y
23	Navsari	421.00	3748.00	8.90	2208	21777.54	9.86	2316	22893.14	9.88
24	Panchmahal	537.00	4723.00	8.80	405	3606.65	8.91	544	4828.95	8.88
25	Patan	383.00	3542.00	9.25	46	408	8.87	59	524.89	8.90
26	Porbandar	200.00	1932.00	9.66	90	749.58	8.33	90	770.20	8.56
27	Rakot	962.00	9355.00	9.72	328	3025.4	9.22	337	3122.75	9.27
28	Sabarkantha	69.00	644.00	9.33	135	1297	9.61	148	1425.07	9.63
29	Surat	2009.00	19379.00	9.65	1022	9944.05	9.73	1040	10134.76	9.74
30	Surendranagar'	1698.00	15990.00	9.42	55	512.3	9.31	58	541.20	9.33
31	Tapi	2140.00	21131.00	9.87	534	4967.46	9.30	543	5056.05	9.31
32	Vadodara	183.00	1529.00	8.36	1628	15575.36	9.57	1738	16770.01	9.65
33	Valsad	529.00	4938.00	9.33	1887	17748.24	9.41	1981	18851.30	9.52
	Total	18788.00	177632.00	9.45	19498	184160.2	9.45	20641	195981.82	9.49

Source: Department of Horticulture, Gujarat state (A-Area in '00'ha, P-Production '00; tones and Y- Yield in q/ha)

4.3.1.5 District wise Average Area, Production and Productivity of Fruit and Flower

Crops (Average of 2014 To 2016)

In case of average area and production of fruit crops, maximum area was recorded in Valsad and Bhavnagar districts, whereas highest productivity was noted in Bharuch and Narmada districts. Similarly for flower crops, the highest area under cultivation was noted in Ahmedabad and Navsari districts. The highest productivity was registered in Anand and Valsad. The District-wise average area, production and productivity are given in Table 4.3.3

Table-4.3.3 District-wise Average Area, Production and Productivity of Fruit and Flower Crops (2014 to 2016)

Sr. No	District	Fruit Crops			Flower Crops		
		A	P	Y	A	P	Y
1	Ahmedabad	4165.00	59663.42	14.33	1823.33	17293.35	9.48
2	Amreli	9033.33	86133.52	9.53	28.00	217.10	7.75
3	Anand	22991.00	924878.68	40.23	1392.33	13878.89	10.08
4	Arvalli	3106.33	76208.96	16.36	65.00	629.85	6.46
5	Banaskantha	9780.67	172583.24	17.45	698.00	6484.83	9.40
6	Bharuch	19754.67	1051782.46	53.18	1116.33	10126.85	8.94
7	Bhavnagar	26475.33	380036.86	14.36	246.67	2138.33	8.65
8	Botad	844.00	11985.27	9.51	26.33	218.21	5.52
9	Chhota Udepur	7030.00	306826.61	29.09	308.33	2959.36	6.40
10	Dahod	6222.67	49868.69	8.03	659.33	6084.64	9.15
11	Dang	6383.00	36915.19	5.78	259.33	2230.92	8.58
12	Devbh. Dwarka	679.33	17043.14	16.73	59.33	518.17	5.82
13	Gandhinagar	6469.67	92013.38	14.22	679.67	6500.84	9.40
14	GirSomnath	11336.33	117414.61	6.89	50.67	450.14	5.92
15	Jamnagar	2314.00	39494.91	16.96	244.33	2113.13	8.58
16	Junagadh	20061.33	220990.51	11.07	270.00	2375.72	8.81
17	Kheda	8317.67	161218.50	19.35	1640.33	15713.04	9.58
18	Kutchh	41210.33	758544.20	18.42	832.33	8008.22	9.23
19	Mahisagar	2318.67	37985.96	10.89	136.33	1348.97	6.59
20	Mehsana	20084.00	273158.38	13.56	159.67	1401.90	8.78
21	Morbi	2136.67	31232.29	9.75	36.33	358.83	6.58
22	Narmada	12696.00	620027.95	48.83	126.00	1059.73	8.53
23	Navsari	41700.67	558219.17	13.38	1648.33	16139.56	9.55
24	Panchmahal	5276.33	69854.26	13.21	495.33	4386.20	8.86
25	Patan	2352.67	27770.50	11.76	162.67	1491.63	9.00
26	Porbandar	823.67	7588.38	9.21	126.67	1150.59	8.85
27	Rakot	3240.67	37229.94	11.58	542.33	5167.72	9.40
28	Sabarkantha	7312.33	146470.63	19.98	117.33	1122.02	9.52
29	Surat	20620.33	714098.76	34.59	1357.00	13152.60	9.71
30	Surendranagar'	5195.33	70872.30	13.75	603.67	5681.17	9.35
31	Tapi	9871.67	266190.02	26.95	1072.33	10384.84	9.50
32	Vadodara	22036.00	752483.06	33.88	1183.00	11291.46	9.19
33	Valsad	42789.33	419212.94	9.79	1465.67	13845.85	9.42
	Total	404629.00	8595561.37	21.24	19642.33	185924.68	9.46

(A-Area in '00'ha, P-Production '00; tones and Y- Yield in q/ha)

4.3.1.6 Major Fruit and Flower Varieties:**Table- 4.3.4 Varieties of fruits and flower crops commercially grown**

Sr No	Name of Crops	Varieties which are grown
A	Fruit Crops	
1	Mango	Kesar, Jamadar, Alphonso, Sonpari
2	Sapota	Kalipatti, Cricket Ball
3	Acid lime	Kagzi lime
4	Guava	L-49, Bhavanagar Red, Allhabad Safeda, Reshmadi (Local)
5	Papaya	GJP-1, Taiwan (Red leady)
6	Custard apple	Sindhani, GJCA-1
7	Banana	Grand Naine, Basrai
8	Ber	Gola, Umran
9	Pomegranate	Bhagavo, Ganesh
10	Coconut (Plantation)	WCT, Lotan (Gudajali), Bona, DxT, TxD, NCD
11	Aonla	Anand-1, Anand-2, NA-7
12	Jamun	Paras, Local
B	Flower Crops	
1	Rose	Gladiator, La franc, Devine
2	Gaillardia	Double
3	Marigold	African type, French type
4	Golden rode	Local
5	Spider lily	Barmasi (Local)
6	Chrysanthemum	Big flower types, small flower types
7	Tuberose	Double types
8	Gladiolus	--

4.3.1.7 Input Management**4.3.1.7.1 Fertilizer**

Location specific integrated nutrient management, bio fertilizers, FYM and vermicomposting, farm residues management are to be popularized amongst the farmers for wider adoption under the plan. District-wise consumption of fertilizers, NPK consumption and ratio in *Rabi* and fertilizers requirement in fruit and flower crops during 2016-17 is given in Tables 4.3.5 to 4.3.8.

Table - 4.3.5 District-wise Consumption of Fertilizers in *Rabi* Crops 2016-17 (in terms of materials, T)

Sr. No	District	Urea	DAP	MoP	TSP	SSP	AS	Can	20:20:0 0	15:15:1 5	24:24:0 0	12:32:1 6	10:26:2 6	16:16:1 6	16:20:0 0
1	Ahmedabad	63460	10081	1818	937	7381	1044	645	3456	66	21	481	0	31	495
2	Amreli	36140	18667	1467	213	3632	1895	414	3854	36	550	4316	350	5	235
3	Anand	75783	2953	4985	613	3286	7336	976	5676	398	166	263	0	174	15
4	Banaskantha	78973	14152	6076	998	5027	7941	396	10373	0	369	1887	1185	0	3283
5	Bharuch	26108	2182	3923	174	4187	2394	374	3514	36	204	1378	875	45	232
6	Bhavnagar	37121	18193	3672	47	8204	5302	1827	5838	44	514	3287	84	0	0
7	Dahod	15020	1855	479	232	563	657	0	1970	45	0	79	0	0	119
8	Gandhinagar	24180	3275	2196	78	2323	1401	290	2560	0	83	695	423	0	594
9	Jamnagar	30562	17794	1215	490	7008	1561	1250	4694	111	133	6844	0	0	361
10	Junagadh	52933	20141	2534	924	5417	1658	2102	8337	94	226	4589	711	177	1041
11	Kheda	62780	3640	4792	1504	2566	5111	725	3129	147	54	158	0	78	57
12	Kachchh	46717	10566	335	0	1463	910	204	2803	481	0	422	0	0	281
13	Mehsana	55318	7962	1750	198	1962	3049	661	4004	22	215	1090	353	85	914
14	Narmada	10103	585	2343	102	1082	871	40	884	73	92	234	271	0	204
15	Navsari	16320	4911	6145	659	4433	3826	186	2935	1198	415	839	773	0	288
16	Panchmahal	42995	1731	576	576	586	995	204	3414	256	0	408	0	39	163
17	Patan	34029	4847	182	160	684	1325	227	2720	0	20	455	81	11	564
18	Porbandar	7026	4623	78	73	535	221	317	1377	0	0	887	371	0	52
19	Rajkot	68553	25418	3097	766	10383	3668	2418	7693	294	599	17516	310	0	3745
20	Sabarkantha	64407	8627	9803	525	3847	3057	1079	8656	47	850	2703	562	40	2140
21	Surat	34656	9241	14906	466	12455	8007	1369	7770	374	791	5003	5154	0	950
22	S'nagar	55279	15503	1125	116	2695	721	1260	5402	150	62	783	996	0	26
23	Tapi	5400	1386	1585	191	1010	2377	382	1730	60	106	266	792	0	222
24	Dang	65	5	12	0	0	101	0	39	0	0	0	0	0	0
25	Vadodara	79342	3850	7822	1246	5367	3229	897	3804	42	142	1119	55	115	0
26	Valsad	5104	1458	2192	23	505	1235	85	1735	492	278	148	124	0	54
	Total	1028374	213646	85108	11311	96601	69892	18328	108367	4466	5890	55850	13470	800	16035

Source: Fertilizer Division, Krushi Bhavan, Gandhinagar

Table-4.3.6 Crop-wise Fertilizer Requirement of Fruit Crops during 2016-17

Crop	Area (ha)	Nutrient Requirement (T)			Total (T)	Fertilizer Requirement (T)		
		N	P	K		Urea	SSP	MoP
Mango	145140	17009	3629	17009	37646	36910	22681	28235
Chiku	27009	4220	2110	2110	8440	9157	13188	3503
Citrus	44964	16187	13489	8993	38669	35126	84306	14928
Ber	11957	1661	1329	1329	4318	3604	8306	2206
Banana	66309	40931	20466	40931	102329	88820	127913	67945
Guava	12087	672	806	1007	2485	1458	5038	1672
Pomegranate	20858	4172	2086	4172	10429	9053	13038	6926
Date palm	18847	3141	524	3665	7329	6816	3275	6084
Papaya	20878	10439	10439	13049	33927	22653	65244	21661
Custard apple	6176	86	86	86	257	187	538	143
Aonla	7468	1167	583	583	2334	2532	3644	968
Coconut	21995	5865	2933	5865	14663	12727	18331	9736

Table-4.3.7 Crop wise Fertilizer Requirement of Flower Crops during 2016-17

Crop	Area (ha)	Nutrient Requirement (T)			Total (T)	Fertilizer Requirement (T)		
		N	P	K		Urea	SSP	MoP
Rose	4530	1678	1678	839	4194	3641	10488	1393
Marigold	8807	1761	881	881	3523	3821	5506	1462
Mogra	844	1266	506	506	2279	2747	3163	840
Lily	4097	1229	933	819	2982	2667	5831	1360

4.3.1.8 Constraints Analysis and Recommended Interventions for Yield Gaps Analysis:

4.3.1.8.1 Yield Gap:

The yield gap analysis is done on the basis of state average and potential yield of particular fruit and flower crops. District-wise data of state average yield is available, but the data on potential yield of fruit and flower crops are not available. Therefore, District-wise gap analysis of fruit and flower crops are very difficult or not possible due unavailability of the District-wise data of potential yield. Hence, the crop wise gap analysis is calculated. Data in Tables 4.3.8 and 4.3.9 reveal that the state average productivity of majority of fruit and flower crops is lower than potential yield. It might be due to imbalance of NPK ratio.

4.3.1.8.2 Reasons for Yield Gap:

- ✓ Non adoption of SAUs recommended fertilizer doses
- ✓ Imbalance in the nutrient status of the soils for attaining maximum crop yield.

Table 4.3.8: Crop wise gap analysis of fruit crops during year 2017-18

Crop	Potential yield (t/ha)	State average yield (t/ha)	Gap (t/ha)
Mango	10.00	8.11	1.89
Chiku	15.00	11.00	4.00
Citrus	11.00	13.05	-2.05
Ber	20.00	10.19	9.81
Banana	55.00	64.70	-9.70
Guava	15.00	13.15	1.85

Crop	Potential yield (t/ha)	State average yield (t/ha)	Gap (t/ha)
Pomegranate	12.00	15.00	-3.00
Date palm	15.00	9.23	5.77
Papaya	60.00	61.53	-1.53
Custard apple	10.00	10.30	-0.30
Aonla	20.00	9.99	10.01
Coconut	16000 nuts/ha	12000 nuts/ha	4000.00 nuts/ha

Table 4.3.9: Crop wise gap analysis of flower crops during year 2017-18

Crop	Potential yield (t/ha)	State average yield (t/ha)	Gap
Rose	10.00	9.13	0.87
Marigold	13.00	9.61	3.39
Mogra	6.00	8.94	-2.94
Lily	10* Lakh Bundles	9.64 Lakh Bundles	0.36 Lakh Bundles
Sevanti	12.00	9.86	2.14
Gaillardia	18.00	14.15	3.85

*Lakh budles of 50 buds

Table-4.3.10 Sustainability Issues and Gap Analysis of Productivity of Different Fruit Crops and Resources

Sr. No.	Factors/Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
1	Mango				
a	Effect of climate change on flowering, fruit setting as well as insect pests and diseases	Popularize IPM, IDM technologies and awareness against the vulnerability of climate change	Creating awareness and adoption of IPM and IDM technology through demonstrations, training, <i>shibir</i> , literature etc.	Reduction in insect pests and disease incidence through up gradation of knowledge level.	Reduction in pesticide load and increase in yield
b	Old and saline mango orchards	Popularize pruning and rejuvenating technology	Organizing training, <i>shibir</i> , demonstration and other extension activities for awareness regarding pruning and rejuvenating tech. among farmers	Knowledge level among farmers regarding pruning and rejuvenating technology	Increase productivity and ability of farmers for pruning and rejuvenating technology
c	Adoption of HDP without canopy management	Popularize canopy management technology	Organizing training, <i>shibir</i> , demonstration and other extension activities for awareness regarding canopy management technology among farmers	Adaption of canopy management under HDP orchards	Increase productivity with quality fruits
d	Low post harvest management in banana due to lack of awareness and high cost of the processing plant	Establishment of ripening chamber and pack house unit	Establishment of ripening chamber and pack house unit on co-operative basis	Increase in keeping quality, quality improvement for foreign market	Increase income of the farmers.
2	Banana				
a	Adoptability of precision farming i.e. tissue culture fertigation, mulching etc.	Popularize precision farming technology	Organizing training, <i>shibir</i> , demonstration and other extension activities for awareness regarding	Adaption of precision farming	Increase productivity with quality fruits

Sr. No.	Factors/Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
			precision farming technology among farmers		
b	Management of crop residue	Popularize banana Fiber and other value added product from crop residue	Arranging demonstration, training and <i>shibir</i> for banana Fiber and other value added product from crop residue	Increasing utilization of banana crop residue and popularize product in market	Increase net return and proFintability of farmers
c	Low post harvest management in banana due to lack of awareness and high cost of the processing plant	Establishment of ripening chamber and pack house unit	Establishment of ripening chamber and pack house unit on co-operative basis	Increase in keeping quality, Quality improvement for foreign market	Increase income of the farmers.
3	Sapota				
a	Low market price during summer season and labour constrain	Popularize techniques of increase flowering and productivity during winter.	Organizing training, <i>shibir</i> , demonstration and other extension activities for awareness regarding techniques of increase flowering and productivity during winter.	Increase productivity in winter season and farmers received higher market prices	Increase proFintability
b	Low post harvest management in sapota due to lack of awareness and high cost of the processing plant	Popularize the consumption of value added products.	Arranging demonstration, training and <i>shibir</i> , use of mass media, distribution to <i>Madhayan Bhojan Yojana</i> for value added product.	Increaseconsumption rate, overcome the gap and improvement for market	Increase income of the farmers.
4	Citrus				
	Low productivity in Summer seasons	Popularizingbahar treatments and use of plant growth regulators	Organizing training, shibir, demonstration and other extension activities for awareness regarding bahar	Increasing adoptability bahar treatments and use of plant growth regulators	Increase productivity and farmers are able to get remunerative Prices.

Sr. No.	Factors/Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
			treatments and use of plant growth regulators		
5	Guava				
A	Adoption of HDP without canopy management	Popularize canopy management technology i.e. pruning and training	Organizing training, <i>shibir</i> , demonstration and other extension activities for awareness regarding canopy management i.e. pruning and training technology among farmers	Adaption of canopy management with pruning and training under HDP orchards	Increase productivity with quality fruits
b	Low productivity	Popularizing bahar treatments and use of plant growth regulators	Organizing training, <i>shibir</i> , demonstration and other extension activities for awareness regarding bahar treatments and use of plant growth regulators	Increasing adoptability bahar treatments and use of plant growth regulators	Increase productivity and farmers are able to get remunerative Prices.
6	Papaya				
a	Adoptability of precision farming, tissue culture fertigation, mulching and availability of planting materials/seeds.	Popularize precision farming technology through farmers training and make availability of planting material/seeds through seed production plots.	Organizing training, <i>shibir</i> , demonstration and other extension activities for awareness regarding precision farming technology among farmers and seed production plots.	Knowledge level among farmers regarding precision farming and availability of seed	Increase productivity with quality fruits
b	Problems of insect pests and diseases: Incidence of papaya mosaic, PRSV disease and whitefly infestation also due to climate change.	Popularize IPM and IDM technologies	Creating awareness and adoption of IPM and IDM technology through demonstrations, training, <i>shibir</i> , literature etc.	Reduction in insect pests and disease incidence	Reduction in pesticide load and increase in yield

Sr. No.	Factors/Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
c	Management of crop residue: High cost of labour and problem of disposal	Popularize the use of papaya stem and converting in compost	Creating awareness about the importance of shredder and converting it in compost through demonstrations, training, shibir, literature etc.	Knowledge level among farmers to use the crop residues.	Improvement in soil health reflected to the quality and yield
7	Cococnut				
	Availability of disease free planting material	Make availability of disease free planting materials through tissue culture or elite plot.	Research or development of protocol for tissue culture in cococnut as well as esatblishment of elite seed production plots.	Availability of seed nuts and seedling of hybrids D x T, Tx D, Lotan, etc. to the farmers.	Increase the production and productivity of nuts.
	Need to area expansion in coastal belts of Gujarat	Awareness programme to the farmers of coastal region adopt the commercial cultivation of coconut.	To provide training to the farmers for the commercial cultivation of cocnut.	Knowledge level among farmers for coconut and establishment of coconut orchards in coastal region of the state.	Upliftment of socio-economic condition of the farmers.
	Insufficiency of coconut-based industries or value added products.	To establish the coconut based industries	To provide government initiatives to the entrepreneurs.	Number of coconut based industries will introduce in the state.	Upliftment of socio-economic condition of the farmers.
8	Cashew				
a	Low adaptability of INM and IPDM	Popularize INM and IPDM technology	Organizing training, shibir, demonstration and other extension activities for awareness regarding impact	Knowledge level among farmers regarding impact of climate change and methods of INM and IPDM	Increase productivity and ability of farmers to control pest and diseases

Sr. No.	Factors/Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
			of climate change and methods of INM and IPDM among farmers		
B	Monoculture	Include other varieties ie V-7 instead of V-4	Organizing training, shibir, demonstration and other extension activities for awareness	Area expansion under other varieties	Increase in cashew productivity
9	Datepalm				
	Natural pollination is very meager. Rain at the time of fruiting cause serious damage. High cost of planting material	Artificial pollination Bunch covering techniques. Multiplication of elite planting materials	Creating awareness and adoption of artificial pollinizer, bunch cover and quality planting materials through demonstrations, training, <i>shibir</i> , literature etc.	Higher pollination, reduction in damage to bunch due to rain and availability of low cost planting materials	Increase productivity and income of the farmers.
10	Pomegranate				
	Problems of insect pests and diseases: Anar butterfly, Nematode, Wilt etc. Lack of standard package of practices for different bahar. Low adaptability of INM.	Popularize INM and IPDM technology, adoption of package of practices as per bahar	Organizing training, shibir, demonstration and other extension activities for adoption of INM and IPDM technology and suitable practices for different bahar	Reduction in insect pests and disease incidence.	Increase productivity and ability of farmers to control pest and diseases
11	Custard apple				
a	Advanced production technology	Adoption of advanced technologies	Provide training to the farmers	Upgradation of knowledge to the farmers.	Increase the production, productivity and quality of the fruits.

Sr. No.	Factors/Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
b	Problems of insect-pest.	Implementation of IPM and IDM technologies.	Popularize the IPM and IDM technology through training, demonstrations and meetings.	Incidence of insect and disease will be reduced.	Decrease pesticides use and improve the yield.
12	Aonla				
	Low productivity and value addition	Popularize the IPDM, INM and establishing the value addition industries	Organizing training, shibir, demonstration and other extension activities for awareness regarding methods of INM and IPDM among farmers	Increasing adoptability of INM, IDPM and establishing value addition industries	Increase productivity and farmers are able to get remunerative Prices.
13	Ber				
	Low adaption of IPM and low market price	Popularize IPM and value addition	Organizing training, shibir, demonstration and other extension activities for adoption of IPM and value addition	Reduction in pest and aviabilityt quality products in off season	Higher production and market price for farmers
14	Jamun				
a	Availability of planting material i.e. grafts	Populerazed the grafting techniques to the nurserymen for higher production of grafts.	Provide training for grafting techniques to nurserymen and farmers.	Grafts will be available for the farmers.	Increase production and productivity.
b	Harvesting and post-harvest	Populerazed the knowledge of harvesting and post harvest products	Provide training to farmers and enteprenures for the preparation of various products.	Reduction in post-harvest losses.	Socio-economic will improve.

Sr. No.	Factors/Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
15	Other minor fruit crops				
	Diversification towards remunerative minor fruit crops	Popularize remunerative minor fruit crops like Jamun, Karamda, Tamerind, Carambola, Jackfruit, Ber etc.	Organizing training, shibir, demonstration and other extension activities for awareness regarding remunerative minor fruit crops among farmers	Knowledge level among farmers regarding remunerative minor fruit crops	Increase area under remunerative minor fruit crops
16	Floriculture				
	Meager area under flower crops due to lack of awareness, climate change, small land holdings, limited irrigation facility and marketing of the produce	Popularize importance of flower crops for sustainable income in identified area, crop diversification, value addition and market intelligence	Creating awareness and adoption of flower crops through training, demonstrations and literature & crop diversification (orchid, heliconia), value addition (oil extraction, dry flower, pigment extraction) establishment of collection centre and refrigerated van	Increase income of the farmers	Sustainability of farmers income

4.3.1.9 Recommended Interventions for the State with Detailed Action Plan

with Cost (District-wise):

Table-4.3.11 District-wise Training Proposed for Capacity Building of Horticultural/Agricultural Staff

Sl. No	District	Horticulture/Agricultural Staff (Phy- No of Trainee, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	75	0.60	75	0.60	75	0.60	225	1.80
2	Amreli	50	0.40	50	0.40	50	0.40	150	1.20
3	Anand	200	1.60	200	1.60	200	1.60	600	4.80
4	Aravalli	70	0.56	70	0.56	70	0.56	210	1.68
5	Banaskantha	50	0.40	50	0.40	50	0.40	150	1.20
6	Baroda	200	1.60	200	1.60	200	1.60	600	4.80
7	Bharuch	200	1.60	200	1.60	200	1.60	600	4.80
8	Bhavnagar	210	1.68	210	1.68	210	1.68	630	5.04
9	Botad	100	0.80	100	0.80	100	0.80	300	2.40
10	Chhotaudaipur	100	0.80	100	0.80	100	0.80	300	2.40
11	Dahod	100	0.80	100	0.80	100	0.80	300	2.40
12	Dang	200	1.60	200	1.60	200	1.60	600	4.80
13	Devbhumi Dwarka	35	0.28	35	0.28	35	0.28	105	0.84
14	Gandhinagar	100	0.80	100	0.80	100	0.80	300	2.40
15	Gir Somnath	150	0.28	150	0.28	150	0.28	450	0.84
16	Jamnagar	60	0.48	60	0.48	60	0.48	180	1.44
17	Junagadh	310	2.48	310	2.48	310	2.48	930	7.44
18	Kheda	150	1.20	150	1.20	150	1.20	450	3.60
19	Kachchh	200	1.60	200	1.60	200	1.60	600	4.80
20	Mahisagar	100	0.80	100	0.80	100	0.80	300	2.40
21	Mehsana	150	1.20	150	1.20	150	1.20	450	3.60
22	Morbi	35	0.28	35	0.28	35	0.28	105	0.84
23	Narmada	200	1.60	200	1.60	200	1.60	600	4.80
24	Navsari	300	2.40	300	2.40	300	2.40	900	7.20
25	Panchmahal	150	1.20	150	1.20	150	1.20	450	3.60
26	Patan	25	0.20	25	0.20	25	0.20	75	0.60
27	Porbandar	35	0.28	35	0.28	35	0.28	105	0.84
28	Rajkot	35	0.28	35	0.28	35	0.28	105	0.84
29	Sabarkantha	80	0.64	80	0.64	80	0.64	240	1.92
30	Surat	300	2.40	300	2.40	300	2.40	900	7.20
31	Surendranagar	60	0.48	60	0.48	60	0.48	180	1.44
32	Tapi	200	1.60	200	1.60	200	1.60	600	4.80
33	Valsad	300	2.40	300	2.40	300	2.40	900	7.20
	Total	4530	35.32	4530	35.32	4530	35.32	13590	105.96

Cost Norms: Rs.800/day /person during training period.

Table-4.3.12 Districtwise Training Proposed for Capacity Building of Farmers on Different Fruit and Flower Technologies

Sr No	District	Trainees/Farmers (Phy- No of Trainee, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1000	6.00	1000	6.00	1000	6.00	3000	18.00
2	Amreli	1300	7.80	1300	7.80	1300	7.80	3900	23.40
3	Anand	2500	15.00	2500	15.00	2500	15.00	7500	45.00
4	Aravalli	500	3.00	500	3.00	500	3.00	1500	9.00
5	Banaskantha	450	2.70	450	2.70	450	2.70	1350	8.10
6	Baroda	2500	15.00	2500	15.00	2500	15.00	7500	45.00
7	Bharuch	2000	12.00	2000	12.00	2000	12.00	6000	36.00
8	Bhavnagar	3000	18.00	3000	18.00	3000	18.00	9000	54.00
9	Botad	1500	9.00	1500	9.00	1500	9.00	4500	27.00
10	Chhotaudaipur	1500	9.00	1500	9.00	1500	9.00	4500	27.00
11	Dahod	1250	7.50	1250	7.50	1250	7.50	3750	22.50
12	Dang	1800	10.80	1800	10.80	1800	10.80	5400	32.40
13	Devbhumi Dwarka	400	2.40	400	2.40	400	2.40	1200	7.20
14	Gandhinagar	600	3.60	600	3.60	600	3.60	1800	10.80
15	Gir Somnath	1600	2.40	1600	2.40	1600	2.40	4800	7.20
16	Jamnagar	350	2.10	350	2.10	350	2.10	1050	6.30
17	Junagadh	4100	24.60	4100	24.60	4100	24.60	12300	73.80
18	Kheda	1250	7.50	1250	7.50	1250	7.50	3750	22.50
19	Kachchh	3000	18.00	3000	18.00	3000	18.00	9000	54.00
20	Mahisagar	1250	7.50	1250	7.50	1250	7.50	3750	22.50
21	Mehsana	1500	9.00	1500	9.00	1500	9.00	4500	27.00
22	Morbi	400	2.40	400	2.40	400	2.40	1200	7.20
23	Narmada	2000	12.00	2000	12.00	2000	12.00	6000	36.00
24	Navsari	3000	18.00	3000	18.00	3000	18.00	9000	54.00
25	Panchmahal	1500	9.00	1500	9.00	1500	9.00	4500	27.00
26	Patan	300	1.80	300	1.80	300	1.80	900	5.40
27	Porbandar	400	2.40	400	2.40	400	2.40	1200	7.20
28	Rajkot	400	2.40	400	2.40	400	2.40	1200	7.20
29	Sabarkantha	700	4.20	700	4.20	700	4.20	2100	1206.00
30	Surat	3000	18.00	3000	18.00	3000	18.00	9000	54.00
31	Surendranagar	600	3.60	600	3.60	600	3.60	1800	10.80
32	Tapi	3000	18.00	3000	18.00	3000	18.00	9000	54.00
33	Valsad	3000	18.00	3000	18.00	3000	18.00	9000	54.00
	Total	51650	302.7	51650	302.7	51650	302.7	154950	2101.5

Cost Norms: Rs.600/day /person.

Table-4.3.13 District-wise Varietal Demonstrations of Fruit and Flower Crops

Sr No	District	Year-wise Varietal Demonstration (Phy- No of Demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	1.00	20	1.00	20	1.00	60	3.00
2	Amreli	10	0.50	10	0.50	10	0.50	30	1.50
3	Anand	60	3.00	60	3.00	60	3.00	180	9.00
4	Aravali	10	0.50	10	0.50	10	0.50	30	1.50
5	Banaskantha	10	0.50	10	0.50	10	0.50	30	1.50
6	Baroda	40	2.00	40	2.00	40	2.00	120	6.00
7	Bharuch	50	2.50	50	2.50	50	2.50	150	7.50
8	Bhavnagar	40	2.00	40	2.00	40	2.00	120	6.00
9	Botad	45	2.25	45	2.25	45	2.25	135	6.75
10	Chhotaudaipur	45	2.25	45	2.25	45	2.25	135	6.75
11	Dahod	40	2.00	40	2.00	40	2.00	120	6.00
12	Dang	100	5.00	100	5.00	100	5.00	300	15.00
13	Devbhumi Dwarka	10	0.50	10	0.50	10	0.50	30	1.50
14	Gandhinagar	05	0.25	05	0.25	05	0.25	15	75.00
15	Gir Somnath	50	0.50	50	0.50	50	0.50	150	1.50
16	Jamnagar	05	0.25	05	0.25	05	0.25	15	0.75
17	Junagadh	60	3.00	60	3.00	60	3.00	180	9.00
18	Kheda	50	2.50	50	2.50	50	2.50	150	7.50
19	Kachchh	40	2.00	40	2.00	40	2.00	120	6.00
20	Mahisagar	35	1.75	35	1.75	35	1.75	105	5.25
21	Mehsana	25	1.25	25	1.25	25	1.25	75	3.75
22	Morbi	10	0.50	10	0.50	10	0.50	30	1.50
23	Narmada	100	5.00	100	5.00	100	5.00	300	15.00
24	Navsari	200	10.00	200	10.00	200	10.00	600	30.00
25	Panchmahal	40	2.00	40	2.00	40	2.00	120	6.00
26	Patan	05	0.25	05	0.25	05	0.25	15	75.00
27	Porbandar	05	0.25	05	0.25	05	0.25	15	0.75
28	Rajkot	10	0.50	10	0.50	10	0.50	30	1.50
29	Sabarkantha	10	0.50	10	0.50	10	0.50	30	1.50
30	Surat	200	10.00	200	10.00	200	10.00	600	30.00
31	Surendranagar	15	0.75	15	0.75	15	0.75	45	2.25
32	Tapi	200	10.00	200	10.00	200	10.00	600	30.00
33	Valsad	200	10.00	200	10.00	200	10.00	600	30.00
	Total	1745	85.25	1745	85.25	1745	85.25	5235	404.25

Cost Norms: Rs.5000/demonstration.

Table-4.3.14 District-wise INM Demonstrations for Fruit and Flower Crops

Sr No	District	Year-wise INM Demonstrations (Phy- No of demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	30	1.50	30	1.50	30	1.50	90	4.50
2	Amreli	25	1.25	25	1.25	25	1.25	75	3.75
3	Anand	80	4.00	80	4.00	80	4.00	240	12.00
4	Aravali	15	0.75	15	0.75	15	0.75	45	2.25
5	Banaskantha	15	0.75	15	0.75	15	0.75	45	2.25
6	Baroda	80	4.00	80	4.00	80	4.00	240	12.00
7	Bharuch	50	2.50	50	2.50	50	2.50	150	7.50
8	Bhavnagar	70	3.50	70	3.50	70	3.50	210	10.50
9	Botad	50	2.50	50	2.50	50	2.50	150	7.50
10	Chhotaudaipur	40	2.00	40	2.00	40	2.00	120	6.00
11	Dahod	50	2.50	50	2.50	50	2.50	150	7.50
12	Dang	20	1.00	20	1.00	20	1.00	60	3.00
13	Devbhumi Dwarka	25	1.25	25	1.25	25	1.25	75	3.75
14	Gandhinagar	15	0.75	15	0.75	15	0.75	45	2.25
15	Gir Somnath	75	1.25	75	1.25	75	1.25	225	3.75
16	Jamnagar	20	1.00	20	1.00	20	1.00	60	3.00
17	Junagadh	110	5.50	110	5.50	110	5.50	330	16.50
18	Kheda	40	2.00	40	2.00	40	2.00	120	6.00
19	Kachchh	80	4.00	80	4.00	80	4.00	240	12.00
20	Mahisagar	40	2.00	40	2.00	40	2.00	120	6.00
21	Mehsana	40	4.00	80	4.00	80	4.00	240	12.00
22	Morbi	25	1.25	25	1.25	25	1.25	75	3.75
23	Narmada	50	2.50	50	2.50	50	2.50	150	7.50
24	Navsari	50	2.50	50	2.50	50	2.50	150	7.50
25	Panchmahal	50	2.50	50	2.50	50	2.50	150	7.50
26	Patan	5	0.25	5	0.25	5	0.25	15	0.75
27	Porbandar	10	0.50	10	0.50	10	0.50	30	1.50
28	Rajkot	25	1.25	25	1.25	25	1.25	75	3.75
29	Sabarkantha	15	0.75	15	0.75	15	0.75	45	2.25
30	Surat	50	2.50	50	2.50	50	2.50	150	7.50
31	Surendranagar	15	0.75	15	0.75	15	0.75	45	2.25
32	Tapi	50	2.50	50	2.50	50	2.50	150	7.50
33	Valsad	50	2.50	50	2.50	50	2.50	150	7.50
	Total	1365	67.75	1405	67.75	1405	67.75	4215	203.25

Cost Norms: Rs.5000/demonstration.

Table-4.3.15 District-wise Demonstrations on Resource Conservation Technologies for Fruit and Flower Crops (Green Manuring and Mulching)

Sr No	District	Year-wise Demonstrations on Resource Conservation Technologies (Phy- No of demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	30	1.50	30	1.50	30	1.50	90	4.50
2	Amreli	30	1.50	30	1.50	30	1.50	90	4.50
3	Anand	80	4.00	80	4.00	80	4.00	240	12.00
4	Aravali	20	1.00	20	1.00	20	1.00	60	3.00
5	Banaskantha	20	1.00	20	1.00	20	1.00	60	3.00
6	Baroda	80	4.00	80	4.00	80	4.00	240	12.00
7	Bharuch	50	2.50	50	2.50	50	2.50	150	7.50
8	Bhavnagar	110	5.50	110	5.50	110	5.50	330	16.50
9	Botad	50	2.50	50	2.50	50	2.50	150	7.50
10	Chhotaudaipur	40	2.00	40	2.00	40	2.00	120	6.00
11	Dahod	50	2.50	50	2.50	50	2.50	150	7.50
12	Dang	20	1.00	20	1.00	20	1.00	60	3.00
13	Devbhumi Dwarka	25	1.25	25	1.25	25	1.25	75	3.75
14	Gandhinagar	20	1.00	20	1.00	20	1.00	60	3.00
15	Gir Somnath	120	1.25	120	1.25	120	1.25	360	3.75
16	Jamnagar	35	1.75	35	1.75	35	1.75	105	5.25
17	Junagadh	160	8.00	160	8.00	160	8.00	480	24.00
18	Kheda	40	2.00	40	2.00	40	2.00	120	6.00
19	Kachchh	100	5.00	100	5.00	100	5.00	300	15.00
20	Mahisagar	40	2.00	40	2.00	40	2.00	120	6.00
21	Mehsana	40	2.00	40	2.00	40	2.00	120	6.00
22	Morbi	25	1.25	25	1.25	25	1.25	75	3.75
23	Narmada	50	2.50	50	2.50	50	2.50	150	7.50
24	Navsari	50	2.50	50	2.50	50	2.50	150	7.50
25	Panchmahal	50	2.50	50	2.50	50	2.50	150	7.50
26	Patan	15	0.75	15	0.75	15	0.75	45	2.25
27	Porbandar	20	1.00	20	1.00	20	1.00	60	3.00
28	Rajkot	35	1.75	35	1.75	35	1.75	105	5.25
29	Sabarkantha	20	1.00	20	1.00	20	1.00	60	3.00
30	Surat	50	2.50	50	2.50	50	2.50	150	7.50
31	Surendranagar	45	2.25	45	2.25	45	2.25	135	6.75
32	Tapi	50	2.50	50	2.50	50	2.50	150	7.50
33	Valsad	50	2.50	50	2.50	50	2.50	150	7.50
	Total	1620	76.25	1620	76.25	1620	76.25	4860	228.75

Cost Norms: Rs.5000/demonstration.

Table-4.3.16 District-wise Demonstration on IPM for Fruit and Flower Crops

Sr No	District	Year-wise Demonstrations on IPM (Phy- No of demos, Fin-Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	1.00	20	1.00	20	1.00	60	3.00
2	Amreli	40	2.00	40	2.00	40	2.00	120	6.00
3	Anand	60	3.00	60	3.00	60	3.00	180	9.00
4	Aravali	15	0.75	15	0.75	15	0.75	45	2.25
5	Banaskantha	20	1.00	20	1.00	20	1.00	60	3.00
6	Baroda	40	2.00	40	2.00	40	2.00	120	6.00
7	Bharuch	50	2.50	50	2.50	50	2.50	150	7.50
8	Bhavnagar	110	5.50	110	5.50	110	5.50	330	16.50
9	Botad	45	2.25	45	2.25	45	2.25	135	6.75
10	Chhotaudaipur	45	2.25	45	2.25	45	2.25	135	6.75
11	Dahod	40	2.00	40	2.00	40	2.00	120	6.00
12	Dang	50	2.50	50	2.50	50	2.50	150	7.50
13	Devbhumi Dwarka	25	1.25	25	1.25	25	1.25	75	3.75
14	Gandhinagar	15	0.75	15	0.75	15	0.75	45	2.25
15	Gir Somnath	125	1.25	125	1.25	125	1.25	375	3.75
16	Jamnagar	25	1.25	25	1.25	25	1.25	75	3.75
17	Junagadh	150	7.50	150	7.50	150	7.50	450	22.50
18	Kheda	50	2.50	50	2.50	50	2.50	150	7.50
19	Kachchh	70	3.50	70	3.50	70	3.50	210	10.50
20	Mahisagar	35	1.75	35	1.75	35	1.75	105	5.25
21	Mehsana	40	2.00	40	2.00	40	2.00	120	6.00
22	Morbi	25	1.25	25	1.25	25	1.25	75	3.75
23	Narmada	60	3.00	60	3.00	60	3.00	180	9.00
24	Navsari	60	3.00	60	3.00	60	3.00	180	9.00
25	Panchmahal	40	2.00	40	2.00	40	2.00	120	6.00
26	Patan	10	0.50	10	0.50	10	0.50	30	1.50
27	Porbandar	15	0.75	15	0.75	15	0.75	45	2.25
28	Rajkot	25	1.25	25	1.25	25	1.25	75	3.75
29	Sabarkantha	15	0.60	15	0.60	15	0.60	45	1.80
30	Surat	70	3.50	70	3.50	70	3.50	210	10.50
31	Surendranagar	15	0.75	15	0.75	15	0.75	45	2.25
32	Tapi	70	3.50	70	3.50	70	3.50	210	10.50
33	Valsad	70	3.50	70	3.50	70	3.50	210	10.50
	Total	1545	72.10	1545	72.10	1545	72.10	4635	216.30

Cost Norms: Rs.5000/demonstration.

Table-4.3.17 Demonstration on Fruit Crops (Vadi Model)

Sr No	District	Year-wise Demonstrations on <i>Wadi</i> model (Phy- No of demos, Fin-Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	1.00	10	1.00	10	1.00	30	3.00
2	Amreli	10	0.10	10	0.10	10	0.10	30	0.30
3	Anand	25	2.50	25	2.50	25	2.50	75	7.50
4	Aravali	10	1.00	10	1.00	10	1.00	30	3.00
5	Banaskantha	05	0.50	05	0.50	05	0.50	15	1.50
6	Baroda	25	2.50	25	2.50	25	2.50	75	7.50
7	Bharuch	50	5.00	50	5.00	50	5.00	150	15.00
8	Bhavnagar	35	0.35	35	0.35	35	0.35	105	1.05
9	Botad	40	4.00	40	4.00	40	4.00	120	12.00
10	Chhotaudaipur	40	4.00	40	4.00	40	4.00	120	12.00
11	Dahod	35	3.50	35	3.50	35	3.50	105	10.50
12	Dang	50	5.00	50	5.00	50	5.00	150	15.00
13	Devbhumi Dwarka	05	0.05	05	0.05	05	0.05	15	0.15
14	Gandhinagar	05	0.50	05	0.50	05	0.50	15	1.50
15	Gir Somnath	40	0.40	40	0.40	40	0.40	120	1.20
16	Jamnagar	05	0.05	05	0.05	05	0.05	15	0.15
17	Junagadh	50	0.50	50	0.50	50	0.50	150	1.50
18	Kheda	20	2.00	20	2.00	20	2.00	60	6.00
19	Kachchh	40	4.00	40	4.00	40	4.00	120	12.00
20	Mahisagar	35	3.50	35	3.50	35	3.50	105	10.50
21	Mehsana	20	2.00	20	2.00	20	2.00	60	6.00
22	Morbi	15	0.15	15	0.15	15	0.15	45	0.45
23	Narmada	60	6.00	60	6.00	60	6.00	180	18.00
24	Navsari	60	6.00	60	6.00	60	6.00	180	18.00
25	Panchmahal	40	4.00	40	4.00	40	4.00	120	12.00
26	Patan	05	0.50	05	0.50	05	0.50	15	1.50
27	Porbandar	05	0.05	05	0.05	05	0.05	15	0.15
28	Rajkot	05	0.05	05	0.05	05	0.05	15	0.15
29	Sabarkantha	10	1.00	10	1.00	10	1.00	30	3.00
30	Surat	70	7.00	70	7.00	70	7.00	210	21.00
31	Surendranagar	10	0.10	10	0.10	10	0.10	30	0.30
32	Tapi	70	7.00	70	7.00	70	7.00	210	21.00
33	Valsad	70	7.00	70	7.00	70	7.00	210	21.00
	Total	975	81.30	975	81.30	975	81.30	2925	243.90

Cost Norms: Rs. 10,000/demonstration in 0.4 ha area.

Table-4.3.18 Establishment of High Density Planting for Demonstration in Mango

(Phy- No of demos, Fin- Rs. in Lakh)

Sr No	District	Year-wise Demonstrations on HDP in Mango (Phy- No of demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	25	75.00	25	75.00	25	75.00	75	225.00
2	Amreli	10	30.00	10	30.00	10	30.00	30	90.00
3	Anand	50	150.00	50	150.00	50	150.00	150	450.00
4	Aravali	02	6.00	02	6.00	02	6.00	06	18.00
5	Banaskantha	01	3.00	01	3.00	01	3.00	03	9.00
6	Baroda	50	150.00	50	150.00	50	150.00	150	450.00
7	Bharuch	10	30.00	10	30.00	10	30.00	30	90.00
8	Bhavnagar	05	15.00	05	15.00	05	15.00	15	45.00
9	Botad	50	150.00	50	150.00	50	150.00	150	450.00
10	Chhotaudaipur	40	120.00	40	120.00	40	120.00	120	360.00
11	Dahod	50	150.00	50	150.00	50	150.00	150	450.00
12	Dang	10	30.00	10	30.00	10	30.00	30	90.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	05	15.00	05	15.00	05	15.00	15	45.00
15	Gir Somnath	50	150.00	50	150.00	50	150.00	150	450.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	75	225.00	75	225.00	75	225.00	225	675.00
18	Kheda	30	90.00	30	90.00	30	90.00	90	270.00
19	Kachchh	15	45.00	15	45.00	15	45.00	45	135.00
20	Mahisagar	30	90.00	30	90.00	30	90.00	90	270.00
21	Mehsana	02	6.00	02	6.00	02	6.00	06	18.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	10	30.00	10	30.00	10	30.00	30	90.00
24	Navsari	20	60.00	20	60.00	20	60.00	60	180.00
25	Panchmahal	40	120.00	40	120.00	40	120.00	120	360.00
26	Patan	00	0.00	00	0.00	00	0.00	00	0.00
27	Porbandar	02	6.00	02	6.00	02	6.00	06	18.00
28	Rajkot	00	0.00	00	0.00	00	0.00	00	0.00
29	Sabarkantha	03	9.00	03	9.00	03	9.00	09	27.00
30	Surat	20	60.00	20	60.00	20	60.00	60	180.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	20	60.00	20	60.00	20	60.00	60	180.00
33	Valsad	20	60.00	20	60.00	20	60.00	60	180.00
	Total	645	1935.0	645	1935.0	645	1935.0	1935	5805.0

Cost Norms: Rs. 3.00 lakh/unit/ha.

Table-4.3.19 Model Floriculture Centers Cluster Based

(Phy- No of demos, Fin- Rs. in Lakh)

Sr No	District	Year-wise Demonstrations on Model Floriculture Centers (Phy- No of demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0.00	1	8.00	1	8.00	2	16.00
2	Amreli	0	0.00	0	0.00	0	0.00	0	0.00
3	Anand	0	0.00	1	8.00	1	8.00	2	16.00
4	Aravali	0	0.00	1	8.00	0	0.00	1	8.00
5	Banaskantha	1	8.00	0	0.00	1	8.00	2	16.00
6	Baroda	0	0.00	1	8.00	1	8.00	2	16.00
7	Bharuch	1	8.00	1	8.00	1	8.00	3	24.00
8	Bhavnagar	2	16.00	2	16.00	2	16.00	6	48.00
9	Botad	0	0.00	1	8.00	0	0.00	1	8.00
10	Chhotaudaipur	0	0.00	0	0.00	0	0.00	0	0.00
11	Dahod	0	0.00	1	8.00	1	8.00	2	16.00
12	Dang	1	8.00	1	8.00	1	8.00	3	24.00
13	Devbhumi Dwarka	1	8.00	1	8.00	1	8.00	3	24.00
14	Gandhinagar	1	8.00	1	8.00	0	0.00	2	16.00
15	Gir Somnath	2	16.00	2	16.00	2	16.00	6	48.00
16	Jamnagar	0	0.00	0	0.00	0	0.00	0	0.00
17	Junagadh	5	40.00	5	40.00	5	40.00	15	120.00
18	Kheda	0	0.00	1	8.00	0	0.00	1	8.00
19	Kachchh	0	0.00	1	8.00	1	8.00	2	16.00
20	Mahisagar	0	0.00	0	0.00	0	0.00	0	0.00
21	Mehsana	0	0.00	1	8.00	0	0.00	1	8.00
22	Morbi	1	8.00	1	8.00	1	8.00	3	24.00
23	Narmada	1	8.00	1	8.00	1	8.00	3	24.00
24	Navsari	2	16.00	2	16.00	2	16.00	6	48.00
25	Panchmahal	0	0.00	1	8.00	1	8.00	2	16.00
26	Patan	0	0.00	1	8.00	0	0.00	1	8.00
27	Porbandar	0	0.00	0	0.00	0	0.00	0	0.00
28	Rajkot	2	16.00	2	16.00	2	16.00	6	48.00
29	Sabarkantha	1	8.00	0	0.00	0	0.00	1	8.00
30	Surat	2	16.00	2	16.00	2	16.00	6	48.00
31	Surendranagar	0	0.00	0	0.00	0	0.00	0	0.00
32	Tapi	1	8.00	1	8.00	1	8.00	3	24.00
33	Valsad	1	8.00	1	8.00	1	8.00	3	24.00
	Total	25	200.0	34	272.0	29	232.0	88	704.0

Rs. 8.00 lakh/model center

Table-4.3.20 Proposal for Establishment of Advance Technology Expansion through Rejuvenation in Fruit Crops

Sr No	District	Year-wise Demonstrations on Model Floriculture Centers (Phy- No of demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0.00	1	8.00	1	8.00	2	16.00
2	Amreli	0	0.00	0	0.00	0	0.00	0	0.00
3	Anand	0	0.00	1	8.00	1	8.00	2	16.00
4	Aravali	0	0.00	1	8.00	0	0.00	1	8.00
5	Banaskantha	1	8.00	0	0.00	1	8.00	2	16.00
6	Baroda	0	0.00	1	8.00	1	8.00	2	16.00
7	Bharuch	1	8.00	1	8.00	1	8.00	3	24.00
8	Bhavnagar	2	16.00	2	16.00	2	16.00	6	48.00
9	Botad	0	0.00	1	8.00	0	0.00	1	8.00
10	Chhotaudaipur	0	0.00	0	0.00	0	0.00	0	0.00
11	Dahod	0	0.00	1	8.00	1	8.00	2	16.00
12	Dang	1	8.00	1	8.00	1	8.00	3	24.00
13	Devbhumi Dwarka	1	8.00	1	8.00	1	8.00	3	24.00
14	Gandhinagar	1	8.00	1	8.00	0	0.00	2	16.00
15	Gir Somnath	2	16.00	2	16.00	2	16.00	6	48.00
16	Jamnagar	0	0.00	0	0.00	0	0.00	0	0.00
17	Junagadh	5	40.00	5	40.00	5	40.00	15	120.00
18	Kheda	0	0.00	1	8.00	0	0.00	1	8.00
19	Kachchh	0	0.00	1	8.00	1	8.00	2	16.00
20	Mahisagar	0	0.00	0	0.00	0	0.00	0	0.00
21	Mehsana	0	0.00	1	8.00	0	0.00	1	8.00
22	Morbi	1	8.00	1	8.00	1	8.00	3	24.00
23	Narmada	1	8.00	1	8.00	1	8.00	3	24.00
24	Navsari	2	16.00	2	16.00	2	16.00	6	48.00
25	Panchmahal	0	0.00	1	8.00	1	8.00	2	16.00
26	Patan	0	0.00	1	8.00	0	0.00	1	8.00
27	Porbandar	0	0.00	0	0.00	0	0.00	0	0.00
28	Rajkot	2	16.00	2	16.00	2	16.00	6	48.00
29	Sabarkantha	1	8.00	0	0.00	0	0.00	1	8.00
30	Surat	2	16.00	2	16.00	2	16.00	6	48.00
31	Surendranagar	0	0.00	0	0.00	0	0.00	0	0.00
32	Tapi	1	8.00	1	8.00	1	8.00	3	24.00
33	Valsad	1	8.00	1	8.00	1	8.00	3	24.00
	Total	25	200.0	34	272.0	29	232.0	88	704.0

Cost Norms: Rs. 0.50 lakh/rejuvenation unit (1.0 ha)

Table-4.3.21 Proposal for Establishment of Advance Technology Expansion through Crop Diversification in Fruit & Flower Crops

Sr No	District	Year-wise Demonstrations on Advance Technology Expansion through Crop Diversification in Fruit & Flower Crops (Phy- No of demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	5.00	10	5.00	10	5.00	30	15.00
2	Amreli	20	10.00	20	10.00	20	10.00	60	30.00
3	Anand	25	12.50	25	12.50	25	12.50	75	37.50
4	Aravali	05	2.50	05	2.50	05	2.50	15	7.50
5	Banaskantha	05	2.50	05	2.50	05	2.50	15	7.50
6	Baroda	30	15.00	30	15.00	30	15.00	45	22.50
7	Bharuch	10	5.00	10	5.00	10	5.00	30	15.00
8	Bhavnagar	25	12.50	25	12.50	25	12.50	75	37.50
9	Botad	15	7.50	15	7.50	15	7.50	45	22.50
10	Chhotaudaipur	15	7.50	15	7.50	15	7.50	45	22.50
11	Dahod	20	10.00	20	10.00	20	10.00	60	30.00
12	Dang	10	5.00	10	5.00	10	5.00	30	15.00
13	Devbhumi Dwarka	05	2.50	05	2.50	05	2.50	15	7.50
14	Gandhinagar	00	0.00	00	0.00	00	0.00	00	0.00
15	Gir Somnath	20	10.00	20	10.00	20	10.00	60	30.00
16	Jamnagar	10	5.00	10	5.00	10	5.00	30	15.00
17	Junagadh	30	15.00	30	15.00	30	15.00	90	45.00
18	Kheda	15	7.50	15	7.50	15	7.50	45	22.50
19	Kachchh	30	15.00	30	15.00	30	15.00	90	45.00
20	Mahisagar	15	7.50	15	7.50	15	7.50	45	22.50
21	Mehsana	05	2.50	05	2.50	05	2.50	15	7.50
22	Morbi	05	2.50	05	2.50	05	2.50	15	7.50
23	Narmada	10	5.00	10	5.00	10	5.00	30	15.00
24	Navsari	20	10.00	20	10.00	20	10.00	60	30.00
25	Panchmahal	20	10.00	20	10.00	20	10.00	30	15.00
26	Patan	00	0.00	00	0.00	00	0.00	00	0.00
27	Porbandar	06	3.00	06	3.00	06	3.00	18	9.00
28	Rajkot	10	5.00	10	5.00	10	5.00	30	15.00
29	Sabarkantha	05	2.50	05	2.50	05	2.50	15	7.50
30	Surat	10	5.00	10	5.00	10	5.00	30	15.00
31	Surendranagar	05	2.50	05	2.50	05	2.50	15	7.50
32	Tapi	10	5.00	10	5.00	10	5.00	30	15.00
33	Valsad	50	25.00	50	25.00	50	25.00	150	75.00
	Total	471	235.50	471	235.50	471	235.50	1338	669.00

Cost Norms: Rs. 0.50 lakh/rejuvenation unit (1.0 ha)

Table-4.3.22 Proposal for Establishment of Advance Technology Expansion through Organic Farming in Fruit & Flower Crops

Sr No	District	(Phy- No of demos, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	5.00	10	5.00	10	5.00	30	15.00
2	Amreli	15	7.50	15	7.50	15	7.50	45	22.50
3	Anand	25	12.50	25	12.50	25	12.50	75	37.50
4	Aravali	10	5.00	10	5.00	10	5.00	30	15.00
5	Banaskantha	10	5.00	10	5.00	10	5.00	30	15.00
6	Baroda	30	15.00	30	15.00	30	15.00	45	22.50
7	Bharuch	20	10.00	20	10.00	20	10.00	60	30.00
8	Bhavnagar	25	12.50	25	12.50	25	12.50	75	37.50
9	Botad	15	7.50	15	7.50	15	7.50	45	22.50
10	Chhotaudaipur	15	7.50	15	7.50	15	7.50	45	22.50
11	Dahod	20	10.00	20	10.00	20	10.00	60	30.00
12	Dang	50	25.00	50	25.00	50	25.00	150	75.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	10	5.00	10	5.00	10	5.00	30	15.00
15	Gir Somnath	50	25.00	50	25.00	50	25.00	150	75.00
16	Jamnagar	10	5.00	10	5.00	10	5.00	30	15.00
17	Junagadh	45	22.50	45	22.50	45	22.50	135	67.50
18	Kheda	15	7.50	15	7.50	15	7.50	45	22.50
19	Kachchh	50	25.00	50	25.00	50	25.00	150	75.00
20	Mahisagar	15	7.50	15	7.50	15	7.50	45	22.50
21	Mehsana	20	10.00	20	10.00	20	10.00	60	30.00
22	Morbi	05	2.50	05	2.50	05	2.50	15	7.50
23	Narmada	50	25.00	50	25.00	50	25.00	150	75.00
24	Navsari	100	50.00	100	50.00	100	50.00	300	150.00
25	Panchmahal	20	10.00	20	10.00	20	10.00	30	15.00
26	Patan	05	2.50	05	2.50	05	2.50	15	7.50
27	Porbandar	05	2.50	05	2.50	05	2.50	15	7.50
28	Rajkot	05	2.50	05	2.50	05	2.50	15	7.50
29	Sabarkantha	10	5.00	10	5.00	10	5.00	30	15.00
30	Surat	50	25.00	50	25.00	50	25.00	150	75.00
31	Surendranagar	10	5.00	10	5.00	10	5.00	30	15.00
32	Tapi	100	50.00	100	50.00	100	50.00	300	150.00
33	Valsad	100	50.00	100	50.00	100	50.00	300	150.00
	Total	920	460.00	920	460.00	920	460.00	2685	1342.50

Cost Norms: Rs. 0.50 lakh/ rejuvenation unit (1.0 ha)

4.3.1.10 Researchable Issues:

- Crop improvement in fruit and flower crops
- Producing through out the year propagation materials of the different fruit and flower crops under protected environments
- Study of high density planting system with canopy management through pruning and training in commercial fruit crops
- Flowering regulation in fruit crops i.e.early flowering and off season flowering
- Study on various biotic and abiotic stress in fruit and flower crops
- Growth regulators to bring changes in crop physiology so as to adjust with the climatic variations
- Water use efficiency through various methods and critical stages
- Study on fertigation system with use of customized fertilizers in fruit and flower for increasing fertilizer use efficiency
- Rejuvenation technology for old and senile orchards
- Development of modern and low cost agro-techniques
- Development of agro-techniques of high valued horticultural crops under protected cultivation
- Post-harvest management techniques for fruit and flower crops
- Study on recycling of crop residue
- Market research combined with weather changes for deciding the crop area for a season

Special Projects/Schemes:**Establishment of Infrastructure Facilities for Fruit and Flower Crops:****Table- 4.3.23 Establishment of Small Scale Nurseries**

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	05	50.00	05	50.00	05	50.00	15	150.00
2	Amreli	01	10.00	01	10.00	01	10.00	03	30.00
3	Anand	10	100.00	10	100.00	10	100.00	30	300.00
4	Aravali	01	10.00	01	10.00	01	10.00	03	30.00
5	Banaskantha	01	10.00	01	10.00	01	10.00	03	30.00
6	Baroda	10	100.00	10	100.00	10	100.00	30	300.00
7	Bharuch	02	20.00	02	20.00	02	20.00	10	100.00
8	Bhavnagar	02	20.00	02	20.00	02	20.00	06	60.00
9	Botad	10	100.00	10	100.00	10	100.00	30	300.00
10	Chhotaudaipur	05	50.00	05	50.00	05	50.00	15	150.00
11	Dahod	05	50.00	05	50.00	05	50.00	15	150.00
12	Dang	01	10.00	01	10.00	01	10.00	05	50.00
13	Devbhumi Dwarka	01	10.00	01	10.00	01	10.00	03	30.00
14	Gandhinagar	01	10.00	01	10.00	01	10.00	03	30.00
15	Gir Somnath	02	20.00	02	20.00	02	20.00	06	60.00
16	Jamnagar	01	10.00	01	10.00	01	10.00	03	30.00
17	Junagadh	02	20.00	02	20.00	02	20.00	06	60.00
18	Kheda	05	50.00	05	50.00	05	50.00	15	150.00
19	Kutch	02	20.00	02	20.00	02	20.00	10	100.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
20	Mehsana	02	20.00	02	20.00	02	20.00	10	100.00
21	Mahisagar	05	50.00	05	50.00	05	50.00	15	150.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	01	10.00	01	10.00	01	10.00	05	50.00
24	Navsari	02	20.00	02	20.00	02	20.00	10	100.00
25	Panchmahal	05	50.00	05	50.00	05	50.00	15	150.00
26	Patan	01	10.00	01	10.00	01	10.00	03	30.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	01	10.00	01	10.00	01	10.00	03	30.00
29	Sabarkantha	01	10.00	01	10.00	01	10.00	05	50.00
30	Surat	02	20.00	02	20.00	02	20.00	10	100.00
31	Surendranagar	01	10.00	01	10.00	01	10.00	03	30.00
32	Tapi	01	10.00	01	10.00	01	10.00	05	50.00
33	Valsad	03	30.00	03	30.00	03	30.00	15	150.00
	Total	92	920.00	92	920.00	92	920.00	310	3100.00

Cost Norms: Rs. 10.00 lakh/unit (1.0 ha)

Table- 4.3.24 Establishment of Model Nurseries

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	01	25.00	01	25.00	02	50.00
2	Amreli	01	25.00	01	25.00	01	25.00	03	75.00
3	Anand	00	0.00	01	25.00	01	25.00	02	50.00
4	Aravali	00	0.00	01	25.00	00	0.00	01	25.00
5	Banaskantha	00	0.00	00	0.00	01	25.00	01	25.00
6	Baroda	00	0.00	01	25.00	01	25.00	02	50.00
7	Bharuch	00	0.00	01	25.00	01	25.00	02	50.00
8	Bhavnagar	01	25.00	01	25.00	01	25.00	03	75.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	00	0.00	00	0.00
12	Dang	00	0.00	01	25.00	01	25.00	02	50.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	00	0.00	01	25.00	00	0.00	01	25.00
15	Gir Somnath	02	50.00	02	50.00	02	50.00	06	150.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	02	50.00	02	50.00	02	50.00	06	150.00
18	Kheda	00	0.00	01	25.00	01	25.00	02	50.00
19	Kutch	00	0.00	01	25.00	00	0.00	01	25.00
20	Mehsana	01	25.00	00	0.00	00	0.00	01	25.00
21	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	00	0.00	01	25.00	01	25.00	02	50.00
24	Navsari	00	0.00	01	25.00	01	25.00	02	50.00
25	Panchmahal	00	0.00	01	25.00	01	25.00	02	50.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
26	Patan	00	0.00	00	0.00	00	0.00	00	0.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	00	0.00	00	0.00	00	0.00	00	0.00
29	Sabarkantha	01	25.00	00	0.00	00	0.00	01	25.00
30	Surat	00	0.00	01	25.00	01	25.00	02	50.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	00	0.00	01	25.00	01	25.00	02	50.00
33	Valsad	00	0.00	01	25.00	01	25.00	02	50.00
	Total	8	200	21	525	19	475	48	1200

Cost Norms: Rs. 25.00 lakh/nursery (1.0 ha)

Table- 4.3.25 Establishment of Poly Houses for Flower Crops

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	05	75.00	05	75.00	05	75.00	15	225.00
2	Amreli	01	15.00	01	15.00	01	15.00	03	45.00
3	Anand	05	75.00	05	75.00	05	75.00	15	225.00
4	Aravali	01	15.00	01	15.00	01	15.00	03	45.00
5	Banaskantha	01	15.00	01	15.00	01	15.00	03	45.00
6	Baroda	05	75.00	05	75.00	05	75.00	15	225.00
7	Bharuch	00	0.00	01	15.00	01	15.00	02	30.00
8	Bhavnagar	02	30.00	02	30.00	02	30.00	06	90.00
9	Botad	03	45.00	03	45.00	03	45.00	09	135.00
10	Chhotaudaipur	02	30.00	02	30.00	02	30.00	06	90.00
11	Dahod	02	30.00	02	30.00	02	30.00	06	90.00
12	Dang	00	0.00	01	15.00	01	15.00	02	30.00
13	Devbhumi Dwarka	01	15.00	01	15.00	01	15.00	03	45.00
14	Gandhinagar	02	30.00	02	30.00	02	30.00	06	90.00
15	Gir Somnath	01	15.00	01	15.00	01	15.00	03	45.00
16	Jamnagar	01	15.00	01	15.00	01	15.00	03	45.00
17	Junagadh	02	30.00	02	30.00	02	30.00	06	90.00
18	Kheda	02	30.00	02	30.00	02	30.00	06	90.00
19	Kutch	01	15.00	01	15.00	01	15.00	03	45.00
20	Mehsana	01	15.00	01	15.00	01	15.00	03	45.00
21	Mahisagar	02	30.00	02	30.00	02	30.00	06	90.00
22	Morbi	01	15.00	01	15.00	01	15.00	03	45.00
23	Narmada	00	0.00	01	15.00	01	15.00	02	30.00
24	Navsari	00	0.00	01	15.00	01	15.00	02	30.00
25	Panchmahal	02	30.00	02	30.00	02	30.00	06	90.00
26	Patan	01	15.00	01	15.00	01	15.00	03	45.00
27	Porbandar	01	15.00	01	15.00	01	15.00	03	45.00
28	Rajkot	02	30.00	02	30.00	02	30.00	06	90.00
29	Sabarkantha	01	15.00	01	15.00	01	15.00	03	45.00
30	Surat	00	0.00	01	15.00	01	15.00	02	30.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
31	Surendranagar	01	15.00	01	15.00	01	15.00	03	45.00
32	Tapi	00	0.00	01	15.00	01	15.00	02	30.00
33	Valsad	00	0.00	01	15.00	01	15.00	02	30.00
	Total	49	735.00	56	840.00	56	840.00	161	2415.00

Cost Norms: Rs. 15.00 lakh/unit of 1500 sq. m.

Table- 4.3.26 High Tech Green Houses Including All Components for Flower Crops

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	01	50.00	01	50.00	02	100.00
2	Amreli	01	50.00	01	50.00	01	50.00	03	150.00
3	Anand	00	0.00	01	50.00	01	50.00	02	100.00
4	Aravali	01	50.00	01	50.00	01	50.00	03	150.00
5	Banaskantha	01	50.00	00	0.00	01	50.00	02	100.00
6	Baroda	05	75.00	05	75.00	05	75.00	15	225.00
7	Bharuch	00	0.00	01	50.00	01	50.00	02	100.00
8	Bhavnagar	01	50.00	01	50.00	01	50.00	03	150.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	00	0.00	00	0.00
12	Dang	00	0.00	01	50.00	01	50.00	02	100.00
13	Devbhumi Dwarka	01	50.00	01	50.00	01	50.00	03	150.00
14	Gandhinagar	01	50.00	01	50.00	01	50.00	03	150.00
15	Gir Somnath	01	50.00	01	50.00	01	50.00	03	150.00
16	Jamnagar	01	50.00	01	50.00	01	50.00	03	150.00
17	Junagadh	01	50.00	01	50.00	01	50.00	03	150.00
18	Kheda	00	0.00	00	0.00	00	0.00	00	0.00
19	Kutch	01	50.00	01	50.00	01	50.00	03	150.00
20	Mehsana	01	50.00	01	50.00	01	50.00	03	150.00
21	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	01	50.00	01	50.00	01	50.00	03	150.00
23	Narmada	00	0.00	01	50.00	01	50.00	02	100.00
24	Navsari	00	0.00	01	50.00	01	50.00	02	100.00
25	Panchmahal	00	0.00	00	0.00	00	0.00	00	0.00
26	Patan	01	50.00	01	50.00	00	0.00	02	100.00
27	Porbandar	01	50.00	01	50.00	01	50.00	03	150.00
28	Rajkot	01	50.00	01	50.00	01	50.00	03	150.00
29	Sabarkantha	01	50.00	01	50.00	01	50.00	03	150.00
30	Surat	00	0.00	01	50.00	01	50.00	02	100.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	00	0.00	01	50.00	01	50.00	02	100.00
33	Valsad	00	0.00	01	50.00	01	50.00	02	100.00
	Total	21	875.00	29	1275.00	29	1275.00	79	3425.00

Cost Norms: Rs. 50.00 lakh/unit of 2000 sq. m.

**Table- 4.3.27 Project Proposal of Low Cost Net House for Flower Crops
(Phy- No of Unit, Fin- Rs. in Lakh)**

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	05	60.00	05	60.00	05	60.00	15	180.00
2	Amreli	01	12.00	01	12.00	01	12.00	03	36.00
3	Anand	05	60.00	05	60.00	05	60.00	15	180.00
4	Aravali	01	12.00	01	12.00	01	12.00	03	36.00
5	Banaskantha	01	12.00	01	12.00	01	12.00	03	36.00
6	Baroda	05	60.00	05	60.00	05	60.00	15	180.00
7	Bharuch	02	24.00	02	24.00	02	24.00	06	72.00
8	Bhavnagar	02	24.00	02	24.00	02	24.00	06	72.00
9	Botad	03	36.00	03	36.00	03	36.00	09	108.00
10	Chhotaudaipur	02	24.00	02	24.00	02	24.00	06	72.00
11	Dahod	02	24.00	02	24.00	02	24.00	06	72.00
12	Dang	01	12.00	01	12.00	01	12.00	03	36.00
13	Devbhumi Dwarka	01	12.00	01	12.00	01	12.00	03	36.00
14	Gandhinagar	01	12.00	01	12.00	01	12.00	03	36.00
15	Gir Somnath	01	12.00	01	12.00	01	12.00	03	36.00
16	Jamnagar	01	12.00	01	12.00	01	12.00	03	36.00
17	Junagadh	01	12.00	01	12.00	01	12.00	03	36.00
18	Kheda	02	24.00	02	24.00	02	24.00	06	72.00
19	Kutch	01	12.00	01	12.00	01	12.00	03	36.00
20	Mehsana	01	12.00	01	12.00	01	12.00	03	36.00
21	Mahisagar	02	24.00	02	24.00	02	24.00	06	72.00
22	Morbi	01	12.00	01	12.00	01	12.00	03	36.00
23	Narmada	01	12.00	01	12.00	01	12.00	03	36.00
24	Navsari	05	60.00	05	60.00	05	60.00	15	180.00
25	Panchmahal	02	24.00	02	24.00	02	24.00	06	72.00
26	Patan	01	12.00	01	12.00	01	12.00	03	36.00
27	Porbandar	01	12.00	01	12.00	01	12.00	03	36.00
28	Rajkot	01	12.00	01	12.00	01	12.00	03	36.00
29	Sabarkantha	01	12.00	01	12.00	01	12.00	03	36.00
30	Surat	04	48.00	04	48.00	04	48.00	12	144.00
31	Surendranagar	01	12.00	01	12.00	01	12.00	03	36.00
32	Tapi	02	24.00	02	24.00	02	24.00	06	72.00
33	Valsad	04	48.00	04	48.00	04	48.00	12	144.00
	Total	65	780.00	65	780.00	65	780.00	195	2340.00

Cost Norms: Rs. 12.00 lakh/unit of 2000 sq. m.

Table- 4.3.28 Project Proposal for Establishment of Farm Level Small Pack House for Fruit

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	10	30.00	10	30.00	10	30.00	30	90.00
2	Amreli	10	30.00	10	30.00	10	30.00	30	90.00
3	Anand	25	75.00	25	75.00	25	75.00	75	225.00
4	Aravali	05	15.00	05	15.00	05	15.00	15	45.00
5	Banaskantha	12	36.00	12	36.00	12	36.00	36	108.00
6	Baroda	30	90.00	30	90.00	30	90.00	90	180.00
7	Bharuch	05	15.00	05	15.00	05	15.00	15	45.00
8	Bhavnagar	15	45.00	15	45.00	15	45.00	45	135.00
9	Botad	15	45.00	15	45.00	15	45.00	45	135.00
10	Chhotaudaipur	15	45.00	15	45.00	15	45.00	45	135.00
11	Dahod	20	60.00	20	60.00	20	60.00	60	180.00
12	Dang	02	6.00	02	6.00	02	6.00	06	18.00
13	Devbhumi Dwarka	01	3.00	01	3.00	01	3.00	03	9.00
14	Gandhinagar	05	15.00	05	15.00	05	15.00	15	45.00
15	Gir Somnath	20	60.00	20	60.00	20	60.00	60	180.00
16	Jamnagar	02	6.00	02	6.00	02	6.00	06	18.00
17	Junagadh	25	75.00	25	75.00	25	75.00	75	225.00
18	Kheda	15	45.00	15	45.00	15	45.00	45	135.00
19	Kutch	15	45.00	15	45.00	15	45.00	45	135.00
20	Mehsana	10	30.00	10	30.00	10	30.00	30	90.00
21	Mahisagar	15	45.00	15	45.00	15	45.00	45	135.00
22	Morbi	01	3.00	01	3.00	01	3.00	03	9.00
23	Narmada	02	6.00	02	6.00	02	6.00	06	18.00
24	Navsari	20	60.00	20	60.00	20	60.00	60	180.00
25	Panchmahal	20	60.00	20	60.00	20	60.00	60	180.00
26	Patan	02	6.00	02	6.00	02	6.00	06	18.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	02	6.00	02	6.00	02	6.00	06	18.00
29	Sabarkantha	05	15.00	05	15.00	05	15.00	15	45.00
30	Surat	20	60.00	20	60.00	20	60.00	60	180.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	10	30.00	10	30.00	10	30.00	30	90.00
33	Valsad	30	90.00	30	90.00	30	90.00	90	270.00
	Total	384	1152.00	384	1152.00	384	1152.00	1152	3366.00

Cost Norms: Rs. 3.00 lakh/unit

Table-4.3.29 Project Proposal for Establishment of Farm Level Low Cost Ripening Chamber

(Phy- No of Unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	05	25.00	05	25.00	05	25.00	15	75.00
2	Amreli	01	5.00	01	5.00	01	5.00	03	15.00
3	Anand	05	25.00	05	25.00	05	25.00	15	75.00
4	Aravali	00	0.00	00	0.00	00	0.00	00	0.00
5	Banaskantha	05	25.00	05	25.00	05	25.00	25	125.00
6	Baroda	05	25.00	05	25.00	05	25.00	15	45.00
7	Bharuch	02	10.00	02	10.00	02	10.00	06	30.00
8	Bhavnagar	05	25.00	05	25.00	05	25.00	15	75.00
9	Botad	03	15.00	03	15.00	03	15.00	09	45.00
10	Chhotaudaipur	02	10.00	02	10.00	02	10.00	06	30.00
11	Dahod	02	10.00	02	10.00	02	10.00	06	30.00
12	Dang	01	5.00	01	5.00	01	5.00	03	15.00
13	Devbhumi Dwarka	01	5.00	01	5.00	01	5.00	03	15.00
14	Gandhinagar	00	0.00	00	0.00	00	0.00	00	0.00
15	Gir Somnath	10	50.00	10	50.00	10	50.00	30	150.00
16	Jamnagar	02	10.00	02	10.00	02	10.00	06	30.00
17	Junagadh	20	100.00	20	100.00	20	100.00	60	300.00
18	Kheda	02	10.00	02	10.00	02	10.00	06	30.00
19	Kutch	10	50.00	10	50.00	10	50.00	50	250.00
20	Mehsana	00	0.00	00	0.00	00	0.00	00	0.00
21	Mahisagar	02	10.00	02	10.00	02	10.00	06	30.00
22	Morbi	01	5.00	01	5.00	01	5.00	03	15.00
23	Narmada	01	5.00	01	5.00	01	5.00	03	15.00
24	Navsari	10	50.00	10	50.00	10	50.00	30	150.00
25	Panchmahal	02	10.00	02	10.00	02	10.00	06	30.00
26	Patan	00	0.00	00	0.00	00	0.00	00	0.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	02	10.00	02	10.00	02	10.00	06	30.00
29	Sabarkantha	00	0.00	00	0.00	00	0.00	00	0.00
30	Surat	10	50.00	10	50.00	10	50.00	30	150.00
31	Surendranagar	02	10.00	02	10.00	02	10.00	06	30.00
32	Tapi	05	25.00	05	25.00	05	25.00	15	75.00
33	Valsad	20	100.00	20	100.00	20	100.00	60	300.00
	Total	136	680.00	136	680.00	136	680.00	438	2160.00

Cost Norms: Rs. 5.00 lakh/unit

Table -4.3.30 Project Proposal for Establishment of Farm Level Precooling Chamber

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	05	25.00	05	25.00	05	25.00	15	75.00
2	Amreli	05	25.00	05	25.00	05	25.00	15	75.00
3	Anand	05	25.00	05	25.00	05	25.00	15	75.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
4	Aravali	00	0.00	00	0.00	00	0.00	00	0.00
5	Banaskantha	05	25.00	05	25.00	05	25.00	25	125.00
6	Baroda	05	25.00	05	25.00	05	25.00	15	45.00
7	Bharuch	02	10.00	02	10.00	02	10.00	06	30.00
8	Bhavnagar	12	60.00	12	60.00	12	60.00	36	180.00
9	Botad	03	15.00	03	15.00	03	15.00	09	45.00
10	Chhotaudaipur	02	10.00	02	10.00	02	10.00	06	30.00
11	Dahod	02	10.00	02	10.00	02	10.00	06	30.00
12	Dang	01	5.00	01	5.00	01	5.00	03	15.00
13	Devbhumi Dwarka	01	5.00	01	5.00	01	5.00	03	15.00
14	Gandhinagar	00	0.00	00	0.00	00	0.00	00	0.00
15	Gir Somnath	01	5.00	01	5.00	01	5.00	03	15.00
16	Jamnagar	02	10.00	02	10.00	02	10.00	06	30.00
17	Junagadh	20	100.00	20	100.00	20	100.00	60	300.00
18	Kheda	02	10.00	02	10.00	02	10.00	06	30.00
19	Kutch	07	35.00	07	35.00	07	35.00	35	175.00
20	Mehsana	00	0.00	00	0.00	00	0.00	00	0.00
21	Mahisagar	02	10.00	02	10.00	02	10.00	06	30.00
22	Morbi	01	5.00	01	5.00	01	5.00	03	15.00
23	Narmada	01	5.00	01	5.00	01	5.00	03	15.00
24	Navsari	10	50.00	10	50.00	10	50.00	30	150.00
25	Panchmahal	02	10.00	02	10.00	02	10.00	06	30.00
26	Patan	00	0.00	00	0.00	00	0.00	00	0.00
27	Porbandar	01	5.00	01	5.00	01	5.00	03	15.00
28	Rajkot	02	10.00	02	10.00	02	10.00	06	30.00
29	Sabarkantha	00	0.00	00	0.00	00	0.00	00	0.00
30	Surat	10	50.00	10	50.00	10	50.00	30	150.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	05	25.00	05	25.00	05	25.00	15	75.00
33	Valsad	20	100.00	20	100.00	20	100.00	60	300.00
	Total	134	670.00	134	670.00	134	670.00	426	2100.00

Cost Norms: Rs. 5.00 lakh/unit

Table- 4.3.31 Proposal for Establishment of Mango, Banana Large Scale Ripening Chamber

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	01	100.00	01	100.00	02	200.00
2	Amreli	00	0.00	00	0.00	00	0.00	00	0.00
3	Anand	00	0.00	01	100.00	01	100.00	02	200.00
4	Aravali	00	0.00	00	0.00	00	0.00	00	0.00
5	Banaskantha	00	0.00	00	0.00	00	0.00	00	0.00
6	Baroda	05	25.00	05	25.00	05	25.00	15	45.00
7	Bharuch	00	0.00	00	0.00	00	0.00	00	0.00
8	Bhavnagar	00	0.00	00	0.00	00	0.00	00	0.00

HORTICULTURE AND SPICES CROP

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	00	0.00	00	0.00
12	Dang	00	0.00	00	0.00	00	0.00	00	0.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	00	0.00	00	0.00	00	0.00	00	0.00
15	Gir Somnath	01	100.00	01	100.00	01	100.00	03	300.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	01	100.00	01	100.00	01	100.00	03	300.00
18	Kheda	00	0.00	00	0.00	00	0.00	00	0.00
19	Kutch	00	0.00	01	100.00	00	0.00	03	300.00
20	Mehsana	00	0.00	00	0.00	00	0.00	00	0.00
21	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	00	0.00	00	0.00	00	0.00	00	0.00
24	Navsari	00	0.00	01	100.00	01	100.00	02	200.00
25	Panchmahal	00	0.00	00	0.00	00	0.00	00	0.00
26	Patan	00	0.00	00	0.00	00	0.00	00	0.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	00	0.00	00	0.00	00	0.00	00	0.00
29	Sabarkantha	00	0.00	00	0.00	00	0.00	00	0.00
30	Surat	00	0.00	01	100.00	01	100.00	02	200.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	00	0.00	00	0.00	00	0.00	00	0.00
33	Valsad	00	0.00	01	100.00	01	100.00	02	200.00
	Total	07	225.00	13	825.00	12	725.00	34	1945.00

Cost Norms: Rs. 100.00 lakh/unit

Table- 4.3.32 Proposal for Establishment of Primary processing units for fruits and flowers

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	00	0.00	00	0.00	00	0.00
2	Amreli	00	0.00	00	0.00	00	0.00	00	0.00
3	Anand	00	0.00	00	0.00	01	25.00	01	25.00
4	Aravali	01	25.00	01	25.00	01	25.00	03	75.00
5	Banaskantha	01	25.00	01	25.00	01	25.00	03	75.00
6	Baroda	00	0.00	00	0.00	01	25.00	01	25.00
7	Bharuch	01	25.00	01	25.00	01	25.00	03	75.00
8	Bhavnagar	00	0.00	00	0.00	00	0.00	00	0.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	00	0.00	00	0.00
12	Dang	00	0.00	00	0.00	00	0.00	00	0.00

HORTICULTURE AND SPICES CROP

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	01	25.00	01	25.00	01	25.00	03	75.00
15	Gir Somnath	01	25.00	01	25.00	01	25.00	03	75.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	01	25.00	01	25.00	01	25.00	03	75.00
18	Kheda	00	0.00	00	0.00	00	0.00	00	0.00
19	Kutch	01	25.00	01	25.00	01	25.00	03	75.00
20	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
21	Mehsana	01	25.00	01	25.00	01	25.00	03	75.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	01	25.00	01	25.00	01	25.00	03	75.00
24	Navsari	04	100.00	04	100.00	04	100.00	12	300.00
25	Panchmahal	00	0.00	00	0.00	00	0.00	00	0.00
26	Patan	01	25.00	01	25.00	01	25.00	03	75.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	01	25.00	01	25.00	01	25.00	03	75.00
29	Sabarkantha	01	25.00	01	25.00	01	25.00	03	75.00
30	Surat	04	100.00	04	100.00	04	100.00	12	300.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	01	25.00	01	25.00	01	25.00	03	75.00
33	Valsad	04	100.00	04	100.00	04	100.00	12	300.00
	Total	25	625.00	25	625.00	27	675.00	77	1925.00

Cost Norms: Rs. 25.00 lakh/unit

Table- 4.3.33 Proposal for Establishment of Organic product selling center for fruits

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	00	0.00	00	0.00	00	0.00
2	Amreli	00	0.00	00	0.00	00	0.00	00	0.00
3	Anand	04	100.00	04	100.00	04	100.00	12	300.00
4	Aravali	01	25.00	01	25.00	01	25.00	03	75.00
5	Banaskantha	01	25.00	01	25.00	01	25.00	03	75.00
6	Baroda	00	0.00	00	0.00	01	25.00	01	25.00
7	Bharuch	01	25.00	01	25.00	01	25.00	03	75.00
8	Bhavnagar	01	25.00	01	25.00	01	25.00	03	75.00
9	Botad	00	0.00	00	0.00	0	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	00	0.00	00	0.00
12	Dang	00	0.00	00	0.00	00	0.00	00	0.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	01	25.00	01	25.00	01	25.00	03	75.00
15	Gir Somnath	00	0.00	00	0.00	00	0.00	00	0.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	02	50.00	02	50.00	02	50.00	06	150.00
18	Kheda	00	0.00	00	0.00	01	25.00	01	25.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
19	Kutch	01	25.00	01	25.00	01	25.00	03	75.00
20	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
21	Mehsana	01	25.00	01	25.00	01	25.00	03	75.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	00	0.00	00	0.00	00	0.00	00	0.00
24	Navsari	01	25.00	01	25.00	01	25.00	03	75.00
25	Panchmahal	00	0.00	00	0.00	00	0.00	00	0.00
26	Patan	01	25.00	01	25.00	01	25.00	03	75.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	01	25.00	01	25.00	01	25.00	03	75.00
29	Sabarkantha	01	25.00	01	25.00	01	25.00	03	75.00
30	Surat	04	100.00	04	100.00	04	100.00	12	300.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	01	25.00	01	25.00	01	25.00	03	75.00
33	Valsad	04	100.00	04	100.00	04	100.00	12	300.00
	Total	26	650.00	26	650.00	28	700.00	80	2000.00

Cost Norms: Rs. 25.00 lakh/unit

Table- 4.3.34 Proposal for Establishment of Integrated pack-house for fruits and flowers

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	00	0.00	00	0.00	00	0.00
2	Amreli	00	0.00	00	0.00	00	0.00	00	0.00
3	Anand	01	25.00	01	25.00	01	25.00	03	75.00
4	Aravali	00	0.00	00	0.00	00	0.00	00	0.00
5	Banaskantha	00	0.00	00	0.00	00	0.00	00	0.00
6	Baroda	01	25.00	01	25.00	01	25.00	03	75.00
7	Bharuch	01	25.00	01	25.00	01	25.00	03	75.00
8	Bhavnagar	00	0.00	00	0.00	00	0.00	00	0.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	00	0.00	00	0.00
12	Dang	00	0.00	00	0.00	00	0.00	00	0.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	00	0.00	00	0.00	00	0.00	00	0.00
15	Gir Somnath	01	50.00	01	50.00	01	50.00	03	150.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	01	50.00	01	50.00	01	50.00	03	150.00
18	Kheda	00	0.00	00	0.00	00	0.00	00	0.00
19	Kutch	00	0.00	00	0.00	00	0.00	00	0.00
20	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
21	Mehsana	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	00	0.00	00	0.00	00	0.00	00	0.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
24	Navsari	01	25.00	01	25.00	01	25.00	03	75.00
25	Panchmahal	00	0.00	00	0.00	00	0.00	00	0.00
26	Patan	00	0.00	00	0.00	00	0.00	00	0.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	00	0.00	00	0.00	00	0.00	00	0.00
29	Sabarkantha	00	0.00	00	0.00	00	0.00	00	0.00
30	Surat	04	100.00	04	100.00	04	100.00	12	300.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	01	25.00	01	25.00	01	25.00	03	75.00
33	Valsad	04	100.00	04	100.00	4	100.00	12	300.00
	Total	15	425.00	15	425.00	15	425.00	45	1275.00

Cost Norms: Rs. 100.00 lakh/unit

Table- 4.3.35 Proposal for Establishment of oil extraction unit for aeromatic plants and flowers

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	00	0.00	00	0.00	00	0.00
2	Amreli	00	0.00	00	0.00	00	0.00	00	0.00
3	Anand	01	5.00	01	5.00	01	5.00	03	15.00
4	Aravali	00	0.00	01	5.00	00	0.00	01	5.00
5	Banaskantha	01	5.00	00	0.00	00	0.00	01	5.00
6	Baroda	01	5.00	01	5.00	01	5.00	03	15.00
7	Bharuch	01	5.00	01	5.00	01	5.00	03	15.00
8	Bhavnagar	00	0.00	00	0.00	00	0.00	00	0.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	00	0.00	00	0.00
12	Dang	01	5.00	01	5.00	01	5.00	03	15.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	01	5.00	00	0.00	00	0.00	01	5.00
15	Gir Somnath	00	0.00	00	0.00	00	0.00	00	0.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	01	5.00	01	5.00	01	5.00	03	15.00
18	Kheda	00	0.00	00	0.00	00	0.00	00	0.00
19	Kutch	01	5.00	00	0.00	00	0.00	01	5.00
20	Mehsana	01	5.00	00	0.00	00	0.00	01	5.00
21	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	01	5.00	01	5.00	01	5.00	03	15.00
24	Navsari	02	10.00	02	10.00	02	10.00	06	30.00
25	Panchmahal	00	0.00	00	0.00	00	0.00	00	0.00
26	Patan	01	5.00	00	0.00	00	0.00	01	5.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	01	5.00	01	5.00	01	5.00	03	15.00
29	Sabarkantha	01	5.00	00	0.00	00	0.00	01	5.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
30	Surat	02	10.00	02	10.00	02	10.00	06	30.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	01	5.00	01	5.00	01	5.00	03	15.00
33	Valsad	02	10.00	02	10.00	02	10.00	06	30.00
	Total	20	100.00	15	75.00	14	70.00	49	245.00

Cost Norms: Rs. 5.00 lakh/unit

Table- 4.3.36 Proposal for Establishment of chamberbased cold storage 30 t capacity
(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	05	75.00	05	75.00	05	75.00	15	225.00
2	Amreli	00	0.00	00	0.00	00	0.00	00	0.00
3	Anand	05	75.00	05	75.00	05	75.00	15	225.00
4	Aravali	01	15.00	01	15.00	01	15.00	03	45.00
5	Banaskantha	01	15.00	01	15.00	01	15.00	03	45.00
6	Baroda	05	75.00	05	75.00	05	75.00	15	225.00
7	Bharuch	01	15.00	01	15.00	01	15.00	03	45.00
8	Bhavnagar	01	15.00	01	15.00	01	15.00	03	45.00
9	Botad	03	45.00	03	45.00	03	45.00	09	135.00
10	Chhotaudaipur	02	30.00	02	30.00	02	30.00	06	90.00
11	Dahod	02	30.00	02	30.00	02	30.00	06	90.00
12	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
13	Dang	01	15.00	01	15.00	01	15.00	03	45.00
14	Gandhinagar	01	15.00	01	15.00	01	15.00	03	45.00
15	Gir Somnath	02	30.00	02	30.00	02	30.00	06	90.00
16	Jamnagar	00	0.00	00	0.00	00	0.00	00	0.00
17	Junagadh	01	15.00	01	15.00	01	15.00	03	45.00
18	Kheda	02	30.00	02	30.00	02	30.00	06	90.00
19	Kutch	01	15.00	01	15.00	01	15.00	03	45.00
20	Mehsana	01	15.00	01	15.00	01	15.00	03	45.00
21	Mahisagar	02	30.00	02	30.00	02	30.00	06	90.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	01	15.00	01	15.00	01	15.00	03	45.00
24	Navsari	02	30.00	02	30.00	02	30.00	06	90.00
25	Panchmahal	02	30.00	02	30.00	02	30.00	06	90.00
26	Patan	01	15.00	01	15.00	01	15.00	03	45.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	00	0.00	00	0.00	00	0.00	00	0.00
29	Sabarkantha	01	15.00	01	15.00	01	15.00	03	45.00
30	Surat	02	30.00	02	30.00	02	30.00	06	90.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	01	15.00	01	15.00	01	15.00	03	45.00
33	Valsad	02	30.00	02	30.00	02	30.00	06	90.00

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
	Total	49	735.00	49	735.00	49	735.00	147	2205.00

Cost Norms: Rs. 15.00 lakh/unit

Table- 4.3.37 Proposal for Establishment of Refrigerated vehicle/container (6t)
(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	01	15.00	01	15.00	02	30.00
2	Amreli	00	0.00	00	0.00	00	0.00	00	0.00
3	Anand	00	0.00	01	15.00	01	15.00	02	30.00
4	Aravali	01	15.00	01	15.00	01	15.00	03	45.00
5	Banaskantha	01	15.00	01	15.00	01	15.00	03	45.00
6	Baroda	00	0.00	01	15.00	01	15.00	02	30.00
7	Bharuch	01	15.00	01	15.00	01	15.00	03	45.00
8	Bhavnagar	01	15.00	01	15.00	01	15.00	03	45.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	01	15.00	01	15.00
12	Dang	01	15.00	01	15.00	01	15.00	03	45.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	01	15.00	01	15.00	01	15.00	03	45.00
15	Gir Somnath	05	75.00	02	30.00	02	30.00	09	135.00
16	Jamnagar	01	15.00	01	15.00	01	15.00	03	45.00
17	Junagadh	05	75.00	02	30.00	02	30.00	09	135.00
18	Kheda	00	0.00	00	0.00	01	15.00	01	15.00
19	Kutch	01	15.00	01	15.00	01	15.00	03	45.00
20	Mehsana	01	15.00	01	15.00	01	15.00	03	45.00
21	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	01	15.00	01	15.00	01	15.00	03	45.00
24	Navsari	02	30.00	02	30.00	02	30.00	06	90.00
25	Panchmahal	00	0.00	00	0.00	01	15.00	01	15.00
26	Patan	01	15.00	01	15.00	01	15.00	03	45.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	01	15.00	01	15.00	01	15.00	03	45.00
29	Sabarkantha	01	15.00	01	15.00	01	15.00	03	45.00
30	Surat	02	30.00	02	30.00	02	30.00	06	90.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	01	15.00	01	15.00	01	15.00	03	45.00
33	Valsad	02	30.00	2	30.00	2	30.00	06	90.00
	Total	30	450.00	27	405.00	30	450.00	87	1305.00

Cost Norms: Rs. 15.00 lakh/unit

Table- 4.3.38 Proposal for Small Drone

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	Trainee/Farmers (Phy- No of Trainee, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	01	25.00	01	25.00	02	50.00
2	Amreli	01	25.00	01	25.00	01	25.00	03	75.00
3	Anand	00	0.00	01	25.00	01	25.00	02	50.00
4	Aravali	00	0.00	01	25.00	00	0.00	01	25.00
5	Banaskantha	01	25.00	01	25.00	00	0.00	02	50.00
6	Baroda	00	0.00	01	25.00	01	25.00	02	50.00
7	Bharuch	00	0.00	00	0.00	00	0.00	00	0.00
8	Bhavnagar	01	25.00	01	25.00	01	25.00	03	75.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	00	0.00
11	Dahod	00	0.00	00	0.00	01	25.00	01	25.00
12	Dang	00	0.00	00	0.00	00	0.00	00	0.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	00	0.00	01	25.00	01	25.00	02	50.00
15	Gir Somnath	01	25.00	01	25.00	01	25.00	03	75.00
16	Jamnagar	01	25.00	01	25.00	01	25.00	03	75.00
17	Junagadh	01	25.00	01	25.00	01	25.00	03	75.00
18	Kheda	00	0.00	00	0.00	01	25.00	01	25.00
19	Kutch	01	25.00	01	25.00	01	25.00	03	75.00
20	Mehsana	01	25.00	01	25.00	00	0.00	02	50.00
21	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	00	0.00	00	0.00	00	0.00	00	0.00
24	Navsari	01	15.00	01	15.00	01	15.00	03	45.00
25	Panchmahal	00	0.00	00	0.00	01	25.00	01	25.00
26	Patan	00	0.00	01	25.00	00	0.00	01	25.00
27	Porbandar	01	25.00	01	25.00	01	25.00	03	75.00
28	Rajkot	01	25.00	01	25.00	01	25.00	03	75.00
29	Sabarkantha	01	25.00	00	0.00	00	0.00	01	25.00
30	Surat	00	0.00	00	0.00	00	0.00	00	0.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	00	0.00	00	0.00	00	0.00	00	0.00
33	Valsad	01	15.00	01	15.00	01	15.00	03	45.00
	Total	13	305.00	18	430.00	17	405.00	48	1140.00

Cost Norms: Rs. 25.00 lakh/unit

Table- 4.3.39 Proposal for Establishment of grading, sorting unit

(Phy- No of unit, Fin- Rs. in Lakh)

Sr. No.	District	Trainee/Farmers (Phy- No of Trainee, Fin- Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
1	Ahmedabad	00	0.00	01	15.00	01	15.00	02	30.00
2	Amreli	01	15.00	01	15.00	01	15.00	03	45.00
3	Anand	00	0.00	01	15.00	01	15.00	02	30.00
4	Aravali	01	15.00	00	0.00	01	15.00	02	30.00
5	Banaskantha	00	0.00	01	15.00	01	15.00	02	30.00
6	Baroda	00	0.00	01	15.00	01	15.00	02	30.00
7	Bharuch	01	15.00	01	15.00	01	15.00	03	45.00
8	Bhavnagar	01	15.00	01	15.00	01	15.00	03	45.00
9	Botad	00	0.00	00	0.00	00	0.00	00	0.00
10	Chhotaudaipur	00	0.00	00	0.00	00	0.00	0	0.00
11	Dahod	00	0.00	00	0.00	01	15.00	01	15.00
12	Dang	01	15.00	01	15.00	01	15.00	03	45.00
13	Devbhumi Dwarka	00	0.00	00	0.00	00	0.00	00	0.00
14	Gandhinagar	01	15.00	01	15.00	00	0.00	02	30.00
15	Gir Somnath	01	15.00	01	15.00	01	15.00	03	45.00
16	Jamnagar	01	15.00	01	15.00	01	15.00	03	45.00
17	Junagadh	01	15.00	01	15.00	01	15.00	03	45.00
18	Kheda	00	0.00	00	0.00	01	15.00	01	15.00
19	Kutch	01	15.00	01	15.00	01	15.00	03	45.00
20	Mehsana	01	15.00	01	15.00	00	0.00	02	30.00
21	Mahisagar	00	0.00	00	0.00	00	0.00	00	0.00
22	Morbi	00	0.00	00	0.00	00	0.00	00	0.00
23	Narmada	01	15.00	01	15.00	01	15.00	03	45.00
24	Navsari	02	30.00	02	30.00	02	30.00	06	90.00
25	Panchmahal	00	0.00	00	0.00	01	15.00	01	15.00
26	Patan	01	15.00	00	0.00	00	0.00	01	15.00
27	Porbandar	00	0.00	00	0.00	00	0.00	00	0.00
28	Rajkot	01	15.00	01	15.00	01	15.00	03	45.00
29	Sabarkantha	01	15.00	01	15.00	00	0.00	02	30.00
30	Surat	02	30.00	02	30.00	02	30.00	06	90.00
31	Surendranagar	00	0.00	00	0.00	00	0.00	00	0.00
32	Tapi	01	15.00	01	15.00	01	15.00	03	45.00
33	Valsad	02	30.00	02	30.00	02	30.00	06	90.00
	Total	22	330.00	24	360.00	25	375.00	71	1065.00

Cost Norms: Rs. 15.00 lakh/unit

4.3.2 VEGETABLE CROPS:**4.3.2.1 Background:**

Vegetables are important source of micronutrients like β - carotene, vitamin B, C, E as well as folic acid, iron, magnesium etc. and supply fair amounts of carbohydrate, protein, Fiber, antioxidants and energy. They occupy a prominent place in human diet as source of carbohydrates when cooked, as dessert or breakfast fruits, as ingredients of salads, pickles, hamburger, pizza, sandwiches or as candied or preserved.

Gujarat Vegetable Scenario:

The annual production of all vegetable crops in Gujarat is around 13.16 million tonnes from 0.64 million hectares' area with productivity of 20.44 tonnes/ha contributing 8 per cent of the total the country production in the year 2016-17. Tremendous growth in vegetable production sector in the state has been observed, with increase in 212% acreage and 329% production in 2016-17 from 2000-01.

Table 4.3.40 Area, Production and Productivity of Vegetables in Gujarat

Sr. No.	Year	Vegetable Crops		
		Area (in '000ha)	Production (in '000 MT)	Productivity (MT/ha)
1	2000-2001	206	3067	14.92
2	2001-2002	237	3299	13.94
3	2002-2003	248	3515	14.17
4	2003-2004	325	4580	14.07
5	2004-2005	331	4867	14.68
6	2005-2006	380	6308	16.59
7	2006-2007	366	6063	16.56
8	2007-2008	412	7403	17.98
9	2008-2009	395	6807	17.24
10	2009-2010	407	7256	17.84
11	2010-2011	516	9379	18.18
12	2011-2012	517	10049	19.42
13	2012-2013	538	10521	19.57
14	2013-2014	582	11588	19.91
15	2014-2015	605	12049	19.92
16	2015-2016	626	12682	20.25
17	2016-2017	644	13161	20.44

Table -4.3.41 Top Eleven Districts in Vegetable Production (2016-17)

Sr. No	District	Total			Rank		
		Area (ha)	Prod (MT)	Productivity (MT/ha)	Area	Prod.	Productivity
1	Banaskantha	102221	2743842	26.84	1	1	3
2	Bhavnagar	43286	1044373	24.13	2	2	4
3	Aravalli	26014	774900	29.79	9	3	1
4	Anand	42031	770527	18.33	3	4	12

Sr. No	District	Total			Rank		
		Area (ha)	Prod (MT)	Productivity (MT/ha)	Area	Prod.	Productivity
5	Sabarkantha	24185	685737	28.35	10	5	2
6	Kheda	34407	661994	19.24	5	6	7
7	Surat	36411	594669	16.33	4	7	23
8	Mehsana	27954	592888	21.21	8	8	6
9	Vadodara	31545	572237	18.14	7	9	14
10	Ahmedabad	32456	545825	16.82	6	10	21
11	Gandhinagar	23485	520373	22.16	11	11	5
	TOTAL	643877	13161252	20.44	-	-	-

4.3.2.2 Major Vegetable Crops of Gujarat:

The major vegetable crops of Gujarat include onion, potato, brinjal, okra, chilli, cluster bean, tomato, cabbage, cowpea and cauliflower. Vegetable crops like cucurbits, garlic, leafy, legume, root and tuber crops are also grown on a sizable area. Importantly, there is a long list of minor and non-traditional vegetable crops like Chinese cabbage, spine gourd, little gourd, spiny bitter cucumber, drumstick, Indian spinach, celery, lettuce, sweet and baby corn which need long term planning for popularization of their commercial cultivation. The most of the crops are grown round the years in Gujarat during *Kharif* in rainfed as well as *rabi* and summer seasons in irrigated condition.

The state occupies number one position in the country in respect to productivity of potato (31 MT/ha). Banaskantha district stands first in both area (66.17 thousand ha) and production (2.08 million MT) under potato in Gujarat, which is followed by Aravalli and Gandhinagar, respectively.

Table- 4.3.42 Crop-wise Area, Production and Productivity of Vegetable Crops in Gujarat during the Year 2016-17

Sr. No.	Name of Crop	Area (ha)	Production (MT)	Productivity (MT/ha)	Rank for Production
1	Potato	122528	3797816.11	31.00	1
2	Onion	51609	1290168.85	25.00	5
3	Brinjal	74339	1486553.25	20.00	2
4	Tomato	48758	1411851.99	28.96	3
5	Cucurbits	86832	1389027.80	16.00	4
6	Okra	76029	908676.75	11.95	7
7	Cabbage	28339	637619.75	22.50	8
8	Cauliflower	25838	568950.54	22.02	9
9	Cluster bean	38397	391248.35	10.19	10
10	Cowpea	29564	313576.22	10.61	11
11	Others	61644	965762.00	15.67	6
	Total	643877	13161252	20.44	

4.3.2.3 Pest and Disease Management:

Main strategies applied by the vegetable growers for controlling the insect-pests and diseases are the use of agro chemicals (Tables 4.3.43 and 4.3.44). The indiscriminate use of chemicals is not desirable in vegetables as they are harvested in shorter interval and waiting period cannot be increased due to perishable nature of vegetables.

Table- 4.3.43 Insect Pest of Important Vegetable Crops in Gujarat and Their Management

Crop	Pest	Management
Okra	Aphid, Jassid, Whitefly, mite and fruit & shoot borer	<ul style="list-style-type: none"> • Spraying of Imidacloprid 17.8 SL (5ml/10 lit water) or thiamethoxam 25% WG (5g/10 lit water) to control sucking pests. • Spraying of chlorantraniliprole 18.5% SC (3ml/10 lit water) or emamectin benzoate 5% SG (3 g/10 lit water), fenvalrate 20 EC (5 ml/ 10 lit water) for the control of shoot and fruit borer.
Tomato	Tomato fruit borer and Leaf miner	<ul style="list-style-type: none"> • Spraying of chlorantraniliprole 18.5% SC (3 ml/ 10 lit water) or emamectin benzoate 5% SG (3g/ 10 lit water) or flubendiamide 20% WG (3ml/ 10 lit water) for the control of fruit borer. • Spraying of methyl-o-demeton 25% EC (10ml/10 lit water) or dimethoate 30% EC (10 ml/ 10 lit water) to control leaf miner.
Brinjal	Jassid, Whitefly, mite and Shoot & fruit borer	<ul style="list-style-type: none"> • Spraying of chlorantraniliprole 18.5% SC (3 ml/10 lit water) or cypermethrin 10% EC (10ml/ 10 lit water) or indoxacarb 14.5% SC (10ml/10 lit water), emamectin benzoate 5% SG (4g/10 lit water) or thiodicarb 75% WP (20g/10 lit water) for the control of fruit borer.
Chilli	Thrips, mite and fruit borer	<ul style="list-style-type: none"> • Spraying of triazophos 40% EC (20ml/10 lit water) or Finpronil 5% SC (20ml/10 lit water) or spinosad 45% SC (3ml/10 lit water) to control thrips. • For the control of fruit borer, spraying of chlorantraniliprole 18.5% SC (3ml/10 lit water) or indoxacarb 14.5% SC (10ml/10 lit water), emamectin benzoate 5% SG (4g/10 lit water) or spinosad 45% SC (3ml/10 lit water) for the control of fruit borer.
Cole Crops	Aphid and Diamond back moth	<ul style="list-style-type: none"> • Spraying of Spinosad 2.5 % SC (10ml/10 lit water) or thiodicarb 75% WP (20g/10 lit water) or chlorantraniliprole 18.5% SC (3ml/10 lit water) or chlorfenapyr 10% SC (20ml/10 lit water) or chlorpyrifos 20% EC (20ml/10 lit water) or emamectin benzoate 5% SG (4g/10 lit water) to control diamond back moth.
Cucurbitaceous Crops	Fruit fly & red and black pumpkin beetle	<ul style="list-style-type: none"> • Three spray applications of poison baits prepared from Jaggery @ 50 g/lit water and DDVP 76% EC (10ml/10 lit water) • Spray malathion 50 EC (10ml/10 lit water) or quinalphos 25% EC (20ml/10 lit water) to control red and black pumpkin beetles.
Onion	Thrips	<ul style="list-style-type: none"> • Spray insecticides triazophos 40% EC (20ml/10 lit water) or Finpronil 5% SC (20ml/10 lit water) or spinosad 45% SC (3ml/10 lit water) to control thrips.

Table -4.3.44 Major Diseases of Important Vegetable Crops and Their Management:

Crop	Disease	Fungicide/Insecticide
Okra	Powdery mildew	<ul style="list-style-type: none"> On appearance of disease spray with Wettable Sulphur 80 % W.P. 30 g or Sulfex 50 % W.P. 20 g per 10 lit of water. 2-3 sprays at 10 to 12 days interval
Tomato	Spotted wilt (Viral disease)	<ul style="list-style-type: none"> Carbofuran 1.25 kg a.i./ha followed by three sprays of Methyl-O-Demeton 0.025 % Seedling dip treatment with Imidacloprid 3 ml/10 lit water for 1 hr.
	Leaf curl (Viral disease)	<ul style="list-style-type: none"> As above- Remove infected plants when few plants are infected. Raise seedlings in 40 mesh nylon net upto 30 days. Seedling dip treatment with Imidacloprid 3 ml/10 lit water for 1 hr. Spray crop with neem oil.
	Early and late blight	<ul style="list-style-type: none"> Seed treatment with Thirum 75 S.D. at 3-4 g per kg seed. Spray with Dithane M-45 @25 g or Chlorothalonil 25 g in 10 lit of water at 15 days interval (3 to 4 sprays) especially in case of unseasonal rain.
Brinjal	Little leaf	<ul style="list-style-type: none"> Soil application of Carbofuran 3 G 1.25 kg a.i./ha at 21 DATP Remove infected plants Spray with systemic insecticide to check the vector- Jassid
Chilli	Leaf curl (Viral disease)	<ul style="list-style-type: none"> Application of Carbofuran 3G 30 kg/ha in nursery beds before sowing the seeds. Application of Methyl-O-Demeton 10 ml, Dimethoate 10 ml, or Triazophos 40 E C 20 ml/10 lit of water, 20 days after transplanting
	Die back/ Fruit rot	<ul style="list-style-type: none"> Remove and destroy infected fruits Apply three to four sprays of Dithane M-45 @ 27 g or Copper oxychloride 50 g or Chlorothalonil 27 g or Thiophanate methyl 7 g in 10 lit of water
Cole Crops	Erwinia rot	<ul style="list-style-type: none"> Four sprays of Streptocyclene 100 ppm + Copper oxychloride 0.05 %
Cucurbits Crop	Powdery mildew	<ul style="list-style-type: none"> On appearance of disease spray Dinocap 5 ml or Carbendazim 10 g in 10 lit of water at 10 to 12 days interval (3-4 sprays)
	Downy mildew	<ul style="list-style-type: none"> Spray the crop on appearance of the disease with Ridomil MZ 20 g or Dithane M-45 @ 27 g in 10 lit of water at 15 days interval (4 sprays)

4.3.2.4 Technologies Generated and Recommended for Vegetable Growers of Gujarat State:

Total 346 recommendations in 34 commercially important vegetable crops including recommendations for crop improvement (92), crop production (153) and plant protection (101) are summarized in Table 4.3.45.

Table -4.3.45 Vegetable Technologies Generated and Recommended for the Farmers in Gujarat

Name of Vegetable	Crop Improvement	Crop Production	Vegetable Entomology	Vegetable Pathology	Total
Chilli	6	10	6	5	27
Tomato	8	8	6	7	29
Okra	9	20	12	3	44
Brinjal	17	18	9	1	45
Cauliflower	-	12	-	2	14
Cabbage	-	12	5	-	17
Bitter gourd	-	2	2	1	5
Bottle gourd	2	4	-	3	9
Ridge gourd	2	1	-	2	5
Sponge gourd	2	-	-	-	2
Water melon	-	2	-	-	2
Pumpkin	1	-	-	-	1
Little gourd	1	1	1	-	3
Pointed gourd	1	1	-	-	2
Karingada	1	-	-	-	1
Ginger	-	-	-	1	1
Cucumber	1	-	2	-	3
Muskmelon	1	-	-	1	2
Cowpea	2	2	2	1	7
Cluster bean	-	3	-	2	5
Pigeon pea	1	1	7	2	11
Indian bean	8	-	-	-	8
Coriander	3	-	-	-	3
Fenugreek	3	-	-	-	3
Carrot	1	-	-	-	1
Turmeric	2	-	-	-	2
Sweet Potato	3	-	-	-	3
Potato	5	24	4	7	40
Onion	4	16	2	2	24
Garlic	7	7	3	-	17
Dillseed	1	-	-	-	1
Elephant Foot yam	-	5	-	-	5
Greater yam	-	4	-	-	4
Total	92	153	61	40	346

Vision:

Ensure nutritional and income security for all through technological innovations and sustainable better quality vegetables production.

Mission:

Exploit power of science and technology with a human touch for vegetable development.

4.3.2.5 Crop/Area Issues:

1. Development of hybrid variety in important vegetable crops for stable production. e.g. to minimize yield gap between zone, area and soil type
2. Development of genetically modified variety
3. Research on underutilized and unutilized vegetables
4. Development of variety for export purpose

5. Cultivation of exotic unusual vegetables
6. Research on abiotic stress resistant varieties/hybrids
7. Research on perennial vegetable crop
8. Protected cultivation of vegetable crops
9. Organic farming
10. Integrated nutrient management
11. Production technologies
 - a. Off-season onion production
 - b. Ratooning of brinjal
 - c. Cultivation of high value vegetables in low cost poly-house
 - d. Riverbed land cultivation technology
 - e. Use of plant growth regulators
 - f. Sex modification in cucurbits for higher yield
 - g. Use of intensive crop rotations and cropping systems
 - h. Weed management
12. Strategies for vegetable protection: Emerging pests and diseases and injudicious use of insecticides
13. Integrated pest and disease management
 - a. Use of resistant/tolerant varieties
 - b. Adjustment of sowing and planting date keeping in mind the peak activity of the damaging stage of the pest
 - c. Summer ploughing to destroy the soil inhabiting inactive stages of insect
 - d. Following intercropping with diverse plant geometry to reduce the pest population
 - e. Use of trap crop like mustard and marigold to attract the insect-pests
 - f. Bio-pesticides
14. Vegetable processing
15. Storage and transportation facility to be improved and should be easily available
16. Seed production and seedling raising of vegetable crops
17. Improved methods of vegetable nursery production
18. Training centre for farmers and extension workers
19. Transfer of technology
20. Seed supply: supply illegal / spurious seeds
21. Poor mechanization and acute labour shortage in major area of state
22. High cost input year by year
23. Macro/ micro nutrient management
24. Grafting: A New Production Technique in vegetables

4.3.2.6 Priority for Comprehensive Vegetable Cultivation:

- Yield and price stability over locations by cold chain and post harvest technology
- Cultivation of improved high yielding better quality varieties/hybrids
- Promoting the vegetable export oriented cultivation
- Micro irrigation in water deficient area and effective drainage structure in flood prone/ low lying area
- Promoting contract farming for organic cultivation and establishing organic input supply chain and collection centre
- Cultivation of varieties/hybrids resistant/ tolerance to biotic and abiotic stresses

- Empowering woman force for vegetable cultivation right from seeds to consume and hybrid seed production
- Farmers training to E gazette application and pesticide use
- Improved methods of vegetable nursery managements
 - Raised-bed vegetable nursery
 - Plug-tray vegetable nursery
 - Off-season vegetable nursery in low-cost poly-house

4.3.2.7 Current Status of Area, Production and Productivity:

Area, production and productivity of vegetable crops for the past 5 years are presented in bellowTables.

Table.4.3.46 District-wise estimated area & production of different vegetable crops (year 2016-17) for Gujarat state
(Area in ha, Production in MT)

Sr. No.	Name of District	Potato		Onion		Brinjal		Cabbage		Okra		Tomato	
		Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1	Ahmedabad	100	2563	100	2055	3508	69276	1165	21203	2420	21635	5365	153010
2	Amreli	0	0	3500	87325	644	12043	539	10861	486	3912	1091	26642
3	Anand	2584	80698	0	0	7540	166936	2115	45261	3202	30835	3600	114120
4	Aravalli	21900	687660	420	10122	365	10165	258	8886	342	3772	290	8715
5	Banaskantha	66170	2084355	99	2228	4036	89196	3620	71857	4588	62489	4848	174528
6	Bharuch	0	0	106	2030	1875	32906	166	2885	2787	28093	626	13835
7	Bhavnagar	0	0	35000	901600	1800	37296	980	20433	800	8760	1370	32058
8	Botad	0	0	212	5226	627	11913	132	2747	262	2424	485	13289
9	ChhotaUdepur	0	0	0	0	2265	46093	104	1985	2775	34937	3225	96750
10	Dahod	0	0	1170	24687	1524	28118	904	18170	2240	27104	1523	32440
11	Dang	0	0	0	0	627	11161	0	0	1260	18396	360	7974
12	DevbhumiDwarka	100	2800	100	2400	682	12630	198	3936	470	3948	247	7435
13	Gandhinagar	8200	263220	0	0	2805	62692	1910	51417	3270	29430	445	10302
14	GirSomnath	0	0	3000	74880	2450	48878	1150	22770	1050	18375	1135	29669
15	Jamnagar	0	0	1000	16620	908	17470	580	9773	1086	9372	845	25266
16	Junagadh	0	0	1100	27280	1538	30376	830	15181	810	14256	960	25152
17	Kheda	6100	152515	0	0	4288	88333	2223	50573	2850	26790	3168	98335
18	Kutch	107	2271	200	4590	3143	56165	1167	19839	1296	11820	1955	56988
19	Mahisagar	200	4125	100	2125	635	11843	211	4024	871	7360	651	17024
20	Mehsana	7867	234043	317	6483	2536	44760	1040	22516	2055	28462	4541	146901
21	Morbi	0	0	300	7395	870	16339	680	15436	770	7038	660	16269
22	Narmada	0	0	100	1785	865	15406	298	5334	835	8267	495	10964
23	Navsari	0	0	200	3500	2978	58488	206	4730	6389	80501	161	3726
24	Panchmahal	100	2125	100	2215	700	11830	320	4880	1100	10340	400	8056
25	Patan	1100	25751	0	0	330	6138	175	3189	200	1960	100	2470
26	Porbandar	0	0	270	6426	265	4598	5	85	75	675	209	5856
27	Rajkot	0	0	2500	60875	661	13121	1410	31161	1300	11570	480	10128
28	Sabarkantha	7900	253590	215	5203	780	21934	2870	107682	1106	12520	1950	62595
29	Surat	0	0	200	4200	5390	107531	873	16936	12045	165619	1691	41260

Sr. No.	Name of District	Potato		Onion		Brinjal		Cabbage		Okra		Tomato	
		Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
30	Surendranagar	0	0	1200	28920	2870	52521	709	12656	2120	19716	1220	30500
31	Tapi	0	0	0	0	3720	69378	135	3139	9930	135545	655	15065
32	Vadodara	100	2100	100	0	8232	166698	1345	27707	3176	41447	1744	54291
33	Valsad	0	0	0	0	2882	54326	21	368	2063	21311	2263	60241
	TOTAL	122528	3797816	51609	1290169	74339	1486553	28339	637620	76029	908677	48758	1411852

Table 4.3.46 Contd.....

Sr. No.	Name of District	Cauliflower		Clusterbean		Cow Pea		Cucurbits		Others		Total	
		Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1	Ahmedabad	1883	30505	3298	34299	2615	25496	8147	126686	3855	59097	32456	545825
2	Amreli	167	2179	326	2624	532	5911	1193	14435	949	13134	9427	179067
3	Anand	765	14918	3705	38162	3420	40014	5600	92904	9500	146680	42031	770527
4	Aravalli	273	7704	346	3502	90	1089	1613	30808	117	2478	26014	774900
5	Banaskantha	3825	72675	5475	64605	4015	45370	3427	55552	2118	20989	102221	2743842
6	Bharuch	77	1169	605	6020	852	7242	4175	64587	3225	62501	14494	221267
7	Bhavnagar	600	12960	565	3927	345	2715	1498	21541	328	3083	43286	1044373
8	Botad	41	855	256	2496	57	510	1266	19205	423	5626	3761	64290
9	ChhotaUdepur	25	723	1638	17281	388	3958	1045	15780	1812	27905	13277	245411
10	Dahod	785	13895	920	7636	754	6914	2112	31363	1632	19747	13564	210074
11	Dang	0	0	0	0	128	1088	775	10540	2036	43591	5186	92749
12	DevbhumiDwarka	49	720	87	842	179	1346	485	7716	73	810	2670	44584
13	Gandhinagar	1230	23739	518	4403	600	5832	3050	46055	1457	23283	23485	520373
14	GirSomnath	120	2082	980	12152	980	10947	2200	32582	900	11565	13965	263899
15	Jamnagar	34	502	565	5481	318	2385	644	10529	147	1668	6127	99065
16	Junagadh	200	3470	895	10830	820	9184	1950	28860	1065	13739	10168	178326
17	Kheda	2562	52777	3148	34345	2510	29417	4270	70711	3288	58198	34407	661994
18	Kutch	719	11446	1132	11773	248	2753	3753	56257	1716	30905	15436	264807
19	Mahisagar	242	4574	891	8999	450	4995	825	13951	1025	18061	6101	97079
20	Mehsana	1030	18798	3024	32810	1105	11989	234	4076	4205	42050	27954	592889
21	Morbi	99	2006	430	3075	265	2412	657	9527	558	6729	5289	86224

Sr. No.	Name of District	Cauliflower		Clusterbean		Cow Pea		Cucurbits		Others		Total	
		Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
22	Narmada	225	3355	891	7636	804	7059	1942	28839	945	10414	7400	99058
23	Navsari	149	2917	720	7085	861	6888	10619	186151	769	9536	23052	363522
24	Panchmahal	265	4280	800	7768	500	4905	630	8285	1723	34115	6638	98799
25	Patan	275	5115	700	7784	550	5528	680	9384	875	21350	4985	88668
26	Porbandar	0	0	45	362	20	220	45	586	161	1626	1095	20434
27	Rajkot	180	3645	210	1678	400	4400	1450	18995	750	14550	9341	170123
28	Sabarkantha	4860	145022	455	4709	805	10103	2371	43626	873	18752	24185	685737
29	Surat	1396	29595	1532	12118	1596	19631	6015	91127	5673	106652	36411	594670
30	Surendranagar	520	8398	1525	9684	860	9503	1357	19541	980	18434	13361	209872
31	Tapi	330	6402	720	6840	785	6272	3790	67197	2265	29445	22330	339282
32	Vadodara	2869	82082	1806	19144	1607	16488	5011	81178	5555	81103	31545	572237
33	Valsad	43	444	189	1181	105	1014	4003	70453	646	7946	12215	217284
	TOTAL	25838	568951	38397	391248	29564	313576	86832	1389028	61644	965762	643877	13161252

Table. 4.3.47 Year and District wise area, production and productivity of vegetables in Gujarat for 2012-13 to 2016-17

Sr. No.	Name of District	2012-13			2013-14			2014-15		
		Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)
1	Ahmedabad	34920	624920	17.90	31155	492190	15.80	32219	532145	16.52
2	Amreli	5617	88103	15.69	8678	170793	19.68	6009	103422	17.21
3	Banaskantha	83721	2161187	25.81	71550	1786736	24.97	91992	2419233	26.30
4	Bharuch	10485	147634	14.08	15870	246919	15.56	14091	210162	14.91
5	Narmada	8674	114090	13.15	9142	137612	15.05	9369	142209	15.18
6	Bhavnagar	19724	412810	20.93	50639	1214668	23.99	37405	876539	23.43
7	Dang	2856	57420	20.11	4192	73911	17.63	4928	89597	18.18
8	Gandhinagar	23893	563054	23.57	23817	551276	23.15	23278	538574	23.14
9	Jamnagar	15242	170785	11.20	18992	302398	15.92	15025	218292	14.53
10	Junagadh	23185	426392	18.39	26045	499710	19.19	24520	475874	19.41
11	Porbandar	970	27375	28.22	2159	50953	23.60	1632	29188	17.88
12	Kutch	12065	141211	11.70	14453	247350	17.11	14306	240588	16.82

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Sr. No.	Name of District	2012-13			2013-14			2014-15		
		Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)
13	Kheda	33016	568704	17.23	32353	585368	18.09	33926	626690	18.47
14	Anand	36546	723163	19.79	32465	635341	19.57	42716	790317	18.50
15	Mehsana	21049	390062	18.53	20329	411221	20.23	26876	506758	18.86
16	Patan	5763	112863	19.58	5619	108377	19.29	4722	80979	17.15
17	Panchmahal	6145	88947	14.47	9410	148787	15.81	8520	125923	14.78
18	Dahod	10768	174227	16.18	11235	180443	16.06	13763	225328	16.37
19	Rajkot	8049	150876	18.74	17224	391047	22.70	13474	245476	18.22
20	Sabarkantha	33717	972542	28.84	39044	1126520	28.85	38129	1119644	29.36
21	Surat	31474	511876	16.26	29100	445128	15.30	32985	515070	15.62
22	Surendranagar	21264	275529	12.96	17421	266198	15.28	19290	311469	16.15
23	Baroda	38331	711681	18.57	42198	753937	17.87	42328	785645	18.56
24	Valsad	12095	215603	17.83	9951	167196	16.80	11146	190884	17.13
25	Navsari	17350	345323	19.90	17458	271508	15.55	20220	318908	15.77
26	Tapi	20715	344300	16.62	21781	322456	14.80	22097	330334	14.95
27	Aravalli	-	-	-	-	-	-	-	-	-
28	Botad	-	-	-	-	-	-	-	-	-
29	ChhotaUdepur	-	-	-	-	-	-	-	-	-
30	DevbhumiDwarka	-	-	-	-	-	-	-	-	-
31	GirSomnath	-	-	-	-	-	-	-	-	-
32	Mahisagar	-	-	-	-	-	-	-	-	-
33	Morbi	-	-	-	-	-	-	-	-	-
	Total	537634	10520677	19.57	582280	11588039	19.90	604966	12049249	19.92

Table. 4.3.47 Year and District wise area, production and productivity of vegetables in Gujarat for 2012-13 to 2016-17 Contd....

Sr. No.	Name of District	2015-16			2016-17		
		Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)
1	Ahmedabad	31947	530059	16.59	32456	545825	16.82
2	Amreli	9802	191186	19.50	9427	179067	19.00
3	Anand	43099	797359	18.50	42031	770527	18.33
4	Aravalli	25971	790500	30.44	26014	774900	29.79
5	Banaskantha	95070	2511397	26.42	102221	2743842	26.84
6	Bharuch	14603	222408	15.23	14494	221267	15.27
7	Bhavnagar	43761	1067688	24.40	43286	1044373	24.13
8	Botad	3035	49532	16.32	3761	64290	17.09
9	ChhotaUdepur	12704	227330	17.89	13277	245411	18.48
10	Dahod	13497	204753	15.17	13564	210074	15.49
11	Dang	5134	89887	17.51	5186	92749	17.88
12	DevbhumiDwarka	2441	37748	15.46	2670	44584	16.70
13	Gandhinagar	22292	480076	21.54	23485	520373	22.16
14	GirSomnath	13155	250689	19.06	13965	263899	18.90
15	Jamnagar	5112	81061	15.86	6127	99065	16.17
16	Junagadh	10213	171924	16.83	10168	178326	17.54
17	Kheda	33651	647087	19.23	34407	661994	19.24
18	Kutch	14715	246321	16.74	15436	264807	17.16
19	Mahisagar	5215	80011	15.34	6101	97079	15.91
20	Mehsana	26044	506503	19.45	27954	592889	21.21
21	Morbi	6663	114778	17.23	5289	86224	16.30
22	Narmada	7684	101052	13.15	7400	99058	13.39
23	Navsari	21863	344877	15.77	23052	363522	15.77
24	Panchmahal	6100	86950	14.25	6638	98799	14.88
25	Patan	4459	78708	17.65	4985	88668	17.79
26	Porbandar	744	13578	18.25	1095	20434	18.66
27	Rajkot	8005	142087	17.75	9341	170123	18.21
28	Sabarkantha	26393	768054	29.10	24185	685737	28.35
29	Surat	34006	540675	15.90	36411	594670	16.33
30	Surendranagar	13107	202008	15.41	13361	209872	15.71

Sr. No.	Name of District	2015-16			2016-17		
		Area (ha)	Production (MT)	Productivity (MT/ha)	Area (ha)	Production (MT)	Productivity (MT/ha)
31	Tapi	22274	333736	14.98	22330	339282	15.19
32	Vadodara	31816	570763	17.94	31545	572237	18.14
33	Valsad	11633	201495	17.32	12215	217284	17.79
	TOTAL	626208	12682279	20.25	643877	13161252	20.44

Table 4.3.48 Average of five years of district wise area, production and productivity of vegetables in Gujarat during 2012-2017 (old districts)

Sr. No.	Name of District	Average of five years		
		Area (ha)	Production (MT)	Productivity (MT/ha)
1	Ahmedabad	32539.40	545027.80	16.73
2	Amreli	7906.60	146514.20	18.22
3	Banaskantha	88910.80	2324479.00	26.07
4	Bharuch	13908.60	209678.00	15.01
5	Narmada	8453.80	118804.20	13.98
6	Bhavnagar	38963.00	923215.60	23.38
7	Dang	4459.20	80712.80	18.26
8	Gandhinagar	23353.00	530670.60	22.71
9	Jamnagar	12099.60	174320.20	14.74
10	Junagadh	18826.20	350445.20	18.27
11	Porbandar	1320.00	28305.60	21.32
12	Kutch	14195.00	228055.40	15.91
13	Kheda	33470.60	617968.60	18.45
14	Anand	39371.40	743341.40	18.94
15	Mehsana	24450.40	481486.60	19.66
16	Patan	5109.60	93919.00	18.29
17	Panchmahal	7362.60	109881.20	14.84
18	Dahod	12565.40	198965.00	15.85
19	Rajkot	11218.60	219921.80	19.12
20	Sabarkantha	32293.60	934499.40	28.90
21	Surat	32795.20	521483.80	15.88

22	Surendranagar	16888.60	253015.20	15.10
23	Baroda	37243.60	678852.60	18.22
24	Valsad	11408.00	198492.40	17.37
25	Navsari	19988.60	328827.60	16.55
26	Tapi	21839.40	334021.60	15.31

Table 4.3.49 Average of two years of district wise area, production and productivity of vegetables in Gujarat during 2015-2017 (for the newly formed districts)

Sr. No.	Name of Newly formed District	Average of two years		
		Area (ha)	Production (MT)	Productivity (MT/ha)
1	Aravalli	25992.50	782700.00	30.12
2	Botad	3398.00	56911.00	16.71
3	ChhotaUdepur	12990.50	236370.50	18.19
4	DevbhumiDwarka	2555.50	41166.00	16.08
5	GirSomnath	13560.00	257294.00	18.98
6	Mahisagar	5658.00	88545.00	15.63
7	Morbi	5976.00	100501.00	16.77

4.3.2.8 Major Vegetable Varieties:**Status of Improved High Yielding Varieties/Hybrids in Gujarat:**

Growing of improved varieties of vegetables is a pre-requisite for obtaining higher yield. A large numbers of improved vegetable varieties have been developed and released at state level and National level for commercial cultivation.

Table- 4.3.50 Vegetable Varieties/Hybrids Developed, Identified and Released for Gujarat

No.	Crop	Name of variety	Year of Release	Name of University
1	Brinjal	Gujarat Brinjal-6	1976	GAU
2		Junagadh Long (S-67-5-3-38)	1981	GAU
3		Junagadh Oblong (S-67-4-312)	1981	GAU
4		Anand Brinjal Hybrid-1	1993	GAU
5		Anand Brinjal Hybrid-2	1995	GAU
6		Gujarat Brinjal Long-1	2002	GAU
7		Gujarat Brinjal Hybrid-2	2002	GAU
8		Gujarat Oblong Brinjal-1	2005	AAU
9		Junagadh Brinjal Green Round -1	2007	JAU
10		Gujarat Junagadh Brinjal-2	2010	JAU
11		Gujarat Junagadh Brinjal-3	2012	JAU
12		Gujarat Anand Oblong Brinjal -2	2013	AAU
13		Gujarat Anand Brinjal Hybrid -3	2014	AAU
14		Gujarat Junagadh Long Brinjal-4	2015	JAU
15		Gujarat Junagadh Brinjal Hybrid-4	2015	JAU
16		Gujarat Navsari Round Brinjal-1	2016	NAU
17		Gujarat Round Brinjal-5	2018	JAU
18	Okra	Gujarat Okra-1	1983	GAU
19		Gujarat Okra Hybrid-1	1992	GAU
20		Gujarat Okra -2	1999	GAU
21		Gujarat Okra Hybrid-2	2009	JAU
22		Gujarat Junagadh Okra-3	2010	JAU
23		Gujarat Junagadh Okra Hybrid-3	2011	JAU
24		Gujarat Anand Okra-5	2011	AAU
25		Gujarat Junagadh Okra Hybrid-4	2016	JAU
26		Gujarat Okra -6	2018	JAU
27	Chilli	Gujarat Vegetable Chilli-111	2005	AAU
28		Gujarat Vegetable Chilli -101	2005	AAU
29		Gujarat Vegetable Chilli -121	2005	AAU
30		Gujarat Vegetable Non Pungent Chilli -131	2008	AAU
31		Gujarat Anand Vegetable Chilli -112	2011	AAU
32		Gujarat Anand Vegetable Chilli Hybrid -1	2011	AAU
33	Tomato	Junagadh Ruby (S-68-10-2-2)	1981	GAU

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No.	Crop	Name of variety	Year of Release	Name of University
34		Gujarat Tomato-1	2002	GAU
35		Gujarat Tomato -2	2005	AAU
36		AnandTomato-3	2009	AAU
37		Junagadh Tomato-3	2009	JAU
38		Gujarat Anand Tomato -5	2017	AAU
39		Gujarat Tomato -6	2018	JAU
40		Gujarat Tomato -7	2018	NAU
41	Cucumber	Gujarat Cucumber-1	2005	AAU
42	Muskmelon	Gujarat Muskmelon-3	2005	AAU
43	Bottle gourd	Anand Bottle Gourd-1	2006	AAU
44		Gujarat Anand Bottle Gourd Hybrid-1	2017	AAU
45	Sponge gourd	Gujarat Sponge Gourd -1	2006	AAU
46		Gujarat Junagadh Sponge Gourd -2	2015	JAU
47	Cowpea	Anand Vegetable Cowpea-1	2008	AAU
48		Gujarat Dantiwada Vegetable Cowpea-2	2014	SDAU
49	Pigeon pea	Anand Vegetable Pigeon pea-1	2008	AAU
50	Indian bean	Gujarat Wal-1 (ND-15)	1998	GAU
51		Gujarat Indian Bean-1	2001	GAU
52		NW-106	2008	NAU
53		Gujarat Junagadh Indian Bean-11	2011	JAU
54		NPS 1	2012	
55		Gujarat Junagadh Indian Bean-2 (Papdi)	2012	JAU
56		Gujarat Navsari Indian Bean-21	2016	NAU
57	Gujarat Navsari Indian Bean-22	2017	NAU	
58	Pumpkin	Anand Pumpkin-1	2009	AAU
59	Ridge Gourd	Gujarat Anand Ridge Gourd-1	2010	AAU
60		GJRGH-1	2012	JAU
61	Karingada	Gujarat Karingada 1	2002	GAU
62	Garlic	S-97-1	1979	GAU
63		G.G.-10	1979	GAU
64		Gujarat Garlic-2	1993	GAU
65		Gujarat Garlic-3	1999	GAU
66		Gujarat Garlic-4	2007	JAU
67		Gujarat Junagadh Garlic 5	2013	JAU
68		Gujarat Anand Garlic 6	2013	AAU
69	Onion	Gujarat White Onion -1	2001	GAU
70		Gujarat Anand White Onion -2	2013	AAU
71		Gujarat Junagadh Red Onion-11	2015	JAU
72		Gujarat Junagadh White Onion-3	2016	JAU
73	Coriander	GC-2	1985	GAU
74		CoR-29	2012	SDAU

No.	Crop	Name of variety	Year of Release	Name of University
75		Gujarat Dantiwada Coriander 1	2013	SDAU
76	Fenugreek	Gujarat Methi-1	1999	GAU
77		Gujarat Methi-2	2007	SDAU
78		Gujarat Methi-3	2011	SDAU
79	Turmeric	Sugandham	1984	GAU
80		GN Turmeric-1	2010	NAU
81	Little gourd	GNLG-1	2014	NAU
82	Sweet Potato	Collection-71 (Red)	1995	NAU
83		Cross-4 (White)	1995	NAU
84		Bhukanti	2017	NAU
85	Potato	Kufri Bahar (E-3797)	1987	SDAU
86		Kufri Badshah	1987	SDAU
87		Kufri Jawahar	1997	SDAU
88		Kufri Pukhraj	2005	SDAU
89		Kufri Surya	2007	SDAU
90	Pointed gourd	GNPG-1	2014	NAU
91	Carrot	Gujarat Dantiwada Carrot 1	2013	SDAU
92	Dillseed	Gujarat Anand Vegetable Dillseed-1	2014	AAU

Table-4.3.51 Verities/Hybrids Developed and Identified by AICRP-VC at National Level

Sr. No.	Vegetable	Varieties/hybrids	Year of release	Zone
1	Brinjal	ABH 1 (National Check)	1993	IV, VI, VII
2	Brinjal	GBH 2 (ABH 2)	1995	IV, VI, VII
3	Brinjal	AB 1	1996	III, VI, VII
4	Brinjal	ABSR 1	2004	VII
5	Chilli	ASC 2000-02 (GVC 101)	2004	VII
6	Sponge gourd	JSGL-55 (GSG-1)	2004	VI
7	Okra	JNDOL-03-1	2007	VII, VIII
8	Okra	JNDOH-2	2008	II, IV, VI, VII, VIII
9	Muskmelon	GMM-3	2008	IV, VII
10	Tomato	ATL 04-19	2010	VI
11	Chilli	ACS 06-2 (GAVC 112)	2010	VIII
12	Okra	GJOH-4	2016	VI, VII
13	Brinjal	Gujarat Junagadh Long Brinjal-4	2017	VI
14	Tomato	ATL 04-21	2017	VI

4.3.2.9 Input Management:

4.3.2.9.1 Seed:

Table-4.3.52 Districtwise Estimated Seed Required (T) of Different Vegetable Crops 2016-17 for Gujarat

Sr. No.	Name of District	Potato	Onion	Brinjal	Cabbage	Okra	Tomato	Cauliflower	Clusterbean	Cow Pea	Cucurbits	Others	Total
1	Ahmedabad	250.0	1.0	1.2	0.6	19.4	1.1	0.9	39.6	39.2	16.3	3.9	373.2
2	Amreli	0.0	35.0	0.2	0.3	3.9	0.2	0.1	3.9	8.0	2.4	0.9	54.9
3	Anand	6460.0	0.0	2.6	1.1	25.6	0.7	0.4	44.5	51.3	11.2	9.5	6606.9
4	Aravalli	54750.0	4.2	0.1	0.1	2.7	0.1	0.1	4.2	1.4	3.2	0.1	54766.2
5	Banaskantha	165425.0	1.0	1.4	1.8	36.7	1.0	1.9	65.7	60.2	6.9	2.1	165603.7
6	Bharuch	0.0	1.1	0.7	0.1	22.3	0.1	0.0	7.3	12.8	8.4	3.2	56.0
7	Bhavnagar	0.0	350.0	0.6	0.5	6.4	0.3	0.3	6.8	5.2	3.0	0.3	373.4
8	Botad	0.0	2.1	0.2	0.1	2.1	0.1	0.0	3.1	0.9	2.5	0.4	11.5
9	ChhotaUdepur	0.0	0.0	0.8	0.1	22.2	0.6	0.0	19.7	5.8	2.1	1.8	53.1
10	Dahod	0.0	11.7	0.5	0.5	17.9	0.3	0.4	11.0	11.3	4.2	1.6	59.4
11	Dang	0.0	0.0	0.2	0.0	10.1	0.1	0.0	0.0	1.9	1.6	2.0	15.9
12	DevbhumiDwarka	250.0	1.0	0.2	0.1	3.8	0.0	0.0	1.0	2.7	1.0	0.1	259.9
13	Gandhinagar	20500.0	0.0	1.0	1.0	26.2	0.1	0.6	6.2	9.0	6.1	1.5	20551.7
14	GirSomnath	0.0	30.0	0.9	0.6	8.4	0.2	0.1	11.8	14.7	4.4	0.9	72.0
15	Jamnagar	0.0	10.0	0.3	0.3	8.7	0.2	0.0	6.8	4.8	1.3	0.1	32.5
16	Junagadh	0.0	11.0	0.5	0.4	6.5	0.2	0.1	10.7	12.3	3.9	1.1	46.7
17	Kheda	15250.0	0.0	1.5	1.1	22.8	0.6	1.3	37.8	37.7	8.5	3.3	15364.6
18	Kutch	267.5	2.0	1.1	0.6	10.4	0.4	0.4	13.6	3.7	7.5	1.7	308.9
19	Mahisagar	500.0	1.0	0.2	0.1	7.0	0.1	0.1	10.7	6.8	1.7	1.0	528.7
20	Mehsana	19667.5	3.2	0.9	0.5	16.4	0.9	0.5	36.3	16.6	0.5	4.2	19747.5
21	Morbi	0.0	3.0	0.3	0.3	6.2	0.1	0.0	5.2	4.0	1.3	0.6	21.0
22	Narmada	0.0	1.0	0.3	0.1	6.7	0.1	0.1	10.7	12.1	3.9	0.9	35.9
23	Navsari	0.0	2.0	1.0	0.1	51.1	0.0	0.1	8.6	12.9	21.2	0.8	97.8
24	Panchmahal	250.0	1.0	0.2	0.2	8.8	0.1	0.1	9.6	7.5	1.3	1.7	280.5

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Sr. No.	Name of District	Potato	Onion	Brinjal	Cabbage	Okra	Tomato	Cauliflower	Clusterbean	Cow Pea	Cucurbits	Others	Total
25	Patan	2750.0	0.0	0.1	0.1	1.6	0.0	0.1	8.4	8.3	1.4	0.9	2770.9
26	Porbandar	0.0	2.7	0.1	0.0	0.6	0.0	0.0	0.5	0.3	0.1	0.2	4.5
27	Rajkot	0.0	25.0	0.2	0.7	10.4	0.1	0.1	2.5	6.0	2.9	0.8	48.7
28	Sabarkantha	19750.0	2.2	0.3	1.4	8.8	0.4	2.4	5.5	12.1	4.7	0.9	19788.7
29	Surat	0.0	2.0	1.9	0.4	96.4	0.3	0.7	18.4	23.9	12.0	5.7	161.7
30	Surendranagar	0.0	12.0	1.0	0.4	17.0	0.2	0.3	18.3	12.9	2.7	1.0	65.8
31	Tapi	0.0	0.0	1.3	0.1	79.4	0.1	0.2	8.6	11.8	7.6	2.3	111.4
32	Vadodara	250.0	1.0	2.9	0.7	25.4	0.3	1.4	21.7	24.1	10.0	5.6	343.1
33	Valsad	0.0	0.0	1.0	0.0	16.5	0.5	0.0	2.3	1.6	8.0	0.6	30.5
	TOTAL	306320.0	516.1	26.0	14.2	608.2	9.8	12.9	460.8	443.5	173.7	61.6	308646.8

Table-4.3.53 Projection for Seed Requirement (T) of Vegetable Crops in Next Three Years

Name of Vegetable	Used in 2016-17	2017-18	2018-19	2019-20
Brinjal	26.0	28.6	31.5	34.6
Tomato	9.8	10.8	11.9	13.0
Cabbage	14.2	15.6	17.2	18.9
Cauliflower	12.9	14.2	15.6	17.2
Okra	608.2	669.0	735.9	809.5
Cluster bean	460.8	506.9	557.6	613.3
Cowpea	443.5	487.9	536.6	590.3
Cucurbits	173.7	191.1	210.2	231.2
Potato	306320.0	336952.0	370647.2	407711.9
Onion	516.1	567.7	624.5	686.9
Others	61.6	67.8	74.5	82.0
Total	308646.8	339511.5	373462.6	410808.9

4.3.2.9.2 Fertilizer:

District-wise fertiliser required for vegetable crops at the rate of 100:50:50 NPK kg/ha during 2016-17 for Gujarat state is given in bellow Table.

Table-4.3.54 Districtwise Fertilizer Consumption (2016-17)

Sr. No.	Name of District	Total Area (ha)	Fertilizer Required in Tonne			
			DAP	AS	MOP	UREA
1	Ahmedabad	32456	3527.8	13053.0	2797.9	5675.2
2	Amreli	9427	1024.7	3791.3	812.7	1648.4
3	Anand	42031	4568.6	16903.8	3623.4	7349.5
4	Aravalli	26014	2827.6	10462.2	2242.6	4548.8
5	Banaskantha	102221	11111.0	41110.6	8812.2	17874.2
6	Bharuch	14494	1575.4	5829.1	1249.5	2534.4
7	Bhavnagar	43286	4705.0	17408.5	3731.6	7568.9
8	Botad	3761	408.8	1512.6	324.2	657.6
9	ChhotaUdepur	13277	1443.2	5339.7	1144.6	2321.6
10	Dahod	13564	1474.3	5455.1	1169.3	2371.8
11	Dang	5186	563.7	2085.7	447.1	906.8
12	DevbhumiDwarka	2670	290.2	1073.8	230.2	466.9
13	Gandhinagar	23485	2552.7	9445.1	2024.6	4106.5
14	GirSomnath	13965	1517.9	5616.4	1203.9	2441.9
15	Jamnagar	6127	666.0	2464.1	528.2	1071.4
16	Junagadh	10168	1105.2	4089.3	876.6	1778.0
17	Kheda	34407	3739.9	13837.6	2966.1	6016.3
18	Kutch	15436	1677.8	6208.0	1330.7	2699.1
19	Mahisagar	6101	663.2	2453.7	525.9	1066.8
20	Mehsana	27954	3038.5	11242.4	2409.8	4888.0
21	Morbi	5289	574.9	2127.1	455.9	924.8
22	Narmada	7400	804.3	2976.1	637.9	1294.0
23	Navsari	23052	2505.7	9270.9	1987.2	4030.8
24	Panchmahal	6638	721.5	2669.6	572.2	1160.7
25	Patan	4985	541.8	2004.8	429.7	871.7
26	Porbandar	1095	119.0	440.4	94.4	191.5
27	Rajkot	9341	1015.3	3756.7	805.3	1633.4
28	Sabarkantha	24185	2628.8	9726.6	2084.9	4228.9
29	Surat	36411	3957.7	14643.6	3138.9	6366.8
30	Surendranagar	13361	1452.3	5373.4	1151.8	2336.3
31	Tapi	22330	2427.2	8980.5	1925.0	3904.6
32	Vadodara	31545	3428.8	12686.6	2719.4	5515.9
33	Valsad	12215	1327.7	4912.6	1053.0	2135.9
	TOTAL	643877	69986.7	258950.5	55506.6	112587.2

Table-4.3.55 Projection for the Fertilizer Requirement (in '000' T) of Vegetable Crops in Next Three Year

Name of Fertilizer	Used in 2016-17	2017-18	2018-19	2019-20
DAP	70.0	77.0	84.7	93.2
MOP	259.0	284.8	313.3	344.7
AS	55.5	61.1	67.2	73.9
Neem coated Urea	112.6	123.8	136.2	149.9

4.3.2.10 Gap Analysis of Vegetable Crops:

The prospect of increasing the production by area expansion is limited mainly because of the land constraint. Therefore, an alternative way is to increase the productivity of vegetables per unit area. There exists a lot of scope for increasing yield in most of the vegetables mainly by growing high yielding varieties/ hybrids, adopting improved production and protection technologies and following proper pre-harvest management of the crop production.

Table-4.3.56 Gap Analysis of Vegetable Crops of 26 districts

Sr. No.	Name of District	Average of five years (2012-17)			Yield Gap in % over Mean of Gujarat (20 MT/ha)	Yield Gap in % over the Highest District Yield (Sabarkantha, 28.9 MT/ha)
		Area (ha)	Production (MT)	Productivity (MT/ha)		
1	Ahmedabad	32539.40	545027.80	16.73	-16.35	-42.11
2	Amreli	7906.60	146514.20	18.22	-8.90	-36.96
3	Banaskantha	88910.80	2324479.0	26.07	30.35	-9.79
4	Bharuch	13908.60	209678.00	15.01	-24.95	-48.06
5	Narmada	8453.80	118804.20	13.98	-30.10	-51.63
6	Bhavnagar	38963.00	923215.60	23.38	16.90	-19.10
7	Dang	4459.20	80712.80	18.26	-8.70	-36.82
8	Gandhinagar	23353.00	530670.60	22.71	13.55	-21.42
9	Jamnagar	12099.60	174320.20	14.74	-26.30	-49.00
10	Junagadh	18826.20	350445.20	18.27	-8.65	-36.78
11	Porbandar	1320.00	28305.60	21.32	6.60	-26.23
12	Kutch	14195.00	228055.40	15.91	-20.45	-44.95
13	Kheda	33470.60	617968.60	18.45	-7.75	-36.16
14	Anand	39371.40	743341.40	18.94	-5.30	-34.46
15	Mehsana	24450.40	481486.60	19.66	-1.70	-31.97
16	Patan	5109.60	93919.00	18.29	-8.55	-36.71
17	Panchmahal	7362.60	109881.20	14.84	-25.80	-48.65
18	Dahod	12565.40	198965.00	15.85	-20.75	-45.16
19	Rajkot	11218.60	219921.80	19.12	-4.40	-33.84
20	Sabarkantha	32293.60	934499.40	28.90	44.50	0.00
21	Surat	32795.20	521483.80	15.88	-20.60	-45.05
22	Surendranagar	16888.60	253015.20	15.10	-24.50	-47.75
23	Baroda	37243.60	678852.60	18.22	-8.90	-36.96
24	Valsad	11408.00	198492.40	17.37	-13.15	-39.90
25	Navsari	19988.60	328827.60	16.55	-17.25	-42.73
26	Tapi	21839.40	334021.60	15.31	-23.45	-47.02

Table-4.3.57 Gap Analysis of Vegetable Crops of 7 districts

Sr. No.	Name of Newly formed District	Average of two years (2015-16 to 2016-17)			Yield Gap in % over Mean of Gujarat (20 MT/ha)	Yield Gap in % over the Highest District Yield (Aravalli, 30.1 MT/ha)
		Area (ha)	Production (MT)	Productivity (MT/ha)		
1	Aravalli	25992.50	782700.0	30.10	50.50	0.00
2	Botad	3398.00	56911.0	16.71	-16.45	-44.49
3	ChhotaUdepur	12990.50	236370.5	18.19	-9.05	-39.57
4	DevbhumiDwarka	2555.50	41166.0	16.08	-19.60	-46.58
5	GirSomnath	13560.00	257294.0	18.98	-5.10	-36.94
6	Mahisagar	5658.00	88545.0	15.63	-21.85	-48.07
7	Morbi	5976.00	100501.0	16.77	-16.15	-44.29

Table-4.3.58 Gap Analysis of Potato in Comparison to the Highest District Productivity and Mean of Gujarat State

Sr. No.	District	Average of 2015-16 to 2016-17			Yield Gap in % over Mean of Gujarat (26.59 T/ha)	Yield Gap in % over the Highest District Productivity (Sabarkantha, 32.63 T/ha)
		Potato				
		Area (ha)	Production (T)	Productivity (T/ha)		
1	Ahmedabad	50.00	1281.50	25.63	-3.61	-21.45
2	Amreli	0.00	0.00	0.00		
3	Anand	2942.00	93561.66	31.80	19.60	-2.54
4	Aravalli	21900.00	696420.00	31.80	19.59	-2.54
5	Banaskantha	60935.00	1944517.50	31.91	20.01	-2.20
6	Bharuch	0.00	0.00	0.00		
7	Bhavnagar	0.00	0.00	0.00		
8	Botad	0.00	0.00	0.00		
9	Chhota Udepur	0.00	0.00	0.00		
10	Dahod	0.00	0.00	0.00		
11	Dang	0.00	0.00	0.00		
12	Devbhumi Dwarka	50.00	1400.00	28.00	5.30	-14.19
13	Gandhinagar	7450.00	242160.00	32.50	22.24	-0.38
14	Gir Somnath	0.00	0.00	0.00		
15	Jamnagar	0.00	0.00	0.00		
16	Junagadh	0.00	0.00	0.00		
17	Kheda	6050.00	151257.50	25.00	-5.98	-23.38
18	Kutch	103.50	2135.27	20.63	-22.41	-36.77
19	Mahisagar	150.00	3062.50	20.42	-23.22	-37.43
20	Mehsana	7033.50	197621.63	28.10	5.67	-13.89
21	Morbi	0.00	0.00	0.00		
22	Narmada	0.00	0.00	0.00		
23	Navsari	0.00	0.00	0.00		
24	Panchmahal	50.00	1062.50	21.25	-20.08	-34.88
25	Patan	1000.00	22923.00	22.92	-13.79	-29.75
26	Porbandar	0.00	0.00	0.00		
27	Rajkot	0.00	0.00	0.00		
28	Sabarkantha	9600.00	313245.00	32.63	22.71	0.00
29	Surat	0.00	0.00	0.00		
30	Surendranagar	0.00	0.00	0.00		
31	Tapi	0.00	0.00	0.00		
32	Vadodara	150.00	2950.00	19.67	-26.04	-39.73
33	Valsad	0.00	0.00	0.00		
	TOTAL	117464.0	3673598.06	372.26		

Table-4.3.59 Gap Analysis of Onion in Comparison to the Highest District Productivity and Mean of Gujarat State

Sr. No.	District	Average of 2015-16 to 2016-17			Yield Gap in % over Mean of Gujarat (22.05 T/ha)	Yield Gap in % over the Highest District Productivity (Bhavnagar, 25.93 T/ha)
		Onion				
		Area (ha)	Production (T)	Productivity (T/ha)		
1	Ahmedabad	150.00	3083.50	20.56	-6.77	-20.72
2	Amreli	3850.00	97632.50	25.36	15.01	-2.20
3	Anand	100.00	2300.00	23.00	4.31	-11.30
4	Aravalli	510.00	12282.00	24.08	9.22	-7.13
5	Banaskantha	49.50	1113.75	22.50	2.04	-13.23
6	Bharuch	103.00	1973.45	19.16	-13.11	-26.11
7	Bhavnagar	35250.00	914075.00	25.93	17.60	0.00
8	Botad	156.00	3897.90	24.99	13.32	-3.64
9	Chhota Udepur	0.00	0.00	0.00		
10	Dahod	1435.00	29216.00	20.36	-7.67	-21.48
11	Dang	0.00	0.00	0.00		
12	Devbhumi Dwarka	50.00	1200.00	24.00	8.84	-7.44
13	Gandhinagar	0.00	0.00	0.00		
14	Gir Somnath	3300.00	82440.00	24.98	13.30	-3.66
15	Jamnagar	600.00	10360.00	17.27	-21.69	-33.41
16	Junagadh	800.00	19890.00	24.86	12.76	-4.12
17	Kheda	0.00	0.00	0.00		
18	Kutch	250.00	5775.00	23.10	4.76	-10.91
19	Mahisagar	100.00	2124.00	21.24	-3.67	-18.09
20	Mehsana	358.50	7141.33	19.92	-9.66	-23.18
21	Morbi	900.00	22447.50	24.94	13.11	-3.81
22	Narmada	50.00	892.50	17.85	-19.05	-31.16
23	Navsari	150.00	2622.50	17.48	-20.71	-32.57
24	Panchmahal	50.00	1107.50	22.15	0.45	-14.58
25	Patan	0.00	0.00	0.00		
26	Porbandar	235.00	5913.00	25.16	14.11	-2.96
27	Rajkot	2100.00	52537.50	25.02	13.46	-3.52
28	Sabarkantha	307.50	7541.50	24.53	11.23	-5.42
29	Surat	200.00	4200.00	21.00	-4.76	-19.01
30	Surendranagar	1250.00	30235.00	24.19	9.70	-6.72
31	Tapi	0.00	0.00	0.00		
32	Vadodara	100.00	975.00	9.75	-55.78	-62.40
33	Valsad	0.00	0.00	0.00		
	TOTAL	52404.50	1322976.43	573.37		

Table-4.3.60 Gap Analysis of Brinjal in Comparison to the Highest District Productivity and Mean of Gujarat State

Sr. No.	District	Average of 2015-16 to 2016-17			Yield Gap in % over Mean of Gujarat (19.65 T/ha)	Yield Gap in % over the Highest District Productivity (Sabarkantha, 28.06 T/ha)
		Brinjal				
		Area (ha)	Production (T)	Productivity (T/ha)		
1	Ahmedabad	3550.50	70568.00	19.88	1.15	-29.17
2	Amreli	623.00	11499.60	18.46	-6.06	-34.22
3	Anand	7550.00	167194.80	22.15	12.70	-21.08
4	Aravalli	359.00	10024.63	27.92	42.11	-0.49
5	Banaskantha	4397.00	96935.80	22.05	12.19	-21.43
6	Bharuch	1948.00	34136.88	17.52	-10.82	-37.55
7	Bhavnagar	1847.50	38267.57	20.71	5.41	-26.18
8	Botad	538.50	10160.45	18.87	-3.98	-32.76
9	Chhota Udepur	2212.50	44916.38	20.30	3.31	-27.65
10	Dahod	1479.50	27260.90	18.43	-6.23	-34.33
11	Dang	625.00	10875.80	17.40	-11.44	-37.99
12	Devbhumi Dwarka	681.00	12605.00	18.51	-5.80	-34.04
13	Gandhinagar	2879.50	64282.98	22.32	13.61	-20.44
14	Gir Somnath	2270.00	45150.65	19.89	1.22	-29.12
15	Jamnagar	896.50	16921.58	18.88	-3.94	-32.73
16	Junagadh	1534.00	29914.00	19.50	-0.76	-30.50
17	Kheda	4299.00	88328.53	20.55	4.56	-26.78
18	Kutch	3040.00	54295.21	17.86	-9.11	-36.35
19	Mahisagar	627.50	11696.38	18.64	-5.14	-33.57
20	Mehsana	2528.00	44178.20	17.48	-11.07	-37.72
21	Morbi	860.00	16146.55	18.78	-4.45	-33.09
22	Narmada	857.50	15267.61	17.80	-9.39	-36.55
23	Navsari	2907.00	57050.96	19.63	-0.13	-30.06
24	Panchmahal	755.00	12755.42	16.89	-14.02	-39.79
25	Patan	313.50	5831.00	18.60	-5.35	-33.71
26	Porbandar	255.00	4430.38	17.37	-11.58	-38.08
27	Rajkot	655.50	12394.18	18.91	-3.78	-32.62
28	Sabarkantha	769.50	21592.80	28.06	42.80	0.00
29	Surat	5329.50	104742.83	19.65	0.02	-29.96
30	Surendranagar	2860.00	52195.50	18.25	-7.12	-34.96
31	Tapi	3717.50	68309.75	18.38	-6.49	-34.51
32	Vadodara	8218.50	166096.43	20.21	2.85	-27.98
33	Valsad	2813.50	52828.35	18.78	-4.44	-33.08
	TOTAL	74198.00	1478855.04	19.93		

Table-4.3.61 Gap Analysis of Okra in Comparison to the Highest District Productivity and Mean of Gujarat State

Sr. No.	District	Average of 2015-16 to 2016-17			Yield Gap in % over Mean of Gujarat (10.80 T/ha)	Yield Gap in % over the Highest District Productivity (Junagadh 17.60 T/ha)
		Okra				
		Area (ha)	Production (T)	Productivity (T/ha)		
1	Ahmedabad	2410.00	20429.40	8.48	-21.51	-51.84
2	Amreli	478.00	3836.15	8.03	-25.69	-54.40
3	Anand	3226.50	29478.13	9.14	-15.41	-48.09
4	Aravalli	327.00	3605.13	11.02	2.08	-37.36
5	Banaskantha	4562.50	61869.03	13.56	25.56	-22.95
6	Bharuch	2799.00	27988.98	10.00	-7.41	-43.18
7	Bhavnagar	794.00	8635.20	10.88	0.70	-38.21
8	Botad	206.00	1894.25	9.20	-14.86	-47.75
9	Chhota Udepur	2699.00	33862.38	12.55	16.17	-28.71
10	Dahod	2086.50	24666.75	11.82	9.46	-32.83
11	Dang	1253.50	18550.50	14.80	37.03	-15.91
12	Devbhumi Dwarka	465.00	3630.00	7.81	-27.72	-55.65
13	Gandhinagar	3327.50	29812.00	8.96	-17.04	-49.10
14	Gir Somnath	915.00	16012.50	17.50	62.04	-0.57
15	Jamnagar	1072.00	8495.09	7.92	-26.62	-54.97
16	Junagadh	850.00	14960.00	17.60	62.96	0.00
17	Kheda	2842.50	26701.50	9.39	-13.02	-46.63
18	Kutch	1253.50	10942.26	8.73	-19.17	-50.40
19	Mahisagar	810.50	6615.98	8.16	-24.42	-53.62
20	Mehsana	2052.50	28355.38	13.82	27.92	-21.51
21	Morbi	775.00	6617.40	8.54	-20.94	-51.49
22	Narmada	823.50	7827.85	9.51	-11.99	-45.99
23	Navsari	6237.00	78738.20	12.62	16.89	-28.27
24	Panchmahal	1080.00	9028.50	8.36	-22.60	-52.50
25	Patan	193.00	1891.00	9.80	-9.28	-44.33
26	Porbandar	62.50	587.50	9.40	-12.96	-46.59
27	Rajkot	1242.50	10185.00	8.20	-24.10	-53.43
28	Sabarkantha	1016.00	11491.46	11.31	4.73	-35.74
29	Surat	11836.00	162163.38	13.70	26.86	-22.15
30	Surendranagar	2102.50	18604.50	8.85	-18.07	-49.72
31	Tapi	9928.00	135269.25	13.63	26.16	-22.59
32	Vadodara	3167.00	41250.40	13.03	20.60	-25.99
33	Valsad	2014.00	20077.40	9.97	-7.70	-43.36
	TOTAL	74907.50	884072.43	356.26		

**Table-4.3.62 Gap Analysis of Tomato in Comparison to the Highest District
Productivity and Mean of Gujarat State**

Sr. No.	District	Average of 2015-16 to 2016-17			Yield Gap in % over Mean of Gujarat (26.30 T/ha)	Yield Gap in % over the Highest District Productivity (Banaskantha, 36.00 T/ha)
		Tomato				
		Area (ha)	Production (T)	Productivity (T/ha)		
1	Ahmedabad	5216.00	148101.40	28.39	7.96	-21.13
2	Amreli	1049.00	24901.61	23.74	-9.74	-34.06
3	Anand	3597.50	113861.00	31.65	20.34	-12.08
4	Aravalli	273.50	8217.25	30.04	14.24	-16.54
5	Banaskantha	4987.50	179550.00	36.00	36.88	0.00
6	Bharuch	625.50	13792.30	22.05	-16.16	-38.75
7	Bhavnagar	1332.50	30921.50	23.21	-11.77	-35.54
8	Botad	417.50	11133.25	26.67	1.39	-25.93
9	Chhota Udepur	3039.00	90100.13	29.65	12.73	-17.64
10	Dahod	1504.50	31562.90	20.98	-20.23	-41.73
11	Dang	353.50	7821.50	22.13	-15.87	-38.54
12	Devbhumi Dwarka	246.00	7367.85	29.95	13.88	-16.80
13	Gandhinagar	480.00	10815.88	22.53	-14.32	-37.41
14	Gir Somnath	1087.50	28146.45	25.88	-1.59	-28.11
15	Jamnagar	838.50	25029.75	29.85	13.50	-17.08
16	Junagadh	975.00	25248.00	25.90	-1.54	-28.07
17	Kheda	3161.50	98069.86	31.02	17.95	-13.83
18	Kutch	1891.00	53112.95	28.09	6.80	-21.98
19	Mahisagar	525.50	13711.83	26.09	-0.79	-27.52
20	Mehsana	4442.50	143497.68	32.30	22.82	-10.27
21	Morbi	642.50	15710.50	24.45	-7.03	-32.08
22	Narmada	492.50	10901.13	22.13	-15.84	-38.52
23	Navsari	157.00	3629.77	23.12	-12.09	-35.78
24	Panchmahal	392.50	7897.50	20.12	-23.49	-44.11
25	Patan	90.00	2221.00	24.68	-6.17	-31.45
26	Porbandar	129.50	3628.09	28.02	6.53	-22.18
27	Rajkot	447.50	9439.00	21.09	-19.80	-41.41
28	Sabarkantha	1710.50	54098.00	31.63	20.25	-12.15
29	Surat	1678.00	39777.70	23.71	-9.87	-34.15
30	Surendranagar	1198.00	29156.00	24.34	-7.46	-32.40
31	Tapi	652.50	14845.00	22.75	-13.49	-36.80
32	Vadodara	1734.50	52157.86	30.07	14.34	-16.47
33	Valsad	2209.00	57058.03	25.83	-1.79	-28.25
	TOTAL	47577.50	1365482.65	868.05		

4.3.2.11 Vegetables Crop and Resources

Table-4.3.63 Sustainability Issues and Gap Analysis of Productivity of Different Components

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicator	Sustainability Outputs
1	Seed treatment	Unawareness, unavailability of small packing of fungicides	Educate farmers regarding benefit of seed treatment	Trainings, demonstrations, seminars, Field days to make aware farmers	5% growth in area under seed treatment every year	Increased yield on sustainable basis
2	Poor nursery management	Unawareness, poor germination	Line sowing, drenching irrigation with showers, proper application of compost in nursery	Mass campaign of nursery management through trainings & demonstrations popularize nursery raising in poly house	5% growth in area under good managed nursery every year	Quality seedlings, increased income and saving in resources
3	Imbalance use of fertilizers	Excessive use of nitrogenous fertilizers, less use of organic manures and micronutrients. Farmers are not adopted ideal ratio of NPK 4:2:1	Educate farmers in balanced use of fertilizer importance of K, and other micronutrients for quality produce and organic manure on quality of vegetables. Use ideal ratio of NPK 4:2:1	Trainings, demonstrations, farmers Field school and awareness campaigns	5 % growth in area under balanced use of fertilizers every year	Improvement quality and quantity of the produce

Table-4.3.64 Activity Output Matrix of Vegetable Cropd for Narrowing the Gaps in Realizing the Vision

Activity/ Crop/ Commodity	Issues	Mode of Action	Collaborator/Target	Cost
Vegetable cultivation	Non-availability of high quality/ hybrid seeds specially from public sector	Public/private linkage and synergies either through direct testing of existing hybrid seeds of private sector or collaborating with private sector for development of hybrid seeds at the university farm	Director of Horticulture/ University/KVKs/ Gujarat State Seed Corporation	Project proposed
	Contamination of vegetables with pesticides/heavy metal	Injudicious use of pesticides and the use of contaminated groundwater or canal. Random sampling of fresh vegetables for quantiFincation of pesticide residue. Survey of current status of pesticide use on vegetables for recommended or un-recommended	Regulations regarding the disposal of industrial wastes Establishment of state designated pesticide residue lab or outsourcing the residue analysis from other private/ pesticides labs. DHO may collect random samples and outsource the residue analysis alternate arrangement DHO	Strengthening of Pesticides laboratory. Demonstrations Proposed. Survey Proposed
Vegetable crops	Provision of nutritional gardens near/around tube wells.	DHO will ensure the distribution of vegetable seedling free of cost to farmers for plantation on or around the tube wells. Only one species may be given for each location to facilitate watch and ward.	DHO/ KVK	Project proposed
	Crop diversiFincation through promotion of vegetable crops	cultivation of new vegetable crops	DHO/ KVK	Project proposed
	Water management by adoption of drip/ sprinkler irrigation	(i)Bringing the new plantations of vegetable under drip irrigation (ii) Bringing more area under sprinkler irrigation	DHO/ KVK	Project proposed

4.3.2.10 Recommended Interventions for the State with Detailed Action Plan With Costs:

Table-4.3.65 Training Proposed for Capacity Building of Vegetable Crop Related Staff on Different Aspects Covered under Plan

Sr. No.	District	Year-wise No. of Staff to be Trained (Phy- No., Fin. -Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	80	0.72	80	0.72	80	0.72	240	2.16
2	Amreli	40	0.36	40	0.36	40	0.36	120	1.08
3	Banaskantha	50	0.45	50	0.45	50	0.45	150	1.35
4	Bharuch	50	0.45	50	0.45	50	0.45	150	1.35
5	Narmada	30	0.27	30	0.27	30	0.27	90	0.81
6	Bhavnagar	50	0.45	50	0.45	50	0.45	150	1.35
7	Dangs	20	0.18	20	0.18	20	0.18	60	0.54
8	Gandhinagar	40	0.36	40	0.36	40	0.36	120	1.08
9	Jamnagar	60	0.54	60	0.54	60	0.54	180	1.62
10	Junagadh	80	0.72	80	0.72	80	0.72	240	2.16
11	Porbandar	40	0.36	40	0.36	40	0.36	120	1.08
12	Kachchh	60	0.54	60	0.54	60	0.54	180	1.62
13	Kheda	50	0.45	50	0.45	50	0.45	150	1.35
14	Anand	70	0.63	70	0.63	70	0.63	210	1.89
15	Mehsana	60	0.54	60	0.54	60	0.54	180	1.62
16	Patan	50	0.45	50	0.45	50	0.45	150	1.35
17	Panchmahals	40	0.36	40	0.36	40	0.36	120	1.08
18	Dahod	40	0.36	40	0.36	40	0.36	120	1.08
19	Rajkot	50	0.45	50	0.45	50	0.45	150	1.35
20	Sabarkantha	60	0.54	60	0.54	60	0.54	180	1.62
21	Surat	80	0.72	80	0.72	80	0.72	240	2.16
22	Surendranagar	50	0.45	50	0.45	50	0.45	150	1.35
23	Vadodara	50	0.45	50	0.45	50	0.45	150	1.35
24	Valsad	40	0.36	40	0.36	40	0.36	120	1.08
25	Navsari	70	0.63	70	0.63	70	0.63	210	1.89
26	Tapi	50	0.45	50	0.45	50	0.45	150	1.35
27	Aravalli	40	0.36	40	0.36	40	0.36	120	1.08
28	Botad	60	0.54	60	0.54	60	0.54	180	1.62
29	ChhotaUdepur	40	0.36	40	0.36	40	0.36	120	1.08
30	DevbhumiDwarka	70	0.63	70	0.63	70	0.63	210	1.89
31	GirSomnath	50	0.45	50	0.45	50	0.45	150	1.35
32	Mahisagar	50	0.45	50	0.45	50	0.45	150	1.35
33	Morbi	60	0.54	60	0.54	60	0.54	180	1.62
	TOTAL	1730	15.57	1730	15.57	1730	15.57	5190	46.71

Cost norms: @900/day/Trainee

Table-4.3.66 Training Proposed for Capacity Building of Farmers (District-wise) on Different Technologies for Vegetable Crops

(Phy- No., Fin. –Rs. in Lakh)

Sr No.	Name of Technology to be Transferred	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Seed Production	654	3.92	654	3.92	654	3.92	1962	11.76
2	Post Harvest management	1360	8.16	1360	8.16	1360	8.16	4080	24.48
3	Green House / Net house (protected cultivation) and plug nursery	8407	50.44	8407	50.44	8407	50.44	25221	151.32
4	Exotic Veg. Cultivation	2298	13.79	2298	13.79	2298	13.79	6894	41.37
5	Micro Irrigation System	662	3.97	662	3.97	662	3.97	1986	11.91
6	IPDM	1260	7.56	1260	7.56	1260	7.56	3780	22.68
7	INM	3732	22.39	3732	22.39	3732	22.39	11196	67.17
8	Integrated Weed management	2458	14.75	2458	14.75	2458	14.75	7374	44.25
9	Urban peri urban vegetable gardening	2230	13.38	2230	13.38	2230	13.38	6690	40.14
10	Organic farming	1680	10.08	1680	10.08	1680	10.08	5040	30.24
	TOTAL	24741	148.44	24741	148.44	24741	148.44	74223	445.32

Cost norms: @600/day/Trainee

**Table-4.3.67 Training Proposed for Capacity Building of Farmers (District-wise)
on Seed Production for Vegetable Crops**

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	0.12	20	0.12	20	0.12	60	0.36
2	Amreli	20	0.12	20	0.12	20	0.12	60	0.36
3	Banaskantha	60	0.36	60	0.36	60	0.36	180	1.08
4	Bharuch	12	0.07	12	0.07	12	0.07	36	0.21
5	Narmada	8	0.05	8	0.05	8	0.05	24	0.15
6	Bhavnagar	40	0.24	40	0.24	40	0.24	120	0.72
7	Dangs	8	0.05	8	0.05	8	0.05	24	0.15
8	Gandhinagar	16	0.10	16	0.10	16	0.10	48	0.3
9	Jamnagar	14	0.08	14	0.08	14	0.08	42	0.24
10	Junagadh	40	0.24	40	0.24	40	0.24	120	0.72
11	Porbandar	4	0.02	4	0.02	4	0.02	12	0.06
12	Kachchh	10	0.06	10	0.06	10	0.06	30	0.18
13	Kheda	30	0.18	30	0.18	30	0.18	90	0.54
14	Anand	26	0.16	26	0.16	26	0.16	78	0.48
15	Mehsana	18	0.11	18	0.11	18	0.11	54	0.33
16	Patan	8	0.05	8	0.05	8	0.05	24	0.15
17	Panchmahals	6	0.04	6	0.04	6	0.04	18	0.12
18	Dahod	8	0.05	8	0.05	8	0.05	24	0.15
19	Rajkot	40	0.24	40	0.24	40	0.24	120	0.72
20	Sabarkantha	28	0.17	28	0.17	28	0.17	84	0.51
21	Surat	28	0.17	28	0.17	28	0.17	84	0.51
22	Surendranagar	18	0.11	18	0.11	18	0.11	54	0.33
23	Vadodara	36	0.22	36	0.22	36	0.22	108	0.66
24	Valsad	10	0.06	10	0.06	10	0.06	30	0.18
25	Navsari	12	0.07	12	0.07	12	0.07	36	0.21
26	Tapi	14	0.08	14	0.08	14	0.08	42	0.24
27	Aravalli	25	0.15	25	0.15	25	0.15	75	0.45
28	Botad	15	0.09	15	0.09	15	0.09	45	0.27
29	ChhotaUdepur	10	0.06	10	0.06	10	0.06	30	0.18
30	DevbhumiDwarka	10	0.06	10	0.06	10	0.06	30	0.18
31	GirSomnath	10	0.06	10	0.06	10	0.06	30	0.18
32	Mahisagar	30	0.18	30	0.18	30	0.18	90	0.54
33	Morbi	20	0.12	20	0.12	20	0.12	60	0.36
	TOTAL	654	3.92	654	3.92	654	3.92	1962	11.76

Cost norms: @600/day/Trainee

**Table-4.3.68 Training Proposed for Capacity Building of Farmers (District-wise)
On PHM for Vegetable Crops**

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	50	0.30	50	0.30	50	0.30	150	0.9
2	Amreli	44	0.26	44	0.26	44	0.26	132	0.78
3	Banaskantha	150	0.90	150	0.90	150	0.90	450	2.7
4	Bharuch	20	0.12	20	0.12	20	0.12	60	0.36
5	Narmada	10	0.06	10	0.06	10	0.06	30	0.18
6	Bhavnagar	100	0.60	100	0.60	100	0.60	300	1.8
7	Dangs	4	0.02	4	0.02	4	0.02	12	0.06
8	Gandhinagar	40	0.24	40	0.24	40	0.24	120	0.72
9	Jamnagar	30	0.18	30	0.18	30	0.18	90	0.54
10	Junagadh	90	0.54	90	0.54	90	0.54	270	1.62
11	Porbandar	8	0.05	8	0.05	8	0.05	24	0.15
12	Kachchh	20	0.12	20	0.12	20	0.12	60	0.36
13	Kheda	60	0.36	60	0.36	60	0.36	180	1.08
14	Anand	40	0.24	40	0.24	40	0.24	120	0.72
15	Mehsana	50	0.30	50	0.30	50	0.30	150	0.9
16	Patan	16	0.10	16	0.10	16	0.10	48	0.3
17	Panchmahals	10	0.06	10	0.06	10	0.06	30	0.18
18	Dahod	14	0.08	14	0.08	14	0.08	42	0.24
19	Rajkot	80	0.48	80	0.48	80	0.48	240	1.44
20	Sabarkantha	64	0.38	64	0.38	64	0.38	192	1.14
21	Surat	60	0.36	60	0.36	60	0.36	180	1.08
22	Surendranagar	40	0.24	40	0.24	40	0.24	120	0.72
23	Vadodara	60	0.36	60	0.36	60	0.36	180	1.08
24	Valsad	18	0.11	18	0.11	18	0.11	54	0.33
25	Navsari	20	0.12	20	0.12	20	0.12	60	0.36
26	Tapi	22	0.13	22	0.13	22	0.13	66	0.39
27	Aravalli	40	0.24	40	0.24	40	0.24	120	0.72
28	Botad	50	0.30	50	0.30	50	0.30	150	0.9
29	ChhotaUdepur	20	0.12	20	0.12	20	0.12	60	0.36
30	DevbhumiDwarka	10	0.06	10	0.06	10	0.06	30	0.18
31	GirSomnath	10	0.06	10	0.06	10	0.06	30	0.18
32	Mahisagar	70	0.42	70	0.42	70	0.42	210	1.26
33	Morbi	40	0.24	40	0.24	40	0.24	120	0.72
TOTAL		1360	8.16	1360	8.16	1360	8.16	4080	24.48

Cost norms: @600/day/Trainee

Table-4.3.69 Training Proposed for Capacity Building of Farmers (District-wise) on Green House/Net House (Protected Cultivation) and plug nursery

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	240	1.44	240	1.44	240	1.44	720	4.32
2	Amreli	265	1.59	265	1.59	265	1.59	795	4.77
3	Banaskantha	810	4.86	810	4.86	810	4.86	2430	14.58
4	Bharuch	140	0.84	140	0.84	140	0.84	420	2.52
5	Narmada	82	0.49	82	0.49	82	0.49	246	1.47
6	Bhavnagar	600	3.60	600	3.60	600	3.60	1800	10.8
7	Dangs	30	0.18	30	0.18	30	0.18	90	0.54
8	Gandhinagar	235	1.41	235	1.41	235	1.41	705	4.23
9	Jamnagar	180	1.08	180	1.08	180	1.08	540	3.24
10	Junagadh	535	3.21	535	3.21	535	3.21	1605	9.63
11	Porbandar	33	0.19	33	0.19	33	0.19	99	0.57
12	Kachchh	126	0.75	126	0.75	126	0.75	378	2.25
13	Kheda	400	2.40	400	2.40	400	2.40	1200	7.20
14	Anand	340	2.04	340	2.04	340	2.04	1020	6.12
15	Mehsana	230	1.38	230	1.38	230	1.38	690	4.14
16	Patan	86	0.51	86	0.51	86	0.51	258	1.53
17	Panchmahals	60	0.36	60	0.36	60	0.36	180	1.08
18	Dahod	88	0.52	88	0.52	88	0.52	264	1.56
19	Rajkot	480	2.88	480	2.88	480	2.88	1440	8.64
20	Sabarkantha	360	2.16	360	2.16	360	2.16	1080	6.48
21	Surat	368	2.20	368	2.20	368	2.20	1104	6.60
22	Surendranagar	228	1.36	228	1.36	228	1.36	684	4.08
23	Vadodara	460	2.76	460	2.76	460	2.76	1380	8.28
24	Valsad	118	0.70	118	0.70	118	0.70	354	2.10
25	Navsari	140	0.84	140	0.84	140	0.84	420	2.52
26	Tapi	180	1.08	180	1.08	180	1.08	540	3.24
27	Aravalli	500	3.00	500	3.00	500	3.00	1500	9.00
28	Botad	118	0.70	118	0.70	118	0.70	354	2.10
29	ChhotaUdepur	80	0.48	80	0.48	80	0.48	240	1.44
30	DevbhumiDwarka	60	0.36	60	0.36	60	0.36	180	1.08
31	GirSomnath	85	0.51	85	0.51	85	0.51	255	1.53
32	Mahisagar	400	2.40	400	2.40	400	2.40	1200	7.20
33	Morbi	350	2.10	350	2.10	350	2.10	1050	6.30
	TOTAL	8407	50.44	8407	50.44	8407	50.44	25221	151.32

Cost Norms: @600/day/Trainee

**Table-4.3.70 Training Proposed for Capacity Building of Farmers (Districtwise)
on Exotic Vegetable Cultivation** (Phy- No., Fin. –Rs. in Lakh)

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	76	0.46	76	0.46	76	0.46	228	1.38
2	Amreli	80	0.48	80	0.48	80	0.48	240	1.44
3	Banaskantha	250	1.50	250	1.50	250	1.50	750	4.5
4	Bharuch	43	0.26	43	0.26	43	0.26	129	0.78
5	Narmada	25	0.15	25	0.15	25	0.15	75	0.45
6	Bhavnagar	180	1.08	180	1.08	180	1.08	540	3.24
7	Dangs	10	0.06	10	0.06	10	0.06	30	0.18
8	Gandhinagar	64	0.38	64	0.38	64	0.38	192	1.14
9	Jamnagar	56	0.34	56	0.34	56	0.34	168	1.02
10	Junagadh	164	0.98	164	0.98	164	0.98	492	2.94
11	Porbandar	10	0.06	10	0.06	10	0.06	30	0.18
12	Kachchh	40	0.24	40	0.24	40	0.24	120	0.72
13	Kheda	120	0.72	120	0.72	120	0.72	360	2.16
14	Anand	104	0.62	104	0.62	104	0.62	312	1.86
15	Mehsana	70	0.42	70	0.42	70	0.42	210	1.26
16	Patan	26	0.16	26	0.16	26	0.16	78	0.48
17	Panchmahals	18	0.11	18	0.11	18	0.11	54	0.33
18	Dahod	28	0.17	28	0.17	28	0.17	84	0.51
19	Rajkot	150	0.90	150	0.90	150	0.90	450	2.7
20	Sabarkantha	110	0.66	110	0.66	110	0.66	330	1.98
21	Surat	110	0.66	110	0.66	110	0.66	330	1.98
22	Surendranagar	70	0.42	70	0.42	70	0.42	210	1.26
23	Vadodara	140	0.84	140	0.84	140	0.84	420	2.52
24	Valsad	40	0.24	40	0.24	40	0.24	120	0.72
25	Navsari	42	0.25	42	0.25	42	0.25	126	0.75
26	Tapi	54	0.32	54	0.32	54	0.32	162	0.96
27	Aravalli	28	0.17	28	0.17	28	0.17	84	0.51
28	Botad	20	0.12	20	0.12	20	0.12	60	0.36
29	ChhotaUdepur	25	0.15	25	0.15	25	0.15	75	0.45
30	DevbhumiDwarka	30	0.18	30	0.18	30	0.18	90	0.54
31	GirSomnath	35	0.21	35	0.21	35	0.21	105	0.63
32	Mahisagar	40	0.24	40	0.24	40	0.24	120	0.72
33	Morbi	40	0.24	40	0.24	40	0.24	120	0.72
TOTAL		2298	13.79	2298	13.79	2298	13.79	6894	41.37

Cost Norms: @600/day/Trainee

Table-4.3.71 Training Proposed for Capacity Building of Farmers (District-wise) on Micro Irrigation System (Phy- No., Fin. –Rs. in lakh)

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	0.12	20	0.12	20	0.12	60	0.36
2	Amreli	22	0.13	22	0.13	22	0.13	66	0.39
3	Banaskantha	70	0.42	70	0.42	70	0.42	210	1.26
4	Bharuch	10	0.06	10	0.06	10	0.06	30	0.18
5	Narmada	5	0.03	5	0.03	5	0.03	15	0.09
6	Bhavnagar	50	0.30	50	0.30	50	0.30	150	0.90
7	Dangs	2	0.01	2	0.01	2	0.01	6	0.03
8	Gandhinagar	20	0.12	20	0.12	20	0.12	60	0.36
9	Jamnagar	15	0.09	15	0.09	15	0.09	45	0.27
10	Junagadh	45	0.27	45	0.27	45	0.27	135	0.81
11	Porbandar	4	0.02	4	0.02	4	0.02	12	0.06
12	Kachchh	10	0.06	10	0.06	10	0.06	30	0.18
13	Kheda	30	0.18	30	0.18	30	0.18	90	0.54
14	Anand	20	0.12	20	0.12	20	0.12	60	0.36
15	Mehsana	25	0.15	25	0.15	25	0.15	75	0.45
16	Patan	8	0.05	8	0.05	8	0.05	24	0.15
17	Panchmahals	5	0.03	5	0.03	5	0.03	15	0.09
18	Dahod	7	0.04	7	0.04	7	0.04	21	0.12
19	Rajkot	40	0.24	40	0.24	40	0.24	120	0.72
20	Sabarkantha	32	0.19	32	0.19	32	0.19	96	0.57
21	Surat	30	0.18	30	0.18	30	0.18	90	0.54
22	Surendranagar	20	0.12	20	0.12	20	0.12	60	0.36
23	Vadodara	30	0.18	30	0.18	30	0.18	90	0.54
24	Valsad	9	0.05	9	0.05	9	0.05	27	0.15
25	Navsari	10	0.06	10	0.06	10	0.06	30	0.18
26	Tapi	11	0.07	11	0.07	11	0.07	33	0.21
27	Aravalli	12	0.07	12	0.07	12	0.07	36	0.21
28	Botad	22	0.13	22	0.13	22	0.13	66	0.39
29	ChhotaUdepur	20	0.12	20	0.12	20	0.12	60	0.36
30	DevbhumiDwarka	15	0.09	15	0.09	15	0.09	45	0.27
31	GirSomnath	10	0.06	10	0.06	10	0.06	30	0.18
32	Mahisagar	15	0.09	15	0.09	15	0.09	45	0.27
33	Morbi	18	0.11	18	0.11	18	0.11	54	0.33
	TOTAL	662	3.97	662	3.97	662	3.97	1986	11.91

Cost Norms: @600/day/Trainee

**Table-4.3.72 Training Proposed for Capacity Building of Farmers (District-wise)
on IPDM (Phy- No., Fin. –Rs. in Lakh)**

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	38	0.23	38	0.23	38	0.23	114	0.69
2	Amreli	40	0.24	40	0.24	40	0.24	120	0.72
3	Banaskantha	126	0.76	126	0.76	126	0.76	378	2.28
4	Bharuch	22	0.13	22	0.13	22	0.13	66	0.39
5	Narmada	13	0.08	13	0.08	13	0.08	39	0.24
6	Bhavnagar	92	0.55	92	0.55	92	0.55	276	1.65
7	Dangs	6	0.04	6	0.04	6	0.04	18	0.12
8	Gandhinagar	34	0.20	34	0.20	34	0.20	102	0.60
9	Jamnagar	28	0.17	28	0.17	28	0.17	84	0.51
10	Junagadh	84	0.50	84	0.50	84	0.50	252	1.50
11	Porbandar	6	0.04	6	0.04	6	0.04	18	0.12
12	Kachchh	20	0.12	20	0.12	20	0.12	60	0.36
13	Kheda	60	0.36	60	0.36	60	0.36	180	1.08
14	Anand	53	0.32	53	0.32	53	0.32	159	0.96
15	Mehsana	36	0.22	36	0.22	36	0.22	108	0.66
16	Patan	14	0.08	14	0.08	14	0.08	42	0.24
17	Panchmahals	10	0.06	10	0.06	10	0.06	30	0.18
18	Dahod	14	0.08	14	0.08	14	0.08	42	0.24
19	Rajkot	75	0.45	75	0.45	75	0.45	225	1.35
20	Sabarkantha	56	0.34	56	0.34	56	0.34	168	1.02
21	Surat	58	0.35	58	0.35	58	0.35	174	1.05
22	Surendranagar	35	0.21	35	0.21	35	0.21	105	0.63
23	Vadodara	72	0.43	72	0.43	72	0.43	216	1.29
24	Valsad	18	0.11	18	0.11	18	0.11	54	0.33
25	Navsari	22	0.13	22	0.13	22	0.13	66	0.39
26	Tapi	28	0.17	28	0.17	28	0.17	84	0.51
27	Aravalli	22	0.13	22	0.13	22	0.13	66	0.39
28	Botad	30	0.18	30	0.18	30	0.18	90	0.54
29	ChhotaUdepur	25	0.15	25	0.15	25	0.15	75	0.45
30	DevbhumiDwarka	28	0.17	28	0.17	28	0.17	84	0.51
31	GirSomnath	40	0.24	40	0.24	40	0.24	120	0.72
32	Mahisagar	25	0.15	25	0.15	25	0.15	75	0.45
33	Morbi	30	0.18	30	0.18	30	0.18	90	0.54
	TOTAL	1260	7.56	1260	7.56	1260	7.56	3780	22.68

Cost Norms: @600/day/Trainee

**Table-4.3.73 Training Proposed for Capacity Building of Farmers (District-wise)
on INM (Phy- No., Fin. –Rs. in Lakh)**

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	118	0.71	118	0.71	118	0.71	354	2.13
2	Amreli	126	0.76	126	0.76	126	0.76	378	2.28
3	Banaskantha	390	2.34	390	2.34	390	2.34	1170	7.02
4	Bharuch	70	0.42	70	0.42	70	0.42	210	1.26
5	Narmada	40	0.24	40	0.24	40	0.24	120	0.72
6	Bhavnagar	280	1.68	280	1.68	280	1.68	840	5.04
7	Dangs	16	0.10	16	0.10	16	0.10	48	0.30
8	Gandhinagar	100	0.60	100	0.60	100	0.60	300	1.80
9	Jamnagar	85	0.51	85	0.51	85	0.51	255	1.53
10	Junagadh	260	1.56	260	1.56	260	1.56	780	4.68
11	Porbandar	16	0.10	16	0.10	16	0.10	48	0.30
12	Kachchh	60	0.36	60	0.36	60	0.36	180	1.08
13	Kheda	180	1.08	180	1.08	180	1.08	540	3.24
14	Anand	160	0.96	160	0.96	160	0.96	480	2.88
15	Mehsana	110	0.66	110	0.66	110	0.66	330	1.98
16	Patan	40	0.24	40	0.24	40	0.24	120	0.72
17	Panchmahals	30	0.18	30	0.18	30	0.18	90	0.54
18	Dahod	40	0.24	40	0.24	40	0.24	120	0.72
19	Rajkot	240	1.44	240	1.44	240	1.44	720	4.32
20	Sabarkantha	170	1.02	170	1.02	170	1.02	510	3.06
21	Surat	178	1.07	178	1.07	178	1.07	534	3.21
22	Surendranagar	110	0.66	110	0.66	110	0.66	330	1.98
23	Vadodara	220	1.32	220	1.32	220	1.32	660	3.96
24	Valsad	60	0.36	60	0.36	60	0.36	180	1.08
25	Navsari	65	0.39	65	0.39	65	0.39	195	1.17
26	Tapi	86	0.52	86	0.52	86	0.52	258	1.56
27	Aravalli	58	0.35	58	0.35	58	0.35	174	1.05
28	Botad	60	0.36	60	0.36	60	0.36	180	1.08
29	ChhotaUdepur	68	0.41	68	0.41	68	0.41	204	1.23
30	DevbhumiDwarka	78	0.47	78	0.47	78	0.47	234	1.41
31	GirSomnath	55	0.33	55	0.33	55	0.33	165	0.99
32	Mahisagar	63	0.38	63	0.38	63	0.38	189	1.14
33	Morbi	100	0.60	100	0.60	100	0.60	300	1.8
TOTAL		3732	22.39	3732	22.39	3732	22.39	11196	67.17

Cost Norms: @600/day/Trainee

Table-4.3.74 Training Proposed for Capacity Building of Farmers (District-wise) on Integrated Weed Management

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	70	0.42	70	0.42	70	0.42	210	1.26
2	Amreli	76	0.46	76	0.46	76	0.46	228	1.38
3	Banaskantha	232	1.39	232	1.39	232	1.39	696	4.17
4	Bharuch	41	0.25	41	0.25	41	0.25	123	0.75
5	Narmada	24	0.14	24	0.14	24	0.14	72	0.42
6	Bhavnagar	170	1.02	170	1.02	170	1.02	510	3.06
7	Dangs	9	0.05	9	0.05	9	0.05	27	0.15
8	Gandhinagar	60	0.36	60	0.36	60	0.36	180	1.08
9	Jamnagar	52	0.31	52	0.31	52	0.31	156	0.93
10	Junagadh	154	0.92	154	0.92	154	0.92	462	2.76
11	Porbandar	10	0.06	10	0.06	10	0.06	30	0.18
12	Kachchh	37	0.22	37	0.22	37	0.22	111	0.66
13	Kheda	110	0.66	110	0.66	110	0.66	330	1.98
14	Anand	98	0.59	98	0.59	98	0.59	294	1.77
15	Mehsana	65	0.39	65	0.39	65	0.39	195	1.17
16	Patan	25	0.15	25	0.15	25	0.15	75	0.45
17	Panchmahals	18	0.11	18	0.11	18	0.11	54	0.33
18	Dahod	25	0.15	25	0.15	25	0.15	75	0.45
19	Rajkot	140	0.84	140	0.84	140	0.84	420	2.52
20	Sabarkantha	104	0.62	104	0.62	104	0.62	312	1.86
21	Surat	106	0.64	106	0.64	106	0.64	318	1.92
22	Surendranagar	66	0.40	66	0.40	66	0.40	198	1.20
23	Vadodara	134	0.80	134	0.80	134	0.80	402	2.40
24	Valsad	34	0.20	34	0.20	34	0.20	102	0.60
25	Navsari	40	0.24	40	0.24	40	0.24	120	0.72
26	Tapi	50	0.30	50	0.30	50	0.30	150	0.90
27	Aravalli	55	0.33	55	0.33	55	0.33	165	0.99
28	Botad	60	0.36	60	0.36	60	0.36	180	1.08
29	ChhotaUdepur	100	0.60	100	0.60	100	0.60	300	1.80
30	DevbhumiDwarka	68	0.41	68	0.41	68	0.41	204	1.23
31	GirSomnath	70	0.42	70	0.42	70	0.42	210	1.26
32	Mahisagar	80	0.48	80	0.48	80	0.48	240	1.44
33	Morbi	75	0.45	75	0.45	75	0.45	225	1.35
TOTAL		2458	14.75	2458	14.75	2458	14.75	7374	44.25

Cost Norms: @600/day/Trainee

Table-4.3.75 Training Proposed for Capacity Building of Farmers (District-wise) on Urban Peri-urban Vegetable Gardening

(Phy- No., Fin. –Rs. in lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	100	0.60	100	0.60	100	0.60	300	1.80
2	Amreli	50	0.30	50	0.30	50	0.30	150	0.90
3	Banaskantha	50	0.30	50	0.30	50	0.30	150	0.90
4	Bharuch	60	0.36	60	0.36	60	0.36	180	1.08
5	Narmada	40	0.24	40	0.24	40	0.24	120	0.72
6	Bhavnagar	60	0.36	60	0.36	60	0.36	180	1.08
7	Dangs	30	0.18	30	0.18	30	0.18	90	0.54
8	Gandhinagar	100	0.60	100	0.60	100	0.60	300	1.80
9	Jamnagar	100	0.60	100	0.60	100	0.60	300	1.80
10	Junagadh	100	0.60	100	0.60	100	0.60	300	1.80
11	Porbandar	50	0.30	50	0.30	50	0.30	150	0.90
12	Kachchh	50	0.30	50	0.30	50	0.30	150	0.90
13	Kheda	80	0.48	80	0.48	80	0.48	240	1.44
14	Anand	90	0.54	90	0.54	90	0.54	270	1.62
15	Mehsana	70	0.42	70	0.42	70	0.42	210	1.26
16	Patan	50	0.30	50	0.30	50	0.30	150	0.90
17	Panchmahals	40	0.24	40	0.24	40	0.24	120	0.72
18	Dahod	40	0.24	40	0.24	40	0.24	120	0.72
19	Rajkot	70	0.42	70	0.42	70	0.42	210	1.26
20	Sabarkantha	80	0.48	80	0.48	80	0.48	240	1.44
21	Surat	100	0.60	100	0.60	100	0.60	300	1.80
22	Surendranagar	60	0.36	60	0.36	60	0.36	180	1.08
23	Vadodara	100	0.60	100	0.60	100	0.60	300	1.80
24	Valsad	80	0.48	80	0.48	80	0.48	240	1.44
25	Navsari	100	0.60	100	0.60	100	0.60	300	1.80
26	Tapi	50	0.30	50	0.30	50	0.30	150	0.90
27	Aravalli	50	0.30	50	0.30	50	0.30	150	0.90
28	Botad	55	0.33	55	0.33	55	0.33	165	0.99
29	ChhotaUdepur	60	0.36	60	0.36	60	0.36	180	1.08
30	DevbhumiDwarka	55	0.33	55	0.33	55	0.33	165	0.99
31	GirSomnath	65	0.39	65	0.39	65	0.39	195	1.17
32	Mahisagar	75	0.45	75	0.45	75	0.45	225	1.35
33	Morbi	70	0.42	70	0.42	70	0.42	210	1.26
TOTAL		2230	13.38	2230	13.38	2230	13.38	6690	40.14

Cost Norms: @600/day/Trainee

Table-4.3.76 Training Proposed for Capacity Building of Farmers (District-wise) on Organic Farming for Vegetable Crops

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	50	0.30	50	0.30	50	0.30	150	0.90
2	Amreli	30	0.18	30	0.18	30	0.18	90	0.54
3	Banaskantha	35	0.21	35	0.21	35	0.21	105	0.63
4	Bharuch	25	0.15	25	0.15	25	0.15	75	0.45
5	Narmada	40	0.24	40	0.24	40	0.24	120	0.72
6	Bhavnagar	25	0.15	25	0.15	25	0.15	75	0.45
7	Dangs	80	0.48	80	0.48	80	0.48	240	1.44
8	Gandhinagar	20	0.12	20	0.12	20	0.12	60	0.36
9	Jamnagar	30	0.18	30	0.18	30	0.18	90	0.54
10	Junagadh	40	0.24	40	0.24	40	0.24	120	0.72
11	Porbandar	30	0.18	30	0.18	30	0.18	90	0.54
12	Kachchh	60	0.36	60	0.36	60	0.36	180	1.08
13	Kheda	50	0.30	50	0.30	50	0.30	150	0.90
14	Anand	50	0.30	50	0.30	50	0.30	150	0.90
15	Mehsana	50	0.30	50	0.30	50	0.30	150	0.90
16	Patan	40	0.24	40	0.24	40	0.24	120	0.72
17	Panchmahals	80	0.48	80	0.48	80	0.48	240	1.44
18	Dahod	70	0.42	70	0.42	70	0.42	210	1.26
19	Rajkot	40	0.24	40	0.24	40	0.24	120	0.72
20	Sabarkantha	50	0.30	50	0.30	50	0.30	150	0.90
21	Surat	40	0.24	40	0.24	40	0.24	120	0.72
22	Surendranagar	50	0.30	50	0.30	50	0.30	150	0.90
23	Vadodara	60	0.36	60	0.36	60	0.36	180	1.08
24	Valsad	70	0.42	70	0.42	70	0.42	210	1.26
25	Navsari	50	0.30	50	0.30	50	0.30	150	0.90
26	Tapi	60	0.36	60	0.36	60	0.36	180	1.08
27	Aravalli	60	0.36	60	0.36	60	0.36	180	1.08
28	Botad	60	0.36	60	0.36	60	0.36	180	1.08
29	ChhotaUdepur	70	0.42	70	0.42	70	0.42	210	1.26
30	DevbhumiDwarka	75	0.45	75	0.45	75	0.45	225	1.35
31	GirSomnath	80	0.48	80	0.48	80	0.48	240	1.44
32	Mahisagar	70	0.42	70	0.42	70	0.42	210	1.26
33	Morbi	40	0.24	40	0.24	40	0.24	120	0.72
TOTAL		1680	10.08	1680	10.08	1680	10.08	5040	30.24

Cost Norms: @600/day/Trainee

Table-4.3.77 Varietal Demonstration of Vegetable Crops

(Phy- No., Fin –Rs. in lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	15	0.75	15	0.75	15	0.75	45	2.25
2	Amreli	15	0.75	15	0.75	15	0.75	45	2.25
3	Banaskantha	30	1.50	30	1.50	30	1.50	90	4.50
4	Bharuch	10	0.50	10	0.50	10	0.50	30	1.50
5	Narmada	10	0.50	10	0.50	10	0.50	30	1.50
6	Bhavnagar	35	1.75	35	1.75	35	1.75	105	5.25
7	Dangs	10	0.50	10	0.50	10	0.50	30	1.50
8	Gandhinagar	15	0.75	15	0.75	15	0.75	45	2.25
9	Jamnagar	15	0.75	15	0.75	15	0.75	45	2.25
10	Junagadh	30	1.50	30	1.50	30	1.50	90	4.50
11	Porbandar	10	0.50	10	0.50	10	0.50	30	1.50
12	Kachchh	10	0.50	10	0.50	10	0.50	30	1.50
13	Kheda	25	1.25	25	1.25	25	1.25	75	3.75
14	Anand	20	1.00	20	1.00	20	1.00	60	3.00
15	Mehsana	20	1.00	20	1.00	20	1.00	60	3.00
16	Patan	10	0.50	10	0.50	10	0.50	30	1.50
17	Panchmahals	10	0.50	10	0.50	10	0.50	30	1.50
18	Dahod	10	0.50	10	0.50	10	0.50	30	1.50
19	Rajkot	25	1.25	25	1.25	25	1.25	75	3.75
20	Sabarkantha	20	1.00	20	1.00	20	1.00	60	3.00
21	Surat	20	1.00	20	1.00	20	1.00	60	3.00
22	Surendranagar	15	0.75	15	0.75	15	0.75	45	2.25
23	Vadodara	30	1.50	30	1.50	30	1.50	90	4.50
24	Valsad	10	0.50	10	0.50	10	0.50	30	1.50
25	Navsari	10	0.50	10	0.50	10	0.50	30	1.50
26	Tapi	10	0.50	10	0.50	10	0.50	30	1.50
27	Aravalli	20	1.00	20	1.00	20	1.00	60	3.00
28	Botad	15	0.75	15	0.75	15	0.75	45	2.25
29	ChhotaUdepur	15	0.75	15	0.75	15	0.75	45	2.25
30	DevbhumiDwarka	20	1.00	20	1.00	20	1.00	60	3.00
31	GirSomnath	20	1.00	20	1.00	20	1.00	60	3.00
32	Mahisagar	15	0.75	15	0.75	15	0.75	45	2.25
33	Morbi	15	0.75	15	0.75	15	0.75	45	2.25
TOTAL		560	28.00	560	28.00	560	28.00	1680	84.00

Cost Norms: @ Rs.5000/demonstration

Table-4.3.78 INM Demonstration of Vegetable Crops (Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	17	0.85	17	0.85	17	0.85	51	2.55
2	Amreli	15	0.75	15	0.75	15	0.75	45	2.25
3	Banaskantha	30	1.50	30	1.50	30	1.50	90	4.50
4	Bharuch	10	0.50	10	0.50	10	0.50	30	1.50
5	Narmada	10	0.50	10	0.50	10	0.50	30	1.50
6	Bhavnagar	35	1.75	35	1.75	35	1.75	105	5.25
7	Dangs	10	0.50	10	0.50	10	0.50	30	1.50
8	Gandhinagar	15	0.75	15	0.75	15	0.75	45	2.25
9	Jamnagar	15	0.75	15	0.75	15	0.75	45	2.25
10	Junagadh	30	1.50	30	1.50	30	1.50	90	4.50
11	Porbandar	10	0.50	10	0.50	10	0.50	30	1.50
12	Kachchh	10	0.50	10	0.50	10	0.50	30	1.50
13	Kheda	25	1.25	25	1.25	25	1.25	75	3.75
14	Anand	20	1.00	20	1.00	20	1.00	60	3.00
15	Mehsana	20	1.00	20	1.00	20	1.00	60	3.00
16	Patan	10	0.50	10	0.50	10	0.50	30	1.50
17	Panchmahals	10	0.50	10	0.50	10	0.50	30	1.50
18	Dahod	10	0.50	10	0.50	10	0.50	30	1.50
19	Rajkot	25	1.25	25	1.25	25	1.25	75	3.75
20	Sabarkantha	20	1.00	20	1.00	20	1.00	60	3.00
21	Surat	20	1.00	20	1.00	20	1.00	60	3.00
22	Surendranagar	15	0.75	15	0.75	15	0.75	45	2.25
23	Vadodara	30	1.50	30	1.50	30	1.50	90	4.50
24	Valsad	10	0.50	10	0.50	10	0.50	30	1.50
25	Navsari	10	0.50	10	0.50	10	0.50	30	1.50
26	Tapi	10	0.50	10	0.50	10	0.50	30	1.50
27	Aravalli	10	0.50	10	0.50	10	0.50	30	1.50
28	Botad	12	0.60	12	0.60	12	0.60	36	1.80
29	ChhotaUdepur	18	0.90	18	0.90	18	0.90	54	2.70
30	DevbhumiDwarka	10	0.50	10	0.50	10	0.50	30	1.50
31	GirSomnath	10	0.50	10	0.50	10	0.50	30	1.50
32	Mahisagar	10	0.50	10	0.50	10	0.50	30	1.50
33	Morbi	20	1.00	20	1.00	20	1.00	60	3.00
TOTAL		532	26.60	532	26.60	532	26.60	1596	79.80

Cost Norms: @ Rs.5000/demonstration

Table-4.3.79 IPDM Demonstration of Vegetable Crops (Phy- No., Fin –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	19	0.95	19	0.95	19	0.95	57	2.85
2	Amreli	17	0.85	17	0.85	17	0.85	51	2.55
3	Banaskantha	32	1.60	32	1.60	32	1.60	96	4.80
4	Bharuch	12	0.60	12	0.60	12	0.60	36	1.80
5	Narmada	12	0.60	12	0.60	12	0.60	36	1.80
6	Bhavnagar	37	1.85	37	1.85	37	1.85	111	5.55
7	Dangs	12	0.60	12	0.60	12	0.60	36	1.80
8	Gandhinagar	17	0.85	17	0.85	17	0.85	51	2.55
9	Jamnagar	17	0.85	17	0.85	17	0.85	51	2.55
10	Junagadh	32	1.60	32	1.60	32	1.60	96	4.80
11	Porbandar	12	0.60	12	0.60	12	0.60	36	1.80
12	Kachchh	12	0.60	12	0.60	12	0.60	36	1.80
13	Kheda	27	1.35	27	1.35	27	1.35	81	4.05
14	Anand	22	1.10	22	1.10	22	1.10	66	3.30
15	Mehsana	22	1.10	22	1.10	22	1.10	66	3.30
16	Patan	12	0.60	12	0.60	12	0.60	36	1.80
17	Panchmahals	12	0.60	12	0.60	12	0.60	36	1.80
18	Dahod	12	0.60	12	0.60	12	0.60	36	1.80
19	Rajkot	27	1.35	27	1.35	27	1.35	81	4.05
20	Sabarkantha	22	1.10	22	1.10	22	1.10	66	3.30
21	Surat	22	1.10	22	1.10	22	1.10	66	3.30
22	Surendranagar	17	0.85	17	0.85	17	0.85	51	2.55
23	Vadodara	32	1.60	32	1.60	32	1.60	96	4.80
24	Valsad	12	0.60	12	0.60	12	0.60	36	1.80
25	Navsari	12	0.60	12	0.60	12	0.60	36	1.80
26	Tapi	12	0.60	12	0.60	12	0.60	36	1.80
27	Aravalli	8	0.40	8	0.40	8	0.40	24	1.20
28	Botad	10	0.50	10	0.50	10	0.50	30	1.50
29	ChhotaUdepur	15	0.75	15	0.75	15	0.75	45	2.25
30	Devbhumiwarka	20	1.00	20	1.00	20	1.00	60	3.00
31	GirSomnath	15	0.75	15	0.75	15	0.75	45	2.25
32	Mahisagar	12	0.60	12	0.60	12	0.60	36	1.80
33	Morbi	18	0.90	18	0.90	18	0.90	54	2.70
TOTAL		592	29.60	592	29.60	592	29.60	1776	88.80

Cost Norms: @ Rs.5000/demonstration

Table-4.3.80 Seed Treatment Demonstration of Vegetable Crops

(Phy- No., Fin. –Rs. in lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	15	0.75	15	0.75	15	0.75	45	2.25
2	Amreli	15	0.75	15	0.75	15	0.75	45	2.25
3	Banaskantha	30	1.50	30	1.50	30	1.50	90	4.50
4	Bharuch	15	0.75	15	0.75	15	0.75	45	2.25
5	Narmada	25	1.25	25	1.25	25	1.25	75	3.75
6	Bhavnagar	15	0.75	15	0.75	15	0.75	45	2.25
7	Dangs	50	2.50	50	2.50	50	2.50	150	7.50
8	Gandhinagar	10	0.50	10	0.50	10	0.50	30	1.50
9	Jamnagar	10	0.50	10	0.50	10	0.50	30	1.50
10	Junagadh	20	1.00	20	1.00	20	1.00	60	3.00
11	Porbandar	10	0.50	10	0.50	10	0.50	30	1.50
12	Kachchh	10	0.50	10	0.50	10	0.50	30	1.50
13	Kheda	30	1.50	30	1.50	30	1.50	90	4.50
14	Anand	20	1.00	20	1.00	20	1.00	60	3.00
15	Mehsana	10	0.50	10	0.50	10	0.50	30	1.50
16	Patan	10	0.50	10	0.50	10	0.50	30	1.50
17	Panchmahals	50	2.50	50	2.50	50	2.50	150	7.50
18	Dahod	40	2.00	40	2.00	40	2.00	120	6.00
19	Rajkot	25	1.25	25	1.25	25	1.25	75	3.75
20	Sabarkantha	25	1.25	25	1.25	25	1.25	75	3.75
21	Surat	15	0.75	15	0.75	15	0.75	45	2.25
22	Surendranagar	15	0.75	15	0.75	15	0.75	45	2.25
23	Vadodara	25	1.25	25	1.25	25	1.25	75	3.75
24	Valsad	20	1.00	20	1.00	20	1.00	60	3.00
25	Navsari	25	1.25	25	1.25	25	1.25	75	3.75
26	Tapi	25	1.25	25	1.25	25	1.25	75	3.75
27	Aravalli	20	1.00	20	1.00	20	1.00	60	3.00
28	Botad	30	1.50	30	1.50	30	1.50	90	4.50
29	ChhotaUdepur	25	1.25	25	1.25	25	1.25	75	3.75
30	DevbhumiDwarka	30	1.50	30	1.50	30	1.50	90	4.50
31	GirSomnath	20	1.00	20	1.00	20	1.00	60	3.00
32	Mahisagar	30	1.50	30	1.50	30	1.50	90	4.50
33	Morbi	35	1.75	35	1.75	35	1.75	105	5.25
TOTAL		750	37.50	750	37.50	750	37.50	2250	112.50

Cost Norms: @ Rs.5000/demonstration

Table-4.3.81 Summary of Demonstration of Vegetable Crops

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	Activity	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Varietal demonstration of vegetable crops	560	28.00	560	28.00	560	28.00	1680	84.00
2	INM demonstration	532	26.60	532	26.60	532	26.60	1596	79.80
3	IPDM demonstration	592	29.60	592	29.60	592	29.60	1776	88.80
4	Seed treatment demonstration	750	37.50	750	37.50	750	37.50	2250	112.50
	TOTAL	2434	121.7	2434	121.7	2434	121.7	7302	365.10

Cost Norms: @ Rs.5000/demonstration

4.3.2.12 Researchable Issues:

1. Development of hybrid variety in commercially important vegetable crops
2. Development of genetically modified variety
3. Research on underutilized and unutilized vegetables
4. Development of variety for export purpose
5. Research on biotic and abiotic stress resistant varieties/hybrids
6. Protected cultivation and precision farming of high valued vegetable crops
7. Integrated nutrient management
8. Production technologies
 - a. Off-season vegetable production
 - b. Ratooning of brinjal
 - c. Cultivation of high value vegetables in low cost poly-house
 - d. Riverbed land cultivation technology
 - e. Use of plant growth regulators
 - f. Sex modification in cucurbits for higher yield
 - g. Use of intensive crop rotations and cropping systems
 - h. Integrated Weed management
 - i. Organic farming in vegetable crops
9. Strategies for vegetable protection: Emerging pests and diseases and injudicious use of insecticides
10. Value addition and post harvest managements in vegetable crops
11. Farm mechanization, Seed production and nursery managements of vegetable crops
12. Grafting: A New Production Technique in vegetables
13. Influence of climate change on vegetable production

4.3.3 SEED SPICE CROPS:

4.3.3.1 Background:

Within the state, seed spices cultivation area in Saurashtra, North Gujarat and Middle Gujarat. The productivity is higher in Saurashtra followed by North Gujarat and Middle Gujarat. Gujarat grows various seed spices viz., cumin (*Cuminum cyminum* L.), fennel (*Foeniculum vulgare* Mill.), coriander (*Coriandrum sativum* L.), Fenugreek (*Trigonella Foenum graecum* L.), ajowain (*Trachyspermum ammi* S.) and dillseed (*Anethum graveolens* L.) in scattered pockets. The state has nearly 45.90 per cent of the area under irrigation. The state has wide range of cropping systems viz. Jowar/Bajra-seed spices, Mung-cumin/fennel, Sesamum-seed spices etc.

Vision:

Produce good quality of seed spices for sustaining productivity, to meet the National and International demand with concomitant sustainability of natural resources.

Mission:

Ensuring good income and better livelihood of farmers of Gujarat state by enhancing the productivity of seed spices and profitability of seed spices growers on an ecologically and economically sustainable basis and making Gujarat a leader in seed spice production and export.

4.3.3.2 Crop/Area Issues:

Seed Spices Cultivation:

- Seed Spices area: fluctuation in area year by year
- Generally grown on marginal land
- Seed spices productivity: Area wise fluctuation for yield have to be minimize gap among the zone, area, and soil type
- Narrow temperature window
- Costlier and scarce irrigation water
- Seed supply: Use of inferior quality seeds, Seed replacement rate is very low
- Poor mechanization and acute labour shortage in major area of state
- Climate change impact
- Quality: inferior, Trade base quality seed spices should have to be produced
- Weed management
- Macro/ micro nutrient management
- Development of heat tolerant genotypes
- Integrated pest and disease management with special focus on biological control
- Storage facility to be improved
- Fluctuating prices

4.3.3.3 Priority for Comprehensive Seed Spices Cultivation:

- Promotion of newly developed high yielding varieties through front line demonstration
- Promotion of seed village concept for smooth supply of quality seed at village level.
- Timely sowing with drilling method
- Create awareness about critical stages of irrigation through demonstration
- Adopt MIS system
- Popularization of water saving practices for seed spices farming through demonstrations

- Demonstration on integrated weed control methods
- Encourage the use of bio-fertilizers
- Adopt INM through demonstrations
- Popularization of integrated control measures for diseases and pest to reduce the load of pesticide residues
- Promote organic cultivation of seed spices
- Harvesting at physiological maturity
- Use thresher and threshing should be done on pakka threshing yard
- Safe storage

4.3.3.4 Current Status of Area, Production and Productivity:

The District-wise area under seed spices crops is given bellow.

Table-4.3.82 District-wise area, production and productivity of cumin, fennel and coriander in the state during 2012-13

Sr. No.	District	Cumin			Fennel			Coriander		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	359.2	1616	0.45	105	99	0.94	0	0	0
2	Amreli	21.62	1305	0.60	0	0	0	162	219	1.35
3	Banaskantha	748.5	7258	0.97	7950	1733	2.18	120	144	1.20
4	Bharuch	0	0	0	0	0	0	84	119	1.42
5	Narmada	0	0	0	0	0	0	21	27	1.29
6	Bhavnagar	52.20	4732	0.91	25	50	2.00	205	425	2.07
7	Dangs	0	0	0	0	0	0	5	40	8.00
8	Gandhinagar	1.47	75	0.51	2236	4814	2.15	103	72	0.70
9	Jamnagar	202.5	1767	0.87	4	5	1.25	1974	3545	1.80
10	Junagadh	117.5	8825	0.75	19	26	1.37	4780	6990	1.46
11	Porbandar	128.2	1146	0.89	0	0	0	1315	1973	1.50
12	Kachchh	134.1	7378	0.55	510	861	1.69	2135	4675	2.19
13	Kheda	3.15	326	1.03	1503	5526	3.68	35	52	1.49
14	Anand	4.09	262	0.64	0	0	0	175	285	1.63
15	Mehsana	114.0	8550	0.75	1394	2538	1.82	298	402	1.35
16	Patan	449.1	3519	0.78	6250	1080	1.73	13	22	1.69
17	Panchmahal	0.22	26	0	657	873	1.33	75	98	1.31
18	Dahod		0	0	195	87	0.45	2850	2269	7.96
19	Rajkot	132.0	9704	0.74	0	0	0	332	561	1.69
20	Sabarkantha	26.00	1164	0.45	5650	1130	2.00	60	90	1.50
21	Surat	0	0	0	0	0	0.0	15	23	1.53
22	Surendranag	1231.	1427	1.16	752	1579	2.10	369	594	1.61
23	Vadodara	0	0	0	0	0	0	136	237	1.74
24	Valsad	0	0	0	0	0	0	30	57	1.90
25	Navsari	0	0	0	0	0	0	64	115	1.80
26	Tapi	0	0	0	0	0	0	40	489	12.23
	Total	3725.	3381	0.91	3980	7873	1.98	1539	4394	28.50

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.83 District-wise area, production and productivity of fenugreek, ajwain and dillseed in the state during 2012-13

Sr. No.	District	Fenugreek			Ajwain			Dillseed		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	604	1298	2.15	0	0	0	2247	2247	1
2	Amreli	175	435	2.49	27	24	0.89	0	0	0
3	Banaskantha	533	1146	2.15	70	59	0.84	715	572	0.80
4	Bharuch	104	230	2.21	5	8	1.60	0	0	0
5	Narmada	85	416	4.89	1	7	0.64	0	0	0
6	Bhavnagar	50	147	2.94	85	96	1.13	0	0	0
7	Dangs	0	0	0	0	0	0.0	0	0	0
8	Gandhinagar	0	0	0	17	23	1.35	52	57	1.10
9	Jamnagar	135	452	3.35	583	521	0.89	132	94	0.71
10	Junagadh	75	164	2.19	0	0	0	0	0	0
11	Porbandar	170	375	2.21	0	0	0	0	0	0
12	Kachchh	256	518	2.02	0	0	0	0	0	0
13	Kheda	65	172	2.65	1	1	1	20	123	6.15
14	Anand	0	0	0	350	0	0	0	0	0
15	Mehsana	571	1408	2.47	578	757	1.31	2030	2152	1.06
16	Patan	869	1653	1.90	200	178	0.89	1159	16222	1.40
17	Panchmahal	300	450	1.50	0	0	0	0	0	0
18	Dahod	261	2168	8.31	0	0	0	0	0	0
19	Rajkot	185	397	2.15	0	0	0	0	0	0
20	Sabarkantha	135	324	2.40	23	32	1.39	31	47	1.52
21	Surat	72	442	6.14	0	0	0	0	0	0
22	Surendranag	214	460	2.15	25	29	1.16	110	66	0.60
23	Vadodara	500	2485	4.97	0	0	0	0	0	0
24	Valsad	0	0	0	221	196	8.90	0	0	0
25	Navsari	0	0	0	35	23	0.66	0	0	0
26	Tapi	35	296	8.46	80	56	0.70	35	17	0.49
	Total	539	1543	2.86	755	847	1.12	1696	21601	1.27

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.84 Districtwise area, production and productivity of cumin, fennel and coriander in the state during 2013-14

Sr. No	District	Cumin			Fennel			Coriander		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	30000	16500	0.55	100	95	0.95	0	0	0
2	Amreli	5000	3000	0.60	0	0	0	194	262	1.3
3	Banaskanth	71400	69972	0.98	3100	6789	2.19	129	161	1.2
4	Bharuch	0	0	0	0	0	0	169	240	1.4
5	Narmada	0	0	0	0	0	0	18	23	1.2
6	Bhavnagar	2600	1728	0.62	0	0	0	110	210	1.9
7	Dangs	0	0	0	0	0	0	80	65	0.8
8	Gandhinaga	0	0	0	1000	2155	2.16	107	187	1.7
9	Jamnagar	44000	33000	0.75	0	0	0	3571	4704	1.3
10	Junagadh	20300	14210	0.70	0	0	0	2675	3531	1.3
11	Porbandar	26600	22610	0.85	0	0	0	5675	9080	1.6
12	Kachchh	31900	17542	0.55	0	0	0	2238	4902	2.1
13	Kheda	400	320	0.80	1200	2400	2.00	67	81	1.2
14	Anand	500	320	0.64	0	0	0	175	285	1.6
15	Mehsana	5900	4425	0.75	4800	9600	2.00	308	416	1.3
16	Patan	57200	44617	0.78	2800	6160	2.20	13	22	1.6
17	Panchmahal	0	0	0	900	1170	1.30	76	98	1.2
18	Dahod	0	0	0	200	89	0.45	2853	5592	1.9
19	Rajkot	48200	37593	0.78	100	150	1.50	960	1815	1.8
20	Sabarkanth	1600	800	0.50	2200	4440	2.02	86	132	1.5
21	Surat	0	0	0	0	0	0	25	45	1.8
22	Surendrana	10890	98010	0.90	5700	1197	2.10	162	243	1.5
23	Vadodara	200	0	0	0	0	0	160	296	1.8
24	Valsad	0	0	0	0	0	0	30	30	1.0
25	Navsari	0	0	0	0	0	0	64	115	1.8
26	Tapi	0	0	0	0	0	0	40	67	1.6
	Total	45490	36464	0.80	2210	4502	2.04	4406	6438	1.4

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.85 Districtwise area, production and productivity of fenugreek, ajwain and dillseed in the state during 2013-14

Sr. No.	District	Fenugreek			Ajwain			Dillseed		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	608	1216	2.00	5	3	0.60	150	119	0.80
2	Amreli	164	246	1.50	118	105	0.89	0	0	0
3	Banaskantha	546	1146	2.10	77	65	0.84	200	160	0.80
4	Bharuch	205	453	2.21	5	8	1.60	0	0	0
5	Narmada	71	107	1.50	8	5	0.63	0	0	0
6	Bhavnagar	33	40	1.20	87	87	1.00	0	0	0
7	Dangs	0	0	0	0	0	0	0	0	0
8	Gandhinagar	0	0	0	18	21	1.17	0	0	0
9	Jamnagar	13	20	1.50	481	347	0.72	100	71	0.71
10	Junagadh	10	10	1.00	0	0	0	0	0	0
11	Porbandar	0	0	0.00	0	0	0	0	0	0
12	Kachchh	281	568	2.02	0	0	0	0	0	0
13	Kheda	99	178	1.80	3	3	1.00	200	199	1.00
14	Anand	0	0	0	350	175	0.50	0	0	0
15	Mehsana	578	1156	2.00	591	774	1.31	500	530	1.06
16	Patan	875	1663	1.90	200	178	0.89	490	686	1.40
17	Panchmahal	280	454	1.62	0	0	0	0	0	0
18	Dahod	262	498	1.90	0	0	0	0	0	0
19	Rajkot	358	750	2.09	0	0	0	0	0	0
20	Sabarkantha	138	248	1.80	25	36	1.44	0	0	0
21	Surat	76	114	1.50	0	0	0	0	0	0
22	Surendranaga	128	243	1.90	25	18	0.72	0	0	0
23	Vadodara	550	935	1.70	0	0	0	0	0	0
24	Valsad	0	0	0	0	0	0	0	0	0
25	Navsari	0	0	0	35	23	0.66	0	0	0
26	Tapi	24	43	1.80	67	43	0.64	0	0	0
	Total	529	1008	1.90	642	502	0.78	740	901	1.22

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.86 Districtwise area, production and productivity of cumin, fennel and coriander in the state during 2014-15

Sr. No.	District	Cumin			Fennel			Coriander		
		A	P	Y	A	P	Y	A	P	Y
1	Ahmedabad	2360	1416	0.60	100	98	0.00	100	145	1.45
2	Amreli	500	350	0.70	0	0	0.00	100	144	1.44
3	Banaskantha	6850	6850	1.00	4000	8520	1.98	0	0	0
4	Bharuch	0	0	0.00	0	0	1.88	0	0	0
5	Narmada	0	0	0.00	0	0	0.00	0	0	0
6	Bhavnagar	2700	1836	0.68	0	0	2.15	100	198	1.98
7	Dangs	0	0	0.00	0	0	2.30	0	0	0
8	Gandhinagar	0	0	0.00	1100	2387	1.30	0	0	0

Sr. No.	District	Cumin			Fennel			Coriander		
		A	P	Y	A	P	Y	A	P	Y
9	Jamnagar	4300	3655	0.85	0	0	0.50	2300	3335	1.45
10	Junagadh	1180	1014	0.86	0	0	1.58	5190	7369	1.42
11	Porbandar	1350	1323	0.98	0	0	2.15	1550	2526	1.63
12	Kachchh	5100	3825	0.75	200	396	0.00	6300	1404	2.23
13	Kheda	100	80	0.80	100	188	2.15	100	123	1.23
14	Anand	200	140	0.70	0	0	0.00	2000	3400	1.7
15	Mehsana	3400	2890	0.85	5300	1139	0.00	100	133	1.33
16	Patan	3550	3195	0.90	3100	7130	0.00	0	0	0
17	Panchmahal	0	0	0.00	300	390	0.00	0	0	0
18	Dahod	0	0	0.00	400	200	2.11	0	0	0
19	Rajkot	1000	6600	0.66	700	1106	0.00	3900	7566	19.4
20	Sabarkantha	900	540	0.60	2100	4515	0.00	100	154	1.54
21	Surat	0	0	0.00	0	0	1.98	0	0	0
22	Surendranag	8660	9352	1.08	1280	2752	1.88	9600	1516	1.58
23	Vadodara	0	0	0.00	0	0	0.00	0	0	0
24	Valsad	0	0	0.00	0	0	2.15	0	0	0
25	Navsari	0	0	0.00	0	0	2.30	0	0	0
26	Tapi	0	0	0.00	0	0	1.30	0	0	0
	Total	2667	2514	0.94	3020	6384	0.50	9210	1433	1.56

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.87 District-wise area, production and productivity of fenugreek, ajwain and dillseed in the state during 2014-15

Sr. No.	District	Fenugreek			Ajwain			Dillseed		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	652	1369	2.10	5	4	0.80	330	4125	1.25
2	Amreli	164	272	1.66	140	133	0.95	0	0	0
3	Banaskantha	562	1293	2.30	133	120	0.90	100	130	1.30
4	Bharuch	315	693	2.20	5	8	1.60	0	0	0
5	Narmada	93	145	1.56	9	6	0.67	0	0	0
6	Bhavnagar	37	61	1.65	76	80	1.05	0	0	0
7	Dangs	0	0	0	0	0	0	0	0	0
8	Gandhinagar	35	56	1.60	0	0	0	0	0	0
9	Jamnagar	90	141	1.57	501	426	0.85	0	0	0
10	Junagadh	25	35	1.40	0	0	0	0	0	0
11	Porbandar	0	0	0	0	0	0	0	0	0
12	Kachchh	348	738	2.12	0	0	0	0	0	0
13	Kheda	120	235	1.96	3	3	1.00	100	125	1.25
14	Anand	0	0		10	8	0.80	0	0	0
15	Mehsana	625	1456	2.33	605	847	1.40	500	650	1.30
16	Patan	875	1733	1.98	200	190	0.95	330	4785	1.45
17	Panchmahal	415	685	1.65	0	0	0	0	0	0
18	Dahod	286	549	1.92	0	0	0	0	0	0
19	Rajkot	380	798	2.10	0	0	0	0	0	0
20	Sabarkantha	138	265	1.92	27	41	1.52	0	0	0

Sr. No.	District	Fenugreek			Ajwain			Dillseed		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
21	Surat	82	128	1.56	0	0	0	0	0	0
22	Surendranaga	732	1427	1.95	0	0	0	500	700	1.40
23	Vadodara	569	1047	1.84	0	0	0	0	0	0
24	Valsad	25	48	1.92	0	0	0	0	0	0
25	Navsari	77	138	1.79	42	30	0.71	0	0	0
26	<u>Tapi</u>	30	59	1.97	70	49	0.70	0	0	0
	Total	667	1337	22.93	634	578	5.28	780	1051	4.15

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.88 District-wise area, production and productivity of cumin, fennel and coriander in the state during 2015-16

Sr. No.	District	Cumin			Fennel			Coriander		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	17600	14432	0.82	0	0	0	500	725	1.45
2	Amreli	1200	864	0.72	0	0	0	500	720	1.44
3	Anand	20	144	7.2	0	0	0	1200	2040	1.7
4	Aravalli	200	130	0.65	1900	4161	2.19	100	148	1.48
5	Banaskantha	62000	65100	1.05	490	1053	21.5	0	0	0
6	Bharuch	0	0	0	0	00	0	0	0	0
7	Bhavnagar	200	160	0.8	0	0	0	100	172	1.72
8	Botad	1500	1350	0.9	0	0	0	0	0	0
9	Chhota	0	0	0	0	0	0	0	0	0
10	Dahod	0	0		100	50		0	0	
11	<u>Dangs</u>	0	0	0	0	0	0.5	0	0	0
12	Devbhoomi	500	450	0	0	0	0	700	1015	0
13	Gandhinagar	0	0	0.9	2000	4340	0	0	0	1.45
14	Gir somnath	0	0	0	0	0	2.17	1380	19734	0
15	Jamnagar	800	720	0	0	0	0	900	1305	1.43
16	Junagadh	1500	1350	0.9	0	0	0	4280	62425	1.45
17	Kheda	100	80	0.9	600	1164	0	0	0	1.46
18	Kachchh	28200	29610	0.8	400	792	1.94	6700	14941	
19	Mahisagar	0	0	1.05	600	1124	1.98	0	0	2.23
20	Mehsana	1800	1530	0.85	6800	1475	1.87	100	144	0
21	Morbi	19000	19570	1.03	6200	1209	2.17	6500	10400	1.44
22	Narmada	0	0	0	0	0	1.95	0	0	1.60
23	Navsari	0	0	0	0	0	0	0	0	0
24	Panchmahal	0	0	0	200	260	0	0	0	0
25	Patan	6610	66100	10	3600	8280	0	0	0	0
26	Porbandar	3500	3500	1	0	0	2.30	5900	9935	0
27	Rajkot	5900	4130	0.7	0	0	0	2900	5655	1.68
28	Sabarkanth	500	350	0.7	1500	3200	0	0	0	1.95
29	Surat	0	0	0	0	0	2.13	0	0	0
30	Surendranag	84600	91368	1.08	1660	3602	0	5900	9440	0
31	<u>Tapi</u>	0	0	0	0	0	2.17	0	0	1.60

Sr. No.	District	Cumin			Fennel			Coriander		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
32	Vadodara	0	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0	0
	Total	29540	30093	15.3	4540	9677	19.1	8860	13880	16.2

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.89 District-wise area, production and productivity of fenugreek, ajwain and dillseed in the state during 2015-16

Sr. No.	District	Fenugreek			Ajwain			Dillseed		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	210	468	2.23	25	22	0.88	200	242	1.21
2	Amreli	106	176	1.66	139	126	0.91	0	0	0.00
3	Anand	0	0	0.00	5	4	0.80	0	0	0.00
4	Aravalli	64	124	1.94	12	13	1.08	0	0	0.00
5	Banaskantha	558	1283	2.30	135	114	0.84	100	125	1.25
6	Bharuch	313	689	2.20	5	5	1.00	0	0	0.00
7	Bhavnagar	15	20	1.33	63	70	1.11	0	0	0.00
8	Botad	25	54	2.16	20	20	1.00	0	0	0.00
9	Chhota Nagpur	106	252	2.38	0	0	0.00	0	0	0.00
10	Dahod	110	2212	2.00	0	0	0.00	0	0	0.00
11	Dangs	0	0	0.00	0	0	0.00	0	0	0.00
12	Devbhoomi	20	35	1.75	135	112	0.83	0	0	0.00
13	Gandhinagar	0	0	0.00	0	0	0.00	0	0	0.00
14	Gir somnath	15	21	1.40	0	0	0.00	0	0	0.00
15	Jamnagar	82	128	1.56	1	1	1.00	0	0	0.00
16	Junagadh	10	14	1.40	0	0	0.00	0	0	0.00
17	Kheda	9	17	1.89	0	0	0.00	100	124	1.24
18	Kachchh	341	722	2.12	0	0	0.00	0	0	0.00
19	Mahisagar	170	283	1.66	5	5	1.00	0	0	0.00
20	Mehsana	637	1484	2.33	611	641	1.05	600	750	1.25
21	Morbi	233	494	2.12	0	0	0.00	0	0	0.00
22	Narmada	67	104	1.55	7	5	0.71	0	0	0.00
23	Navsari	131	234	1.79	42	30	0.71	0	0	0.00
24	Panchmahal	275	454	1.65	0	0	0.00	0	0	0.00
25	Patan	900	1782	1.98	200	190	0.95	350	416	1.19
26	Porbandar	0	0	0.00	0	0	0.00	0	0	0.00
27	Rajkot	250	520	2.08	0	0	0.00	0	0	0.00
28	Sabarkantha	80	158	1.98	16	17	1.06	0	0	0.00
29	Surat	82	127	1.55	5	5	1.00	900	900	1.00
30	Surendranagar	680	1326	1.95	56	40	0.71	0	0	0.00
31	<u>Tapi</u>	105	210	2.00	70	50	0.71	0	0	0.00
32	Vadodara	424	720	1.70	0	0	0.00	0	0	0.00
33	Valsad	28	54	1.93	0	0	0.00	0	0	0.00
	Total	704	1416	54.58	155	147	17.37	720	848	7.14

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.90 Districtwise area, production and productivity of cumin, fennel and coriander in the state during 2016-17

Sr. No.	District	Cumin			Fennel			Coriander		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	1240	11408.0	0.92	125	250.00	2.0	415	643.25	1.55
2	Amreli	900	765.00	0.85	0	0.00	0.0	1300	1664.0	1.28
3	Anand	0	0.00	0.00	0	0.00	0.0	1475	2507.0	1.70
4	Aravalli	200	156.00	0.78	2300	4899.0	2.1	100	148.00	1.48
5	Banaskanth	6491	67506.4	1.04	3410	7365.6	2.2	0	0.00	0.00
6	Bharuch	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
7	Bhavnagar	202	179.78	0.89	0	0.00	0.0	100	171.00	1.71
8	Botad	300	306.00	1.02	0	0.00	0.0	0	0.00	0.00
9	Chhota	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
10	Dahod	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
11	Dang	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
12	Devbhumi	4800	4848.00	1.01	0	0.00	0.0	5300	7685.0	1.45
13	Gandhinag	0	0.00	0.00	1600	3488.0	2.2	0	0.00	0.00
14	Gir	145	127.60	0.88	0	0.00	0.0	1464	21081.	1.44
15	Jamnagar	1889	1964.56	1.04	0	0.00	0.0	1206	1736.6	1.44
16	Junagadh	5300	4664.00	0.88	0	0.00	0.0	5353	77618.	1.45
17	Kheda	0	0.00	0.00	200	396.00	2.0	100	123.00	1.23
18	Kutch	2320	24592.0	1.06	900	1809.0	2.0	7500	16575.	2.21
19	Mahisagar	0	0.00	0.00	1000	1880.0	1.9	0	0.00	0.00
20	Mehsana	1844	1604.28	0.87	9774	21405.	2.2	262	377.28	1.44
21	Morbi	1100	12345.0	1.12	7100	14839.	2.1	6300	10080.	1.60
22	Narmada	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
23	Navsari	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
24	Panchmaha	0	0.00	0.00	200	270.00	1.4	0	0.00	0.00
25	Patan	4070	42328.0	1.04	1400	3150.0	2.3	100	169.00	1.69
26	Porbandar	1208	12326.7	1.02	0	0.00	0.0	1772	30132.	1.70
27	Rajkot	4876	3657.00	0.75	0	0.00	0.0	3946	7142.2	1.81
28	Sabarkanth	700	560.00	0.80	2600	5616.0	2.2	0	0.00	0.00
29	Surat	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
30	Surendrana	9330	102150.	1.09	1030	22454.	2.2	7200	11664.	1.62
31	Tapi	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
32	Vadodara	0	0.00	0.00	0	0.00	0.0	0	0.00	0.00
33	Valsad	0	0.00	0	125	250.00	0.0	0	0.00	0.00
	Total									

Source: Directorate of Horticulture, Gandhinagar

Table-4.3.91 District-wise area, production and productivity of fenugreek, ajwain and dillseed in the state during 2016-17

Sr. No.	District	Fenugreek			Ajwain			Dillseed		
		A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)	A (ha)	P (MT)	Y (MT/ha)
1	Ahmedabad	106	227.9	2.15	125	115	0.92	3065	3708.	1.21
2	Amreli	108	177.12	1.64	491	456.6	0.93	0	0	0
3	Anand	0	0	0.00	5	4	0.80	0	0	0
4	Aravalli	71	135.61	1.91	12	13.2	1.10	0	0	0
5	Banaskantha	7915	15592.	1.97	160	1441.	0.90	97	119.3	1.23
6	Bharuch	303	636.3	2.10	7	7.35	1.05	0	0	0
7	Bhavnagar	16	20	1.25	61	69	1.13	0	0	0
8	Botad	35	75.25	2.15	19	19	1.00	0	0	0
9	Chhota	75	157	2.09	0	0	0.00	0	0	0
10	Dahod	1144	2253.6	1.97	0	0	0.00	0	0	0
11	Dangs	0	0	0	0	0	0.00	0	0	0
12	Devbhoomi	23	41	1.78	137	115	0.84	0	0	0
13	Gandhinagar	0	0	0	0	0	0.00	0	0	0
14	Gir somnath	284	398	1.40	0	0	0.00	0	0	0
15	Jamnagar	85	131.75	1.55	176	1748.	0.99	35	35.7	1.02
16	Junagadh	190	266	1.4	0	0	0.00	0	0	0
17	Kheda	15	26.25	1.75	0	0	0.00	0	0	0
18	Kachchh	365	772.54	2.12	0	0	0.00	0	0	0
19	Mahisagar	175	248	1.42	6	6	1.00	0	0	0
20	Mehsana	637	1401.4	2.20	611	641.5	1.05	1590	1923.	1.21
21	Morbi	263	558	2.12	0	0	0.00	0	0	0
22	Narmada	72	110.88	1.54	7	6.16	0.88	0	0	0
23	Navsari	138	246	1.78	44	32	0.73	0	0	0
24	Panchmahal	300	435	1.45	0	0	0.00	0	0	0
25	Patan	950	1862	1.96	250	237.5	0.95	1230	14760	1.2
26	Porbandar	0	0	0	0	0	0.00	0	0	0
27	Rajkot	255	504.9	1.98	0	0	0.00	0	0	0
28	Sabarkanth	80	157.6	1.97	22	22.84	1.04	0	0	0
29	Surat	82	126.28	1.54	5	4.9	0.98	0	0	0
30	Surendranag	700	1358	1.94	65	46.8	0.72	0	0	0
31	Tapi	110	210	1.91	80	60	0.75	0	0	0
32	Vadodara	437	738.53	1.69	0	0	0.00	0	0	0
33	Valsad	29	56.26	1.94	0	0	0.00	0	0	0
	Total	1496	28923.	52.6	531	5047.	0.95	1708	20547	5.87

Source: Directorate of Horticulture, Gandhinagar

4.3.3.5 Major Seed Spices Varieties in the State:

The varieties grown in the state are given in Table 4.3.92

Table-4.3.92 Major Varieties of Seed Spices of the State

Seed Spices	Varieties
Cumin	Gujarat Cumin-2 (GC 2) and Gujarat Cumin-4 (GC 4)
Fennel	Gujarat Fennel-2 (GF 2), Gujarat Fennel-11 (GF 11) and Gujarat Fennel-12 (GF 12)
Coriander	Gujarat Coriander-2 (GCor 2), Gujarat Coriander-3 (GCor 3)
Fenugreek	Gujarat Methi-2 (GM 2)
Dill Seed	Gujarat Dill-2 (GD 2) and Gujarat Dill-3 (GD 3)
Ajowain	Gujrat Ajwain-1 (GA 1) and Gujrat Ajwain-1 (GA 2)

4.3.3.6 Input Management:

4.3.3.6.1 Seed:

At present, the seed replacement ratio (SRR) of seed spices is very low. Thus, the scope of SRR is ambient in future to enhance the productivity of crops like seed spices in the state especially through seed village concept.

Table-4.3.93 Agriculture inputs for cumin seed (2016-17)

Sr. No.	Seed Quantity Requirement and SRR							
	District	Area (ha)	Seed Rate kg/ha	Total Seed Quantity, T	SRR	Seed Quantity Required,		
						2017-18	2018-19	2019-20
1	Ahmedabad	12400	15	148.8	12	205	225	248
2	Amreli	900	15	10.8	9	15	16	18
3	Anand	0	15	0.0	0	0	0	0
4	Aravalli	200	15	2.4	8	3	4	4
5	Banaskantha	64910	15	778.9	25	1071	1178	1296
6	Bharuch	0	15	0.0	0	0	0	0
7	Bhavnagar	202	15	2.4	9	3	4	4
8	Botad	300	15	3.6	8	5	5	6
9	Chhota	0	15	0.0	0	0	0	0
10	Dahod	0	15	0.0	0	0	0	0
11	Dang	0	15	0.0	0	0	0	0
12	Devbhumi	4800	15	57.6	24	0	0	0
13	Gandhinagar	0	15	0.0	0	79	87	96
14	GirSomnath	145	15	1.7	11	0	0	0
15	Jamnagar	1889	15	22.7	19	0	0	0
16	Junagadh	5300	15	63.6	13	2	3	3
17	Kheda	0	15	0.0	0	31	34	38
18	Kutch	23200	15	278.4	23	87	96	106
19	Mahisagar	0	15	0.0	0	0	0	0
20	Mehsana	1844	15	22.1	18	383	421	463
21	Morbi	11000	15	132.0	12	0	0	0
22	Narmada	0	15	0.0	0	30	33	37
23	Navsari	0	15	0.0	0	182	200	220
24	Panchmahal	0	15	0.0	0	0	0	0

Sr. No.	Seed Quantity Requirement and SRR							
	District	Area (ha)	Seed Rate kg/ha	Total Seed Quantity, T	SR R	Seed Quantity Required,		
						2017-18	2018-19	2019-20
25	Patan	40700	15	488.4	29	0	0	0
26	Porbandar	12085	15	145.0	12	0	0	0
27	Rajkot	4876	15	58.5	14	672	739	813
28	Sabarkantha	700	15	8.4	7	199	219	241
29	Surat	0	15	0.0	0	80	88	97
30	Surendranag	93300	15	1119.6	9	12	13	14
31	Tapi	0	15	0.0	0	0	0	0
32	Vadodara	0	15	0.0	0	1539	1693	1863
33	Valsad	0	15	0.0	0	0	0	0
	TOTAL	27875	495	3345.0				

Table-4.3.94 Agriculture inputs for fennel seed (2016-17)

Sr. No.	Fennel Seed Quantity Requirement and SRR							
	District	Area (ha)	Seed Rate kg/ha	Total Seed Quantity, T	SRR	Seed Quantity Required, T		
						2017-18	2018-19	2019-20
1	Ahmedabad	125	5	0.6	3	1.80	1	0.25
2	Amreli	0	5	0.0	0	0	0	0.00
3	Anand	0	5	0.0	0	0	0	0.00
4	Aravalli	2300	5	11.5	22	34.50	13.80	4.60
5	Banaskantha	3410	5	17.1	30	51.30	20.46	6.82
6	Bharuch	0	5	0.0	0	0	0	0.00
7	Bhavnagar	0	5	0.0	0	0	0	0.00
8	Botad	0	5	0.0	0	0	0	0.00
9	Chhota	0	5	0.0	0	0	0.75	5
10	Dahod	0	5	0.0	0	0	0	0.000
11	Dangs	0	5	0.0	0	0	0	0.000
12	Devbhumi	0	5	0.0	0	0	0	0
13	Gandhinagar	1600	5	8.0	17	51.00	0	3.200
14	Gir Somnath	0	5	0.0	0	0	0	0.000
15	Jamnagar	0	5	0.0	0	0	0	0.000
16	Junagadh	0	5	0.0	0	0	0	0.000
17	Kheda	200	5	1.0	4	0	0	0.400
18	Kutch	900	5	4.5	18	13.50	0	1.800
19	Mahisagar	1000	5	5.0	19	0	6.00	2.000
20	Mehsana	9774	5	48.9	35	146.7	58.64	19.55
21	Morbi	7100	5	35.5	29	106.5	42.60	14.200
22	Narmada	0	5	0.0	0	0	0	0.000
23	Navsari	0	5	0.0	0	0	0	0.000
24	Panchmahal	200	5	1.0	5	3.00	1.20	0.400
25	Patan	1400	5	7.0	27	21.00	8.40	2.800
26	Porbandar	0	5	0.0	0	39.00	0	0.000
27	Rajkot	0	5	0.0	0	0	0	0.000

Sr. No.	Fennel Seed Quantity Requirement and SRR							
	District	Area (ha)	Seed Rate kg/ha	Total Seed Quantity, T	SRR	Seed Quantity Required, T		
						2017-18	2018-19	2019-20
28	Sabarkantha	2600	5	13.0	24	39.0	0	5.200
29	Surat	0	5	0.0	0	0	0	0.000
30	Surendranag	10300	5	51.5	34	154.5	61.80	20.600
31	Tapi	0	5	0.0	0	0	0	0.000
32	Vadodara	0	5	0.0	0	0	0	0.000
33	Valsad	0	5	0.0	0	0	0	0.000
	Total	40909	5	204.5		523.2	245.4	81.818

4.3.3.6.2 Fertilizer:

. District-wise fertilizers requirement in seed spices crops 2016-17 is given below.

Table-4.3.95 Fertilizers utilized in cumin crop during 2016-17

Sr. No.	District	Area (ha)	Fertilizer Requirement(T)	
			DAP	Urea
1	Ahmedabad	12400	404.2	920.5
2	Amreli	900	29.3	66.8
3	Anand	0	0.0	0.0
4	Aravalli	200	6.5	14.8
5	Banaskantha	64910	2116.1	4818.3
6	Bharuch	0	0.0	0.0
7	Bhavnagar	202	6.6	15.0
8	Botad	300	9.8	22.3
9	Chhota Udepur	0	0.0	0.0
10	Dahod	0	0.0	0.0
11	Dang	0	0.0	0.0
12	Devbhumi Dwarka	4800	156.5	356.3
13	Gandhinagar	0	0.0	0.0
14	GirSomnath	145	4.7	10.8
15	Jamnagar	1889	61.6	140.2
16	Junagadh	5300	172.8	393.4
17	Kheda	0	0.0	0.0
18	Kutch	23200	756.3	1722.1
19	Mahisagar	0	0.0	0.0
20	Mehsana	1844	60.1	136.9
21	Morbi	11000	358.6	816.5
22	Narmada	0	0.0	0.0
23	Navsari	0	0.0	0.0
24	Panchmahal	0	0.0	0.0
25	Patan	40700	1326.8	3021.2
26	Porbandar	12085	394.0	897.1
27	Rajkot	4876	159.0	361.9
28	Sabarkantha	700	22.8	52.0
29	Surat	0	0.0	0.0

Sr. No.	District	Area (ha)	Fertilizer Requirement(T)	
			DAP	Urea
30	Surendranagar	93300	3041.6	6925.7
31	Tapi	0	0.0	0.0
32	Vadodara	0	0.0	0.0
33	Valsad	0	0.0	0.0
	Total	278751	9087.3	20691.7

(Same quantity will be required in coming five years i.e. 2017-18 to 2019-20)

Table-4.3.96 Fertilizers utilized in fennel crop during 2016-17

Sr. No.	District	Area (ha)	Fertilizer Requirement(T)	
			DAP	Urea
1	Ahmedabad	125	8.2	21.3
2	Amreli	0	0.0	0.0
3	Anand	0	0.0	0.0
4	Aravalli	2300	150.0	391.5
5	Banaskantha	3410	222.4	580.4
6	Bharuch	0	0.0	0.0
7	Bhavnagar	0	0.0	0.0
8	Botad	0	0.0	0.0
9	Chhota Udepur	0	0.0	0.0
10	Dahod	0	0.0	0.0
11	Dang	0	0.0	0.0
	Devbhumi	0	0.0	0.0
13	Gandhinagar	1600	104.4	272.3
14	GirSomnath	0	0.0	0.0
15	Jamnagar	0	0.0	0.0
16	Junagadh	0	0.0	0.0
17	Kheda	200	13.0	34.0
18	Kutch	900	58.7	153.2
19	Mahisagar	1000	65.2	170.2
20	Mehsana	9774	637.5	1663.6
21	Morbi	7100	463.1	1208.5
22	Narmada	0	0.0	0.0
23	Navsari	0	0.0	0.0
24	Panchmahal	200	13.0	34.0
25	Patan	1400	91.3	238.3
26	Porbandar	0	0.0	0.0
27	Rajkot	0	0.0	0.0
28	Sabarkantha	2600	169.6	442.5
29	Surat	0	0.0	0.0
30	Surendranagar	10300	671.8	1753.2
31	Tapi	0	0.0	0.0
32	Vadodara	0	0.0	0.0
33	Valsad	0	0.0	0.0
		40909		

(Same quantity will be required in coming five years i.e. 2017-18 to 2019-20)

4.3.3.6.3 Pesticides:

District-wise requirement of pesticides for pests, diseases and weed management is given in Table 4.3.97 and 4.3.98

Table-4.3.97 District-wise requirement of pesticides for cumin

Sr. No	District	Area (ha)	Seed Rate kg/ha	Total Seed Quantity, T	Pesticides Quantity Required (T)			
					Seed Treatment (Thiram)	Spray (Mancozeb)	Insecticide (Dimethoate)	Pendimethalin
1	Ahmedabad	12400	15	148.8	446	149	25	37
2	Amreli	900	15	10.8	32	11	2	3
3	Anand	0	15	0.0	0	0	0	0
4	Aravalli	200	15	2.4	7	2	0	1
5	Banaskanth	64910	15	778.9	233	779	130	195
6	Bharuch	0	15	0.0	0	0	0	0
7	Bhavnagar	202	15	2.4	7	2	0	1
8	Botad	300	15	3.6	11	4	1	1
9	Chhota	0	15	0.0	0	4	1	1
10	Dahod	0	15	0.0	0	0	0	0
11	Dang	0	15	0.0	0	0	0	0
12	Devbhumi	4800	15	57.6	11	4	1	1
13	Gandhinagar	0	15	0.0	0	0	0	0
14	GirSomnath	145	15	1.7	5	2	0	0
15	Jamnagar	1889	15	22.7	68	23	4	6
16	Junagadh	5300	15	63.6	191	64	11	16
17	Kheda	0	15	0.0	0	0	0	0
18	Kutch	23200	15	278.4	835	0	46	70
19	Mahisagar	0	15	0.0	0	0	0	0
20	Mehsana	1844	15	22.1	66	22	4	6
21	Morbi	11000	15	132.0	396	132	22	33
22	Narmada	0	15	0.0	0	0	0	0
23	Navsari	0	15	0.0	0	0	0	0
24	Panchmahall	0	15	0.0	0	0	0	0
25	Patan	40700	15	488.4	146	488	81	122
26	Porbandar	12085	15	145.0	435	145	24	36
27	Rajkot	4876	15	58.5	176	59	10	15
28	Sabarkantha	700	15	8.4	25	8	1	2
29	Surat	0	15	0.0	0	0	0	0
30	Surendranag	93300	15	1119.6	335	1120	187	280
31	Tapi	0	15	0.0	0	0	0	0
32	Vadodara	0	15	0.0	0	0	0	0
33	Valsad	0	15	0.0	0	0	0	0
	Total	27875	495	3345.0	675	2062	390	585

Table-4.3.98 District-wise requirement of pesticides for fennel

Sr. No.	District	Area (ha)	Seed Rate kg/ha	Total Seed Quantity, T	Pesticides Quantity Required (T)			
					Seed Treat. (Thiram)	Spray (Mancozeb)	Insecticide (Imidacloprid)	Pendimithiline
1	Ahmed	125	5	0.6	1.80	1	0.25	0.38
2	Amreli	0	5	0	0	0	0.00	0.00
3	Anand	0	5	0	0	0	0.00	0.00
4	Aravalli	2300	5	11.5	34.50	13.80	4.60	6.90
5	Banas	3410	5	17.1	51.30	20.46	6.82	10.23
6	Bharuc	0	5	0	0	0	0.00	0.00
7	Bhavn	0	5	0	0	0	0.00	0.00
8	Botad	0	5	0	0	0	0.00	0.00
9	Chhota	0	5	0	0	0.00	0.00	0.00
10	Dahod	0	5	0	0	0	0.000	0
11	Dang	0	5	0	0	0	0.000	0
12	Devbh	0	5	0	0	0	0	0
13	Gandhi	1600	5	8	51.000	9.60	3.2	4.8
14	GirSo	0	5	0	0	0	0.000	0
15	Jamna	0	5	0	0	0	0.000	0
16	Junaga	0	5	0	0	0	0	0
17	Kheda	200	5	1	3.00	1.2	0.400	3.000
18	Kutch	900	5	4.5	13.5	5.40	1.80	29.32
19	Mahisa	1000	5	5.000	15.000	6.000	2.000	21.30
20	Mehsa	9774	5	48.9	146.7	58.64	19.55	29.32
21	Morbi	7100	5	35.5	106.5	42.6	14.20	21.300
22	Narma	0	5	0	0	0	0	0
23	Navsar	0	5	0	0	0	0	0
24	Panch	200	5	1	3	1.20	0.4	0.600
25	Patan	1400	5	7	21	8.4	2.800	4.200
26	Porban	0	5	0	0	0	0	0
27	Rajkot	0	5	0	0	0	0	0
28	Sabark	2600	5	13	39.00	15.60	5.20	7.800
29	Surat	0	5	0	0	0	0.000	0
30	Surend	10300	5	51.5	154.5	61.8	20.6	30.9
31	Tapi	0	5	0	0	0	0.000	0
32	Vadod	0	5	0	0	0	0	0
33	Valsad	0	5	0	0	0	0.000	0
	Total	40909	165	204.5	499.20	245.45	81.818	166.224

4.3.3.7 Constraints Analysis and Recommended Interventions for Spices:**4.3.3.7.1 Yield Gaps Analysis:**

Data in Table – 4.3.99 and 4.3.100 reveal that cumin and fennel productivity of some districts in the state is lower than state average.

4.3.3.7.2 Reasons for Yield Gap:

- ✓ The NPK adoption by farmers is more than ideal ratio of NPK (4:2:1)
- ✓ Imbalance nutrient status of the soils and
- ✓ lack of nutrient availability in the soil
- ✓ Lack of knowledge on irrigation method, frequency and schedules in seed spice crops

Table-4.3.99 Comparative Yield of Cumin and Fennel Crops of the State along with Expected Yield and Gaps in Actual Yield

Sr No	District	Actual and Expected yield	Cumin Yield (Kg/ha) (Avg of Years 2012-13, 2013-14 and 2014-15)	Fennel Yield (Kg/ha) (Avg of Years 2012-13, 2013-14 and 2014-15)
1	Ahmedabad	Actual	533.30	630.00
		Expected	680.00	688.33
		Gap %	27.50	9.26
2	Amreli	Actual	633.33	0.00
		Expected	793.33	0.00
		Gap %	25.26	0.00
3	Banaskantha	Actual	983.33	2116.67
		Expected	1123.33	2196.67
		Gap %	14.24	3.78
4	Bharuch	Actual	0.00	626.67
		Expected	0.00	693.33
		Gap %	0.00	10.64
5	Narmada	Actual	0.00	0.00
		Expected	0.00	0.00
		Gap %	0.00	0.00
6	Bhavnagar	Actual	736.67	1383.33
		Expected	870.00	763.33
		Gap %	18.10	-44.82
7	Dang	Actual	0.00	766.67
		Expected	0.00	816.67
		Gap %	0.00	6.52
8	Gandhinagar	Actual	170.00	1870.00
		Expected	0.00	2110.00
		Gap %	-100.00	12.83
9	Jamnagar	Actual	823.33	583.33
		Expected	920.00	666.67
		Gap %	11.74	14.29
10	Junagadh	Actual	770.00	983.33
		Expected	880.00	1050.00
		Gap %	14.29	6.78
11	Porbandar	Actual	906.67	716.67
		Expected	1006.67	760.00

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Sr No	District	Actual and Expected yield	Cumin Yield (Kg/ha) (Avg of Years2012-13,2013-14 and 2014-15)	Fennel Yield (Kg/ha) (Avg of Years2012-13,2013-14 and 2014-15)
		Gap %	11.03	6.05
12	Kutchh	Actual	616.67	563.33
		Expected	703.33	593.33
		Gap %	14.05	5.33
13	Kheda	Actual	876.67	2610.00
		Expected	980.00	2313.33
		Gap %	11.79	-11.37
14	Ananad	Actual	660.00	0.00
		Expected	753.33	0.00
		Gap %	14.14	0.00
15	Mahesana	Actual	783.33	1273.33
		Expected	871.67	1550.00
		Gap %	11.28	21.73
16	Patan	Actual	820.00	1310.00
		Expected	718.33	1566.67
		Gap %	-12.40	19.59
17	Panchmahal	Actual	0.00	876.67
		Expected	0.00	1100.0
		Gap %	0.00	25.48
18	Dahod	Actual	0.00	1003.33
		Expected	0.00	1316.67
		Gap %	0.00	31.23
19	Rajkot	Actual	726.67	500.00
		Expected	850.00	606.67
		Gap %	16.97	21.33
20	Sabarkantha	Actual	516.67	1340.00
		Expected	650.00	1430.00
		Gap %	25.81	6.72
21	Surat	Actual	0.00	660.00
		Expected	0.00	680.33
		Gap %	0.00	3.54
22	Surendranagar	Actual	1046.67	2026.67
		Expected	1183.33	2246.67
		Gap %	13.06	10.86
23	Vadodara	Actual	0.00	0.00
		Expected	0.00	0.00
		Gap %	0.00	0.00
24	Valsad	Actual	0.00	716.67
		Expected	0.00	750.00
		Gap %	0.00	4.65
25	Navsari	Actual	0.00	766.67
		Expected	0.00	816.67
		Gap %	0.00	6.52
26	Tapi	Actual	0.00	433.3

Sr No	District	Actual and Expected yield	Cumin Yield (Kg/ha) (Avg of Years 2012-13, 2013-14 and 2014-15)	Fennel Yield (Kg/ha) (Avg of Years 2012-13, 2013-14 and 2014-15)
		Expected	0.00	510.00
		Gap %	0.00	17.69

Production Constraints:

The constraints associated with low productivity may be enumerated as under

- Short and mild winter
- Cultivation on marginal lands
- Improper selection of variety
- Late sowing time
- Variable water supply in quantum and space
- Imbalanced fertilizers application
- Improper placement of seeds and fertilizers
- Delay in germination with slow initial growth
- Poor weed management
- Poor insect and disease management
- Low organic matter due to poor awareness regarding soil health
- Poor resource conservation technology
- Late harvesting
- Slight change in climatic condition may failure the crop

Table-4.3.100 Region-wise Constraints for Low Productivity for Seed Spices

Sr.No.	Region	Constraints
1.	North Gujarat	<ul style="list-style-type: none"> ➤ Increase in late sown area due to introduction of Bt. cotton ➤ Early sowing (Sabarkantha) to take benefit of water from wells ➤ High weed population. ➤ Improper plant stands due to broadcast sowing of seed ➤ Imbalance fertilizer ➤ Improper pests and disease management ➤ High cost of irrigation ➤ Lack of farm mechanization ➤ Wrong irrigation method ➤ Delay in harvesting
2.	Middle Gujarat	<ul style="list-style-type: none"> ➤ Late / very late sowing ➤ Improper plant stand ➤ Wrong sowing-irrigation method ➤ Imbalance fertilizer ➤ High weed population. ➤ Improper pests and disease management ➤ Poor water management in canal area ➤ Soil salinity / alkalinity ➤ Delay in harvesting
3.	Saurashtra	<ul style="list-style-type: none"> ➤ Late sowing with broadcasting method ➤ High weed population. ➤ Wrong irrigation method ➤ Imbalance fertilizer ➤ High humidity at the time of harvesting ➤ Improper pests and disease management ➤ Delay in harvesting

Table-4.3.101 Sustainability Issues and Gap Analysis of Productivity of Seed Spices Crops and Resources

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
i	Lesser Adoption of seed treatment	Termites, fungal diseases	To popularize practice of seed treatment for maintaining crop health.	Educating and motivating farmers on its importance and adoption through demonstrations and trainings.	Entire seed spices growing area with no exception in seed born diseases and termite affected areas.	Productivity growth on sustainable basis.
ii	Sowing of traditional seed	Low awareness about certified seed	Awareness campaign for use of certified seed.	Farmers Field schools, campaigns.	Entire seed spices growing areas.	Improvement in yield on sustainable basis.
iii	Broadcasting of the seed	Farmers use excess seed with broadcasting of seed after harvest of previous crop.	Application of recommended dose of seed in line sowing	Farmers participatory approach and demonstration	Entire seed spices growing areas.	Improvement in productivity
iv	Poor fertilizer management	Farmers apply excess fertilizer in irrigated crops	Application of recommended dose of fertilizers. Use of organic manure and use of site specific micro-nutrient management.	Farmers participatory approach and demonstration	Entire seed spices growing areas.	Improvement in productivity with sustainable soil health

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
v	High incidence of weeds	<i>Chinopodium albam</i> and <i>Amaranthus spp.</i> are seriously affects yields.	Improve the efficiency of existing herbicides. Capacity building for spraying techniques.	State level strategic plan for the management of <i>Chinopodium albam</i> and <i>Amaranthus spp.</i> Integrated. Capacity building of extension agencies and farmers for appropriate spraying techniques. On farm demonstrations of herbicides	Entire seed spices growing areas.	Economic benefits are increased proFintability
vi	No use of organic manure	Low production and higher price of organic manures	Awareness campaign for production of organic manures in own farms	Farmers Field schools, campaigns	Entire seed spices growing areas.	Improvement in productivity with sustainable soil health
vii	Excess irrigation in irrigated wheat	Canal irrigation water flooded throughout the crop season	Judicious use of water By bed size and appropriate method of	Training and demonstrations on proper water management.	Entire seed spices growing areas.	Increase in water use efficiency and sustain soil health
viii	Growing of companion for intercropping	Improvement in soil fertility and gain more income	Evolve best package of practice to generate more income.	Training and demonstrations on proper water management on recommended practices.	Entire seed spices growing areas.	Increase income and sustain soil health.

Table-4.3.102 Closing the Gaps in Realizing the Seed Spice Crops Vision

Activity Output Matrix				
Activity/Crop/Commodity	Issues	Mode of Action	Collaborator/ Target	Cost
1. Water Management	Irregular water supply in canal water so farmers use more water. drainage facility.	Supply of water in the canal as per the crop requirement. Drainage facility is created	Irrigation Department and SAUs have jointly work to solve this problem.	Demonstration proposed
	Improper irrigation method.	Adopt MIS.	GGRC and SAUs will jointly work	Demonstration proposed
	Water harvesting and recharging	Construction of water harvesting structures near catchment area of drain, panchayati / farmers land.	DDA/concerned departments in consultation with SAUs scientist	Project on water harvesting proposed.
	Watershed development in rainfed areas	Sprinkler/drip irrigation after creating facility of community ponds/ water	DDA/concerned departments in consultation with	Project proposed.
	Ground water testing for nitrate contamination	Survey of marked sites for nitrate contamination and characterization of nitrate	DDA will conduct survey and identify the areas of high fluoride	Survey for study of ground water quality proposed.

<p>i) Zero Tillage</p>	<p>Environmental (Carbon sequestration, soil fertility gains etc.) and economic benefits (saving in labour, diesel, machinery wear and tear etc) will be catalogued and calculated. Zero till technology will be extended to seed spices and other cropping system. Improve agronomic efficiency of nutrients. It also improves nitrogen and water efficiency. Improve biological activity in the soil. Increase of soil organic matter. It improves soil structure and reduced leaching of N. The cultivation cost of wheat crop reduced so farmer gain more profit.</p>	<p>Some farmers have adopted zero-tillage and they found beneficial effect on soil fertility and yield.</p>	<p>The efforts are required to popularize the zero tillage system for cultivation of cumin crop.</p>	<p>The Govt. has to give 60% subsidy to purchase seed drill for small and marginal farmers.</p>
<p>(ii) Laser –Leveling</p>	<p>Laser land leveling for water saving, land saving and improve yields of seed spices and other crops.</p>	<p>DDA will organize and monitor the distribution of laser leveler especially on custom hire services.</p>	<p>DDA in consultation with KVK.</p>	<p>Demonstrations proposed. The Govt. has to give 60 per cent subsidy to purchase</p>
<p>(iii) Green Manuring</p>	<p>Improvement in the soil health with additional organic carbon.</p>	<p>DDA will ensure the timely availability of sunhemp and clusterbean seed with subsidy. 50 per cent area will be covered during the plan period of Five years.</p>		

3. Seed Production	1. Seed planning	1. Selection of improved variety at farmers Fineld. 2. Motivating farmers to produce the seed of best variety 3. Mandatory testing of new	DDAs in consultation with KVKs.	Project proposed.
	2. Best quality seed	Seed production at farmers' Fineld with farmers participatory approach.	DDA and KVK.	Project proposed.
	3. Seed treatment	1. Motivating farmers to seed treatment 2. Demonstrations will be laid out by DDA in collaboration with KVK	DDA's Data for all activities will be presented in the ofFincers workshop	Survey proposed.
4. Site speciFinc Nutrient Management	Number of split application and timing of top dress N with reference to irrigation	-	DDA and KVK	-
	Legume in cropping rotation	Integrated soil and crop management for rehabilitation of legume production in present cropping system.	DDA will ensured quality seed of important legumes green gram for summer season	Demonstration will be laid out on green gram.
	Crop residue	Surface residue management for improving soil health. Improving the efFiciency of nutrient utilization.	Machineries for uniform distribution of residue will be ensured by DDA Residue retention machinery, second generation machinery,	Demonstrations proposed

	Bio- fertilizers	Integrate chemical fertilizers with bio-fertilizers Reduced level of chemical fertilizers	DDA will ensure the availability of quality bio-fertilizers	Demonstrations proposed under INM, free supply of bio fertilizer to the small and marginal farmers.
5. IWM	Spraying techniques for improving efficiency of herbicides. Monitoring of herbicide resistance.	Adopt IWM to reduce residues load Survey & demonstrations	DDA / SAUs / KVK	
6. Timely Sowing Timely Harvesting	Delayed harvesting of cotton/paddy, availability of irrigation, excess/untimely rains Delayed harvesting reduce the yield and quality	Extension and development agencies should approach in a farmers' participatory approach for each of possible solution. Evaluating and refining the technology for a range of stubbles, developing guidelines for achieving good establishment with residue retention Efficient use of N fertilizer.	DDAs / KVK DDA	Demonstrations proposed. Campaigns, hoarding/posters, Field days, district level training camps

Table.4.3.103 District-wise estimated area & production of different seed spices crops (year 2016-17) for Gujarat state

(Area in ha, Production in MT)

Sr. No.	Name of District	Cumin		Fennel		Coriander		Fenugreek		Ajwain		Dill seed	
		Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1	Ahmedabad	12400	11408.00	125	250.00	415	643.25	106	227.9	125	115	3065	3708.65
2	Amreli	900	765.00	0	0.00	1300	1664.00	108	177.12	491	456.63	0	0
3	Anand	0	0.00	0	0.00	1475	2507.00	0	0	5	4	0	0
4	Aravalli	200	156.00	2300	4899.00	100	148.00	71	135.61	12	13.2	0	0
5	Banaskantha	64910	67506.40	3410	7365.60	0	0.00	7915	15592.55	1602	1441.8	97	119.31
6	Bharuch	0	0.00	0	0.00	0	0.00	303	636.3	7	7.35	0	0
7	Bhavnagar	202	179.78	0	0.00	100	171.00	16	20	61	69	0	0
8	Botad	300	306.00	0	0.00	0	0.00	35	75.25	19	19	0	0
9	ChhotaUdepur	0	0.00	0	0.00	0	0.00	75	157	0	0	0	0
10	Dahod	0	0.00	0	0.00	0	0.00	1144	2253.68	0	0	0	0
11	Dang	0	0.00	0	0.00	0	0.00	0	0	0	0	0	0
12	DevbhumiDwarka	4800	4848.00	0	0.00	5300	7685.00	23	41	137	115	0	0
13	Gandhinagar	0	0.00	1600	3488.00	0	0.00	0	0	0	0	0	0
14	GirSomnath	145	127.60	0	0.00	14640	21081.60	284	398	0	0	0	0
15	Jamnagar	1889	1964.56	0	0.00	1206	1736.64	85	131.75	1766	1748.34	35	35.7
16	Junagadh	5300	4664.00	0	0.00	53530	77618.50	190	266	0	0	0	0
17	Kheda	0	0.00	200	396.00	100	123.00	15	26.25	0	0	0	0
18	Kutch	23200	24592.00	900	1809.00	7500	16575.00	365	772.54	0	0	0	0
19	Mahisagar	0	0.00	1000	1880.00	0	0.00	175	248	6	6	0	0
20	Mehsana	1844	1604.28	9774	21405.06	262	377.28	637	1401.4	611	641.55	1590	1923.9
21	Morbi	11000	12345.00	7100	14839.00	6300	10080.00	263	558	0	0	0	0
22	Narmada	0	0.00	0	0.00	0	0.00	72	110.88	7	6.16	0	0
23	Navsari	0	0.00	0	0.00	0	0.00	138	246	44	32	0	0
24	Panchmahal	0	0.00	200	270.00	0	0.00	300	435	0	0	0	0
25	Patan	40700	42328.00	1400	3150.00	100	169.00	950	1862	250	237.5	12300	14760
26	Porbandar	12085	12326.70	0	0.00	17725	30132.50	0	0	0	0	0	0
27	Rajkot	4876	3657.00	0	0.00	3946	7142.26	255	504.9	0	0	0	0

Sr. No.	Name of District	Cumin		Fennel		Coriander		Fenugreek		Ajwain		Dill seed	
		Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
28	Sabarkantha	700	560.00	2600	5616.00	0	0.00	80	157.6	22	22.84	0	0
29	Surat	0	0.00	0	0.00	0	0.00	82	126.28	5	4.9	0	0
30	Surendranagar	93300	102150.00	10300	22454.00	7200	11664.00	700	1358	65	46.8	0	0
31	Tapi	0	0.00	0	0.00	0	0.00	110	210	80	60	0	0
32	Vadodara	0	0.00	0	0.00	0	0.00	437	738.53	0	0	0	0
33	Valsad	0	0.00	125	250.00	0	0.00	29	56.26	0	0	0	0
	TOTAL			51609	1290169	74339	1486553	14963	28923.8	5315	5047.07	17087	20547.6

4.3.3.8 Input Management:

4.3.3.8.1 Seed:

Table-4.3.104 Districtwise Estimated Seed Required (T) of Different Seed Spices Crops 2016-17 for Gujarat

Sr. No.	Name of District	Cumin		Fennel		Coriander		Fenugreek		Ajwain		Dill Seed	
		Area	Seed	Area	Seed	Area	Seed	Area	Seed	Area	Seed	Area	Seed
1	Ahmedabad	12400	148.8	125	0.6	415	6.2	106	1.6	125	0.3	3065	18.4
2	Amreli	900	10.8	0	0.0	1300	19.5	108	1.6	491	1.2	0	0.0
3	Anand	0	0.0	0	0.0	1475	22.1	0	0.0	5	0.0	0	0.0
4	Aravalli	200	2.4	2300	11.5	100	1.5	71	1.1	12	0.0	0	0.0
5	Banaskantha	64910	778.9	3410	17.1	0	0.0	7915	118.7	1602	4.0	97	0.6
6	Bharuch	0	0.0	0	0.0	0	0.0	303	4.5	7	0.0	0	0.0
7	Bhavnagar	202	2.4	0	0.0	100	1.5	16	0.2	61	0.2	0	0.0
8	Botad	300	3.6	0	0.0	0	0.0	35	0.5	19	0.0	0	0.0
9	ChhotaUdepur	0	0.0	0	0.0	0	0.0	75	1.1	0	0.0	0	0.0
10	Dahod	0	0.0	0	0.0	0	0.0	1144	17.2	0	0.0	0	0.0
11	Dang	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
12	DevbhumiDwa	4800	57.6	0	0.0	5300	79.5	23	0.3	137	0.3	0	0.0
13	Gandhinagar	0	0.0	1600	8.0	0	0.0	0	0.0	0	0.0	0	0.0
14	GirSomnath	145	1.7	0	0.0	14640	219.6	284	4.3	0	0.0	0	0.0
15	Jamnagar	1889	22.7	0	0.0	1206	18.1	85	1.3	1766	4.4	35	0.2
16	Junagadh	5300	63.6	0	0.0	53530	803.0	190	2.9	0	0.0	0	0.0

Sr. No.	Name of District	Cumin		Fennel		Coriander		Fenugreek		Ajwain		Dill Seed	
		Area	Seed	Area	Seed	Area	Seed	Area	Seed	Area	Seed	Area	Seed
17	Kheda	0	0.0	200	1.0	100	1.5	15	0.2	0	0.0	0	0.0
18	Kutch	23200	278.4	900	4.5	7500	112.5	365	5.5	0	0.0	0	0.0
19	Mahisagar	0	0.0	1000	5.0	0	0.0	175	2.6	6	0.0	0	0.0
20	Mehsana	1844	22.1	9774	48.9	262	3.9	637	9.6	611	1.5	1590	9.5
21	Morbi	11000	132.0	7100	35.5	6300	94.5	263	3.9	0	0.0	0	0.0
22	Narmada	0	0.0	0	0.0	0	0.0	72	1.1	7	0.0	0	0.0
23	Navsari	0	0.0	0	0.0	0	0.0	138	2.1	44	0.1	0	0.0
24	Panchmahal	0	0.0	200	1.0	0	0.0	300	4.5	0	0.0	0	0.0
25	Patan	40700	488.4	1400	7.0	100	1.5	950	14.3	250	0.6	12300	73.8
26	Porbandar	12085	145.0	0	0.0	17725	265.9	0	0.0	0	0.0	0	0.0
27	Rajkot	4876	58.5	0	0.0	3946	59.2	255	3.8	0	0.0	0	0.0
28	Sabarkantha	700	8.4	2600	13.0	0	0.0	80	1.2	22	0.1	0	0.0
29	Surat	0	0.0	0	0.0	0	0.0	82	1.2	5	0.0	0	0.0
30	Surendranagar	93300	1119.6	10300	51.5	7200	108.0	700	10.5	65	0.2	0	0.0
31	Tapi	0	0.0	0	0.0	0	0.0	110	1.7	80	0.2	0	0.0
32	Vadodara	0	0.0	0	0.0	0	0.0	437	6.6	0	0.0	0	0.0
33	Valsad	0	0.0	0	0.0	0	0.0	29	0.4	0	0.0	0	0.0
	TOTAL	27875	3345	40909	204.5	121199	1818	14963	224.4	5315.0	13.3	17087	102.5

Table-4.3.105 Projection for Seed Requirement (T) of SeedSpices Crops in Next Three Years

Name of Seed Spices	Used in 2016-17	2017-18	2018-19	2019-20
Cumin	3345	3679.5	4047.5	4452.2
Fennel	204.5	225.0	247.4	272.2
Coriander	1818	1999.8	2199.8	2419.8
Fenugreek	224.4	246.8	271.5	298.7
Ajwain	13.3	14.6	16.1	17.7
Dill Seed	102.5	112.8	124.0	136.4
Total	5707.7	6278.47	6906.32	7596.95

4.3.3.8.2 Fertilizer:

District-wise fertiliser required for Seed Spices during 2016-17 for Gujarat state is given in Table 4.3.106 and 4.3.107.

Table-4.3.106 Districtwise Fertilizer Consumption in cumin and fennel (2016-17)

Sr. No.	Name of District	Cumin Area (ha)	Fertilizer Required in Tonne		Fennel Area (ha)	Fertilizer Required in Tonne	
			Cumin			Fennel	
			DAP	Urea		DAP	UREA
1	Ahmedabad	12400	404.2	920.5	125	8.2	21.3
2	Amreli	900	29.3	66.8	0	0.0	0.0
3	Anand	0	0.0	0.0	0	0.0	0.0
4	Aravalli	200	6.5	14.8	2300	150.0	391.5
5	Banaskantha	64910	2116.1	4818.3	3410	222.4	580.4
6	Bharuch	0	0.0	0.0	0	0.0	0.0
7	Bhavnagar	202	6.6	15.0	0	0.0	0.0
8	Botad	300	9.8	22.3	0	0.0	0.0
9	ChhotaUdepur	0	0.0	0.0	0	0.0	0.0
10	Dahod	0	0.0	0.0	0	0.0	0.0
11	Dangs	0	0.0	0.0	0	0.0	0.0
12	DevbhumiDwarka	4800	156.5	356.3	0	0.0	0.0
13	Gandhinagar	0	0.0	0.0	1600	104.4	272.3
14	GirSomnath	145	4.7	10.8	0	0.0	0.0
15	Jamnagar	1889	61.6	140.2	0	0.0	0.0
16	Junagadh	5300	172.8	393.4	0	0.0	0.0
17	Kheda	0	0.0	0.0	200	13.0	34.0
18	Kutch	23200	756.3	1722.1	900	58.7	153.2
19	Mahisagar	0	0.0	0.0	1000	65.2	170.2
20	Mehsana	1844	60.1	136.9	9774	637.5	1663.6
21	Morbi	11000	358.6	816.5	7100	463.1	1208.5
22	Narmada	0	0.0	0.0	0	0.0	0.0
23	Navsari	0	0.0	0.0	0	0.0	0.0
24	Panchmahals	0	0.0	0.0	200	13.0	34.0
25	Patan	40700	1326.8	3021.2	1400	91.3	238.3

Sr. No.	Name of District	Cumin Area (ha)	Fertilizer Required in Tonne		Fennel Area (ha)	Fertilizer Required in Tonne	
			Cumin			Fennel	
			DAP	Urea		DAP	UREA
26	Porbandar	12085	394.0	897.1	0	0.0	0.0
27	Rajkot	4876	159.0	361.9	0	0.0	0.0
28	Sabarkantha	700	22.8	52.0	2600	169.6	442.5
29	Surat	0	0.0	0.0	0	0.0	0.0
30	Surendranagar	93300	3041.6	6925.7	10300	671.8	1753.2
31	Tapi	0	0.0	0.0	0	0.0	0.0
32	Vadodara	0	0.0	0.0	0	0.0	0.0
33	Valsad	0	0.0	0.0	0	0.0	0.0
	TOTAL	278751	9087.3	20691.7	40909	2668.1	6963.1

Table-4.3.107 Districtwise Fertilizer Consumption in coriander and fenugreek (2016-17)

Sr. No.	Name of District	Coriander Area (ha)	Fertilizer Required in Tonne		Fenugreek Area (ha)	Fertilizer Required in Tonne	
			Coriander			Fenugreek	
			DAP	Urea		DAP	UREA
1	Ahmedabad	415	9.0	14.5	106	9.2	1.0
2	Amreli	1300	28.3	45.5	108	9.4	1.0
3	Anand	1475	32.1	51.6	0	0.0	0.0
4	Aravalli	100	2.2	3.5	71	6.2	0.7
5	Banaskantha	0	0.0	0.0	7915	688.3	74.8
6	Bharuch	0	0.0	0.0	303	26.3	2.9
7	Bhavnagar	100	2.2	3.5	16	1.4	0.2
8	Botad	0	0.0	0.0	35	3.0	0.3
9	ChhotaUdepur	0	0.0	0.0	75	6.5	0.7
10	Dahod	0	0.0	0.0	1144	99.5	10.8
11	Dang	0	0.0	0.0	0	0.0	0.0
12	DevbhumiDwarka	5300	115.2	185.4	23	2.0	0.2
13	Gandhinagar	0	0.0	0.0	0	0.0	0.0
14	GirSomnath	14640	318.3	512.1	284	24.7	2.7

Sr. No.	Name of District	Coriander Area (ha)	Fertilizer Required in Tonne		Fenugreek Area (ha)	Fertilizer Required in Tonne	
			Coriander			Fenugreek	
			DAP	Urea		DAP	UREA
15	Jamnagar	1206	26.2	42.2	85	7.4	0.8
16	Junagadh	53530	1163.7	1872.5	190	16.5	1.8
17	Kheda	100	2.2	3.5	15	1.3	0.1
18	Kutch	7500	163.1	262.4	365	31.7	3.4
19	Mahisagar	0	0.0	0.0	175	15.2	1.7
20	Mehsana	262	5.7	9.2	637	55.4	6.0
21	Morbi	6300	137.0	220.4	263	22.9	2.5
22	Narmada	0	0.0	0.0	72	6.3	0.7
23	Navsari	0	0.0	0.0	138	12.0	1.3
24	Panchmahal	0	0.0	0.0	300	26.1	2.8
25	Patan	100	2.2	3.5	950	82.6	9.0
26	Porbandar	17725	385.3	620.0	0	0.0	0.0
27	Rajkot	3946	85.8	138.0	255	22.2	2.4
28	Sabarkantha	0	0.0	0.0	80	7.0	0.8
29	Surat	0	0.0	0.0	82	7.1	0.8
30	Surendranagar	7200	156.5	251.9	700	60.9	6.6
31	Tapi	0	0.0	0.0	110	9.6	1.0
32	Vadodara	0	0.0	0.0	437	38.0	4.1
33	Valsad	0	0.0	0.0	29	2.5	0.3
	TOTAL	121199		4239.50	14963.0	1301.2	141.4

Table-4.3.108 Districtwise Fertilizer Consumption in ajwain and dill seed (2016-17)

Sr. No.	Name of District	Ajwain Area (ha)	Fertilizer Required in Tonne		Dill seed Area (ha)	Fertilizer Required in Tonne	
			Ajwain			Dill seed	
			DAP	Urea		DAP	UREA
1	Ahmedabad	125	5.4	8.7	3065	199.9	321.7
2	Amreli	491	21.3	34.4	0	0.0	0.0
3	Anand	5	0.2	0.3	0	0.0	0.0

Sr. No.	Name of District	Ajwain Area (ha)	Fertilizer Required in Tonne		Dill seed Area (ha)	Fertilizer Required in Tonne	
			Ajwain			Dill seed	
			DAP	Urea		DAP	UREA
4	Aravalli	12	0.5	0.8	0	0.0	0.0
5	Banaskantha	1602	69.7	112.1	97	6.3	10.2
6	Bharuch	7	0.3	0.5	0	0.0	0.0
7	Bhavnagar	61	2.7	4.3	0	0.0	0.0
8	Botad	19	0.8	1.3	0	0.0	0.0
9	ChhotaUdepur	0	0.0	0.0	0	0.0	0.0
10	Dahod	0	0.0	0.0	0	0.0	0.0
11	Dang	0	0.0	0.0	0	0.0	0.0
12	DevbhumiDwarka	137	6.0	9.6	0	0.0	0.0
13	Gandhinagar	0	0.0	0.0	0	0.0	0.0
14	GirSomnath	0	0.0	0.0	0	0.0	0.0
15	Jamnagar	1766	76.8	123.6	35	2.3	3.7
16	Junagadh	0	0.0	0.0	0	0.0	0.0
17	Kheda	0	0.0	0.0	0	0.0	0.0
18	Kutch	0	0.0	0.0	0	0.0	0.0
19	Mahisagar	6	0.3	0.4	0	0.0	0.0
20	Mehsana	611	26.6	42.8	1590	103.7	166.9
21	Morbi	0	0.0	0.0	0	0.0	0.0
22	Narmada	7	0.3	0.5	0	0.0	0.0
23	Navsari	44	1.9	3.1	0	0.0	0.0
24	Panchmahal	0	0.0	0.0	0	0.0	0.0
25	Patan	250	10.9	17.5	12300	802.2	1291.0
26	Porbandar	0	0.0	0.0	0	0.0	0.0
27	Rajkot	0	0.0	0.0	0	0.0	0.0
28	Sabarkantha	22	1.0	1.5	0	0.0	0.0
29	Surat	5	0.2	0.3	0	0.0	0.0
30	Surendranagar	65	2.8	4.5	0	0.0	0.0
31	Tapi	80	3.5	5.6	0	0.0	0.0

Sr. No.	Name of District	Ajwain Area (ha)	Fertilizer Required in Tonne		Dill seed Area (ha)	Fertilizer Required in Tonne	
			Ajwain			Dill seed	
			DAP	Urea		DAP	UREA
32	Vadodara	0	0.0	0.0	0	0.0	0.0
33	Valsad	0	0.0	0.0	0	0.0	0.0
	TOTAL	5315	231.1	371.9	17087.0	1114.4	1793.5

Table-4.3.109 Projection for the Fertilizer Requirement (in '000' T) of Seed Spices Crops in next three years

Name of Fertilizer	Used in 2016-17	2017-18	2018-19	2019-20
DAP	17.0	18.7	20.6	22.7
Urea	33.9	37.3	41.0	45.1
Total	50.9	56.0	61.6	67.8

4.3.3.9 Recommended Interventions for the State with Detailed Action Plan with Costs:

Table-4.3.110 Training Proposed for Capacity Building of Farmers (District-wise) on Different Technologies for Seed Spices Crops
(Phy- No., Fin. –Rs. in Lakh)

Sr No.	Name of Technology to be Transferred	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1.	Seed treatment	654	3.92	654	3.92	654	3.92	1962	11.76
2.	Post Harvest management	287	14.35	287	14.35	287	14.35	861	43.05
3.	IPDM	669	33.45	669	33.45	669	33.45	2007	100.35
4.	INM	654	32.7	654	32.7	654	32.7	1962	98.1
5.	Integrated Weed management	2458	14.75	2458	14.75	2458	14.75	7374	44.25
6.	Varietal adoption	625	31.25	625	31.25	625	31.25	1875	93.75
7.	Organic farming	1680	10.08	1680	10.08	1680	10.08	5040	30.24
	TOTAL	7027	140.5	7027	140.5	7027	140.5	21081	421.5

Cost norms: @600/day/Trainee

**Table-4.3.111 Training Proposed for Capacity Building of Farmers (District-wise)
On Post harvest technologies for Seed Spices**

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	0.5	10	0.5	10	0.5	30	1.50
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	5	0.25	5	0.25	5	0.25	15	0.75
4	Aravalli	5	0.25	5	0.25	5	0.25	15	0.75
5	Banaskantha	25	1.25	25	1.25	25	1.25	75	3.75
6	Bharuch	1	0.05	1	0.05	1	0.05	3	0.15
7	Bhavnagar	2	0.1	2	0.1	2	0.1	6	0.30
8	Botad	5	0.25	5	0.25	5	0.25	15	0.75
9	Chhota Udepur	3	0.15	3	0.15	3	0.15	9	0.45
10	Dahod	2	0.1	2	0.1	2	0.1	6	0.30
11	Dang	2	0.1	2	0.1	2	0.1	6	0.30
12	DevbhumiDwarka	2	0.1	2	0.1	2	0.1	6	0.30
13	Gandhinagar	10	0.5	10	0.5	10	0.5	30	1.50
14	GirSomnath	2	0.1	2	0.1	2	0.1	6	0.30
15	Jamnagar	5	0.25	5	0.25	5	0.25	15	0.75
16	Junagadh	30	1.5	30	1.5	30	1.5	90	4.50
17	Kheda	5	0.25	5	0.25	5	0.25	15	0.75
18	Kutch	20	1	20	1	20	1	60	3.00
19	Mahisagar	5	0.25	5	0.25	5	0.25	15	0.75
20	Mehsana	40	2	40	2	40	2	120	6.00
21	Morbi	3	0.15	3	0.15	3	0.15	9	0.45
22	Narmada	3	0.15	3	0.15	3	0.15	9	0.45
23	Navsari	2	0.1	2	0.1	2	0.1	6	0.30
24	Panchmahals	2	0.1	2	0.1	2	0.1	6	0.30
25	Patan	35	1.75	35	1.75	35	1.75	105	5.25
26	Porbandar	2	0.1	2	0.1	2	0.1	6	0.30
27	Rajkot	2	0.1	2	0.1	2	0.1	6	0.30
28	Sabarkantha	20	1	20	1	20	1	60	3.00
29	Surat	3	0.15	3	0.15	3	0.15	9	0.45
30	Surendranagar	25	1.25	25	1.25	25	1.25	75	3.75
31	Tapi	2	0.1	2	0.1	2	0.1	6	0.30
32	Vadodara	2	0.1	2	0.1	2	0.1	6	0.30
33	Valsad	2	0.1	2	0.1	2	0.1	6	0.30
TOTAL		287	14.35	287	14.35	287	14.35	861	43.05

Cost norms: @600/day/Trainee

**Table-4.3.112 Training Proposed for Capacity Building of Farmers (District-wise)
on IPDM**

(Phy- No., Fin. –Rs. in Lakh)

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	30	1.5	30	1.5	30	1.5	90	4.50
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	5	0.25	5	0.25	5	0.25	15	0.75
4	Aravalli	5	0.25	5	0.25	5	0.25	15	0.75
5	Banaskantha	70	3.5	70	3.5	70	3.5	210	10.50

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
6	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75
7	Bhavnagar	5	0.25	5	0.25	5	0.25	15	0.75
8	Botad	6	0.3	6	0.3	6	0.3	18	0.90
9	ChhotaUdepur	5	0.25	5	0.25	5	0.25	15	0.75
10	Dahod	5	0.25	5	0.25	5	0.25	15	0.75
11	Dang	5	0.25	5	0.25	5	0.25	15	0.75
12	DevbhumiDwarka	5	0.25	5	0.25	5	0.25	15	0.75
13	Gandhinagar	5	0.25	5	0.25	5	0.25	15	0.75
14	GirSomnath	5	0.25	5	0.25	5	0.25	15	0.75
15	Jamnagar	5	0.25	5	0.25	5	0.25	15	0.75
16	Junagadh	60	3	60	3	60	3	180	9.00
17	Kheda	20	1	20	1	20	1	60	3.00
18	Kutch	50	2.5	50	2.5	50	2.5	150	7.50
19	Mahisagar	10	0.5	10	0.5	10	0.5	30	1.50
20	Mehsana	70	3.5	70	3.5	70	3.5	210	10.50
21	Morbi	10	0.5	10	0.5	10	0.5	30	1.50
22	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
23	Navsari	4	0.2	4	0.2	4	0.2	12	0.60
24	Panchmahal	5	0.25	5	0.25	5	0.25	15	0.75
25	Patan	85	4.25	85	4.25	85	4.25	255	12.75
26	Porbandar	10	0.5	10	0.5	10	0.5	30	1.50
27	Rajkot	9	0.45	9	0.45	9	0.45	27	1.35
28	Sabarkantha	60	3	60	3	60	3	180	9.00
29	Surat	10	0.5	10	0.5	10	0.5	30	1.50
30	Surendranagar	80	4	80	4	80	4	240	12.00
31	Tapi	5	0.25	5	0.25	5	0.25	15	0.75
32	Vadodara	5	0.25	5	0.25	5	0.25	15	0.75
33	Valsad	5	0.25	5	0.25	5	0.25	15	0.75
	TOTAL	669	33.45	669	33.45	669	33.45	2007	100.35

Cost Norms: @600/day/Trainee

Table-4.3.113 Training Proposed for Capacity Building of Farmers (Districtwise) on INM (Phy- No., Fin. –Rs. in Lakh)

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	1.00	20	1.00	20	1.00	60	3.00
2	Amreli	10	0.50	10	0.50	10	0.50	30	1.50
3	Anand	10	0.50	10	0.50	10	0.50	30	1.50
4	Aravalli	10	0.50	10	0.50	10	0.50	30	1.50
5	Banaskantha	60	3.00	60	3.00	60	3.00	180	9.00
6	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75
7	Bhavnagar	5	0.25	5	0.25	5	0.25	15	0.75
8	Botad	6	0.30	6	0.30	6	0.30	18	0.90
9	ChhotaUdepur	5	0.25	5	0.25	5	0.25	15	0.75
10	Dahod	5	0.25	5	0.25	5	0.25	15	0.75
11	Dang	5	0.25	5	0.25	5	0.25	15	0.75
12	DevbhumiDwarka	5	0.25	5	0.25	5	0.25	15	0.75

Sr. No	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
13	Gandhinagar	5	0.25	5	0.25	5	0.25	15	0.75
14	GirSomnath	10	0.50	10	0.50	10	0.50	30	1.50
15	Jamnagar	5	0.25	5	0.25	5	0.25	15	0.75
16	Junagadh	50	2.50	50	2.50	50	2.50	150	7.50
17	Kheda	25	1.25	25	1.25	25	1.25	75	3.75
18	Kutch	40	2.00	40	2.00	40	2.00	120	6.00
19	Mahisagar	25	1.25	25	1.25	25	1.25	75	3.75
20	Mehsana	60	3.00	60	3.00	60	3.00	180	9.00
21	Morbi	20	1.00	20	1.00	20	1.00	60	3.00
22	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
23	Navsari	4	0.20	4	0.20	4	0.20	12	0.60
24	Panchmahal	5	0.25	5	0.25	5	0.25	15	0.75
25	Patan	80	4.00	80	4.00	80	4.00	240	12.00
26	Porbandar	20	1.00	20	1.00	20	1.00	60	3.00
27	Rajkot	9	0.45	9	0.45	9	0.45	27	1.35
28	Sabarkantha	50	2.50	50	2.50	50	2.50	150	7.50
29	Surat	10	0.50	10	0.50	10	0.50	30	1.50
30	Surendranagar	70	3.50	70	3.50	70	3.50	210	10.50
31	Tapi	5	0.25	5	0.25	5	0.25	15	0.75
32	Vadodara	5	0.25	5	0.25	5	0.25	15	0.75
33	Valsad	5	0.25	5	0.25	5	0.25	15	0.75
TOTAL		654	32.70	654	32.70	654	32.70	1962	98.10

Cost Norms: @600/day/Trainee

Table-4.3.114 Training Proposed for Capacity Building of Farmers (Districtwise) on Integrated Weed Management

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	18	0.108	18	0.108	18	0.108	54	0.324
2	Amreli	10	0.06	10	0.06	10	0.06	30	0.18
3	Anand	10	0.06	10	0.06	10	0.06	30	0.18
4	Aravalli	10	0.06	10	0.06	10	0.06	30	0.18
5	Banaskantha	50	0.3	50	0.3	50	0.3	150	0.9
6	Bharuch	5	0.03	5	0.03	5	0.03	15	0.09
7	Bhavnagar	5	0.03	5	0.03	5	0.03	15	0.09
8	Botad	6	0.036	6	0.036	6	0.036	18	0.108
9	ChhotaUdepur	5	0.03	5	0.03	5	0.03	15	0.09
10	Dahod	5	0.03	5	0.03	5	0.03	15	0.09
11	Dang	5	0.03	5	0.03	5	0.03	15	0.09
12	DevbhumiDwarka	5	0.03	5	0.03	5	0.03	15	0.09
13	Gandhinagar	5	0.03	5	0.03	5	0.03	15	0.09
14	GirSomnath	10	0.06	10	0.06	10	0.06	30	0.18
15	Jamnagar	5	0.03	5	0.03	5	0.03	15	0.09
16	Junagadh	40	0.24	40	0.24	40	0.24	120	0.72
17	Kheda	25	0.15	25	0.15	25	0.15	75	0.45
18	Kutch	10	0.06	10	0.06	10	0.06	30	0.18
19	Mahisagar	25	0.15	25	0.15	25	0.15	75	0.45

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
20	Mehsana	5	0.03	5	0.03	5	0.03	15	0.09
21	Morbi	20	0.12	20	0.12	20	0.12	60	0.36
22	Narmada	5	0.03	5	0.03	5	0.03	15	0.09
23	Navsari	4	0.024	4	0.024	4	0.024	12	0.072
24	Panchmahals	5	0.03	5	0.03	5	0.03	15	0.09
25	Patan	50	0.3	50	0.3	50	0.3	150	0.9
26	Porbandar	20	0.12	20	0.12	20	0.12	60	0.36
27	Rajkot	9	0.054	9	0.054	9	0.054	27	0.162
28	Sabarkantha	3	0.018	3	0.018	3	0.018	9	0.054
29	Surat	10	0.06	10	0.06	10	0.06	30	0.18
30	Surendranagar	70	0.42	70	0.42	70	0.42	210	1.26
31	Tapi	5	0.03	5	0.03	5	0.03	15	0.09
32	Vadodara	5	0.03	5	0.03	5	0.03	15	0.09
33	Valsad	5	0.03	5	0.03	5	0.03	15	0.09
TOTAL		2458	14.75	2458	14.75	2458	14.75	7374	44.25

Cost Norms: @600/day/Trainee

Table-4.3.115 Training Proposed for Capacity Building of Farmers (Districtwise) on Organic Farming for Seed Spices Crops

(Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	30	0.18	30	0.18	30	0.18	90	0.54
2	Amreli	20	0.12	20	0.12	20	0.12	60	0.36
3	Anand	20	0.12	20	0.12	20	0.12	60	0.36
4	Aravalli	20	0.12	20	0.12	20	0.12	60	0.36
5	Banaskantha	60	0.36	60	0.36	60	0.36	180	1.08
6	Bharuch	10	0.06	10	0.06	10	0.06	30	0.18
7	Bhavnagar	10	0.06	10	0.06	10	0.06	30	0.18
8	Botad	10	0.06	10	0.06	10	0.06	30	0.18
9	ChhotaUdepur	10	0.06	10	0.06	10	0.06	30	0.18
10	Dahod	11	0.066	11	0.066	11	0.066	33	0.198
11	Dang	12	0.072	12	0.072	12	0.072	36	0.216
12	DevbhumiDwarka	15	0.09	15	0.09	15	0.09	45	0.27
13	Gandhinagar	15	0.09	15	0.09	15	0.09	45	0.27
14	GirSomnath	20	0.12	20	0.12	20	0.12	60	0.36
15	Jamnagar	10	0.06	10	0.06	10	0.06	30	0.18
16	Junagadh	60	0.36	60	0.36	60	0.36	180	1.08
17	Kheda	40	0.24	40	0.24	40	0.24	120	0.72
18	Kutch	20	0.12	20	0.12	20	0.12	60	0.36
19	Mahisagar	35	0.21	35	0.21	35	0.21	105	0.63
20	Mehsana	20	0.12	20	0.12	20	0.12	60	0.36
21	Morbi	30	0.18	30	0.18	30	0.18	90	0.54
22	Narmada	20	0.12	20	0.12	20	0.12	60	0.36
23	Navsari	20	0.12	20	0.12	20	0.12	60	0.36
24	Panchmahals	20	0.12	20	0.12	20	0.12	60	0.36
25	Patan	60	0.36	60	0.36	60	0.36	180	1.08
26	Porbandar	40	0.24	40	0.24	40	0.24	120	0.72

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
27	Rajkot	30	0.18	30	0.18	30	0.18	90	0.54
28	Sabarkantha	30	0.18	30	0.18	30	0.18	90	0.54
29	Surat	30	0.18	30	0.18	30	0.18	90	0.54
30	Surendranagar	120	0.72	120	0.72	120	0.72	360	2.16
31	Tapi	20	0.12	20	0.12	20	0.12	60	0.36
32	Vadodara	20	0.12	20	0.12	20	0.12	60	0.36
33	Valsad	30	0.18	30	0.18	30	0.18	90	0.54
TOTAL		1680	10.08	1680	10.08	1680	10.08	5040	30.24

Cost Norms: @600/day/Trainee

Table-4.3.116 Varietal Demonstration of Seed Spices Crops

(Phy- No., Fin –Rs. in lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	0.5	10	0.5	10	0.5	30	1.50
2	Amreli	10	0.5	10	0.5	10	0.5	30	1.50
3	Anand	10	0.5	10	0.5	10	0.5	30	1.50
4	Aravalli	15	0.75	15	0.75	15	0.75	45	2.25
5	Banaskantha	25	1.25	25	1.25	25	1.25	75	3.75
6	Bharuch	10	0.5	10	0.5	10	0.5	30	1.50
7	Bhavnagar	10	0.5	10	0.5	10	0.5	30	1.50
8	Botad	10	0.5	10	0.5	10	0.5	30	1.50
9	ChhotaUdepur	10	0.5	10	0.5	10	0.5	30	1.50
10	Dahod	10	0.5	10	0.5	10	0.5	30	1.50
11	Dang	10	0.5	10	0.5	10	0.5	30	1.50
12	DevbhumiDwarka	10	0.5	10	0.5	10	0.5	30	1.50
13	Gandhinagar	40	2	40	2	40	2	120	6.00
14	GirSomnath	10	0.5	10	0.5	10	0.5	30	1.50
15	Jamnagar	15	0.75	15	0.75	15	0.75	45	2.25
16	Junagadh	20	1	20	1	20	1	60	3.00
17	Kheda	10	0.5	10	0.5	10	0.5	30	1.50
18	Kutch	10	0.5	10	0.5	10	0.5	30	1.50
19	Mahisagar	10	0.5	10	0.5	10	0.5	30	1.50
20	Mehsana	60	3	60	3	60	3	180	9.00
21	Morbi	20	1	20	1	20	1	60	3.00
22	Narmada	10	0.5	10	0.5	10	0.5	30	1.50
23	Navsari	10	0.5	10	0.5	10	0.5	30	1.50
24	Panchmahals	10	0.5	10	0.5	10	0.5	30	1.50
25	Patan	80	4	80	4	80	4	240	12.00
26	Porbandar	20	1	20	1	20	1	60	3.00
27	Rajkot	10	0.5	10	0.5	10	0.5	30	1.50
28	Sabarkantha	50	2.5	50	2.5	50	2.5	150	7.50
29	Surat	10	0.5	10	0.5	10	0.5	30	1.50
30	Surendranagar	60	3	60	3	60	3	180	9.00
31	Tapi	10	0.5	10	0.5	10	0.5	30	1.50
32	Vadodara	10	0.5	10	0.5	10	0.5	30	1.50
33	Valsad	10	0.5	10	0.5	10	0.5	30	1.50
TOTAL		625	31.25	625	31.25	625	31.25	1875	93.75

Cost Norms: @ Rs.5000/demonstration

Table-4.3.117 INM Demonstration of Seed Spices (Phy- No., Fin. –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	1.00	20	1.00	20	1.00	60	3.00
2	Amreli	10	0.50	10	0.50	10	0.50	30	1.50
3	Anand	10	0.50	10	0.50	10	0.50	30	1.50
4	Aravalli	10	0.50	10	0.50	10	0.50	30	1.50
5	Banaskantha	60	3.00	60	3.00	60	3.00	180	9.00
6	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75
7	Bhavnagar	5	0.25	5	0.25	5	0.25	15	0.75
8	Botad	6	0.30	6	0.30	6	0.30	18	0.90
9	ChhotaUdepur	5	0.25	5	0.25	5	0.25	15	0.75
10	Dahod	5	0.25	5	0.25	5	0.25	15	0.75
11	Dang	5	0.25	5	0.25	5	0.25	15	0.75
12	DevbhumiDwarka	5	0.25	5	0.25	5	0.25	15	0.75
13	Gandhinagar	5	0.25	5	0.25	5	0.25	15	0.75
14	GirSomnath	10	0.50	10	0.50	10	0.50	30	1.50
15	Jamnagar	5	0.25	5	0.25	5	0.25	15	0.75
16	Junagadh	50	2.50	50	2.50	50	2.50	150	7.50
17	Kheda	25	1.25	25	1.25	25	1.25	75	3.75
18	Kutch	40	2.00	40	2.00	40	2.00	120	6.00
19	Mahisagar	25	1.25	25	1.25	25	1.25	75	3.75
20	Mehsana	60	3.00	60	3.00	60	3.00	180	9.00
21	Morbi	20	1.00	20	1.00	20	1.00	60	3.00
22	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
23	Navsari	4	0.20	4	0.20	4	0.20	12	0.60
24	Panchmahals	5	0.25	5	0.25	5	0.25	15	0.75
25	Patan	80	4.00	80	4.00	80	4.00	240	12.00
26	Porbandar	20	1.00	20	1.00	20	1.00	60	3.00
27	Rajkot	9	0.45	9	0.45	9	0.45	27	1.35
28	Sabarkantha	50	2.50	50	2.50	50	2.50	150	7.50
29	Surat	10	0.50	10	0.50	10	0.50	30	1.50
30	Surendranagar	70	3.50	70	3.50	70	3.50	210	10.50
31	Tapi	5	0.25	5	0.25	5	0.25	15	0.75
32	Vadodara	5	0.25	5	0.25	5	0.25	15	0.75
33	Valsad	5	0.25	5	0.25	5	0.25	15	0.75
TOTAL		654	32.70	654	32.70	654	32.70	1962	98.10

Cost Norms: @ Rs.5000/demonstration

Table-4.3.118. IPDM Demonstration of Seed Spices (Phy- No., Fin –Rs. in Lakh)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	30	1.5	30	1.5	30	1.5	90	4.50
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	5	0.25	5	0.25	5	0.25	15	0.75
4	Aravalli	5	0.25	5	0.25	5	0.25	15	0.75
5	Banaskantha	70	3.5	70	3.5	70	3.5	210	10.50
6	Bharuch	5	0.25	5	0.25	5	0.25	15	0.75

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
7	Bhavnagar	5	0.25	5	0.25	5	0.25	15	0.75
8	Botad	6	0.3	6	0.3	6	0.3	18	0.90
9	Chhota Udepur	5	0.25	5	0.25	5	0.25	15	0.75
10	Dahod	5	0.25	5	0.25	5	0.25	15	0.75
11	Dang	5	0.25	5	0.25	5	0.25	15	0.75
12	DevbhumiDwarka	5	0.25	5	0.25	5	0.25	15	0.75
13	Gandhinagar	5	0.25	5	0.25	5	0.25	15	0.75
14	GirSomnath	5	0.25	5	0.25	5	0.25	15	0.75
15	Jamnagar	5	0.25	5	0.25	5	0.25	15	0.75
16	Junagadh	60	3	60	3	60	3	180	9.00
17	Kheda	20	1	20	1	20	1	60	3.00
18	Kutch	50	2.5	50	2.5	50	2.5	150	7.50
19	Mahisagar	10	0.5	10	0.5	10	0.5	30	1.50
20	Mehsana	70	3.5	70	3.5	70	3.5	210	10.50
21	Morbi	10	0.5	10	0.5	10	0.5	30	1.50
22	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
23	Navsari	4	0.2	4	0.2	4	0.2	12	0.60
24	Panchmahals	5	0.25	5	0.25	5	0.25	15	0.75
25	Patan	85	4.25	85	4.25	85	4.25	255	12.75
26	Porbandar	10	0.5	10	0.5	10	0.5	30	1.50
27	Rajkot	9	0.45	9	0.45	9	0.45	27	1.35
28	Sabarkantha	60	3	60	3	60	3	180	9.00
29	Surat	10	0.5	10	0.5	10	0.5	30	1.50
30	Surendranagar	80	4	80	4	80	4	240	12.00
31	Tapi	5	0.25	5	0.25	5	0.25	15	0.75
32	Vadodara	5	0.25	5	0.25	5	0.25	15	0.75
33	Valsad	5	0.25	5	0.25	5	0.25	15	0.75
TOTAL		669	33.45	669	33.45	669	33.45	2007	100.35

Cost Norms: @ Rs.5000/demonstration

Table-4.3.119 Seed Treatment Demonstration of Seed Spices

(Phy- No., Fin. –Rs. in lakhs)

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	1	20	1	20	1	60	3.00
2	Amreli	5	0.25	5	0.25	5	0.25	15	0.75
3	Anand	5	0.25	5	0.25	5	0.25	15	0.75
4	Aravalli	5	0.25	5	0.25	5	0.25	15	0.75
5	Banaskantha	50	2.5	50	2.5	50	2.5	150	7.50
6	Bharuch	3	0.15	3	0.15	3	0.15	9	0.45
7	Bhavnagar	2	0.1	2	0.1	2	0.1	6	0.30
8	Botad	5	0.25	5	0.25	5	0.25	15	0.75
9	ChhotaUdepur	4	0.2	4	0.2	4	0.2	12	0.60
10	Dahod	3	0.15	3	0.15	3	0.15	9	0.45
11	Dang	3	0.15	3	0.15	3	0.15	9	0.45
12	DevbhumiDwarka	3	0.15	3	0.15	3	0.15	9	0.45
13	Gandhinagar	3	0.15	3	0.15	3	0.15	9	0.45

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
14	Gir Somnath	3	0.15	3	0.15	3	0.15	9	0.45
15	Jamnagar	3	0.15	3	0.15	3	0.15	9	0.45
16	Junagadh	50	2.5	50	2.5	50	2.5	150	7.50
17	Kheda	10	0.5	10	0.5	10	0.5	30	1.50
18	Kutch	30	1.5	30	1.5	30	1.5	90	4.50
19	Mahisagar	5	0.25	5	0.25	5	0.25	15	0.75
20	Mehsana	50	2.5	50	2.5	50	2.5	150	7.50
21	Morbi	5	0.25	5	0.25	5	0.25	15	0.75
22	Narmada	5	0.25	5	0.25	5	0.25	15	0.75
23	Navsari	4	0.2	4	0.2	4	0.2	12	0.60
24	Panchmahal	5	0.25	5	0.25	5	0.25	15	0.75
25	Patan	60	3	60	3	60	3	180	9.00
26	Porbandar	5	0.25	5	0.25	5	0.25	15	0.75
27	Rajkot	5	0.25	5	0.25	5	0.25	15	0.75
28	Sabarkantha	40	2	40	2	40	2	120	6.00
29	Surat	5	0.25	5	0.25	5	0.25	15	0.75
30	Surendranagar	40	2	40	2	40	2	120	6.00
31	Tapi	4	0.2	4	0.2	4	0.2	12	0.60
32	Vadodara	4	0.2	4	0.2	4	0.2	12	0.60
33	Valsad	4	0.2	4	0.2	4	0.2	12	0.60
TOTAL		448	22.4	448	22.4	448	22.4	1344	67.20

Cost Norms: @ Rs.5000/demonstration

Table-4.3.120 Summary of Demonstration of Seed Spices (Phy- No., Fin. –Rs. in Lakh)

Sr. No.	Activity	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Varietal demonstration	625	31.25	625	31.25	625	31.25	1875	93.75
2	INM demonstration	654	32.70	654	32.70	654	32.70	1962	98.10
3	IPDM demonstration	669	33.45	669	33.45	669	33.45	2007	100.35
4	Seed treatment demonstration	448	22.4	448	22.4	448	22.4	1344	67.20
TOTAL		2396	119.8	2396	119.8	2396	119.8	7188	359.4

Cost Norms: @ Rs.5000/demonstration

4.3.3.10 Researchable issues:

- To deal with new insect, pest and diseases found in newly released varieties
- Small equipments so as to reduce drudgery of small and marginal farmers
- Need to specify changes agronomical practices due to weather effects
- Market research combined with weather changes for deciding the crop area for a season
- Research need on post harvest studies
- Development of area specific organic modules
- Need to develop crop production and protection technologies for conserved soil moisture condition.

4.3.3.11 Innovative schemes/project: One

(1) Title of the Project: VALUE ENHANCEMENT OF SEED SPICES THROUGH ORGANIC CULTIVATION

Background/Justification:

Organic farming holds promise under such circumstances. Organics not only supply organic carbon, but also supply most of the plants nutrients in available form. They also improve the physical, biological and chemical properties of the soil. It has also been reported that crop grown through organics are rich in quality and taste as well as they can tolerate drought conditions better in comparison to chemical farming. Reports suggest that water requirement in organic farming is also low. Microbes help in sustaining the bio-dynamics of the soil. Seed dressing of spice crops with Azatobacter and PSB saves 25 and 50 per cent nitrogen and phosphorus, respectively. Awareness in health conscious increased the demand of organic products at national as well as international market. The organics will induce natural sustenance cycles of microbes that would play viberant role in checking cyclic damages triggered by intensive agriculture.

Objectives:

- i. To study the comparative yield and quality of seed spices in organic and conventional modules.
- ii. To study comparative incidences of diseases and pests in organic and conventional modules and their impact on quality and yield of seed spices.
- iii. To study the comparative alteration in physical and chemical properties of soil by employing organic and conventional modules
- iv. To work out economics of different modules.
- v. To create awareness among the farmers for organic cultivation of seed spices.

Table-4.3.121 Budget:

Sr. No.	Item	Year - wise requirement (Rs. in lakh)					Total (Rs. in lakh)
		I	II	III	IV	V	
1	Recurring Contingency						
	(i) Operational Cost	3.500	3.500	3.500	3.500	3.500	17.50
	(ii) Contractual Services	5.976	5.976	5.976	5.976	5.976	29.88
	Total	9.476	9.476	9.476	9.476	9.476	47.38

4.3.4 AGROFORESTRY:

4.3.4.1 Background:

Encouragement of urban forestry program is also important for improving the urban environment and aesthetic values. Urban forestry is one of the major tasks of Social forestry wing of state forest department working on improving tree cover in non-forest areas of urban and semi-urban areas of Gujarat. The overall result shows that there is an increase in green forest cover (TOF) in the state.

The science of agroforestry, integration of trees/shrubs with agricultural crops, has been practiced since time immemorial. A historic agroforestry practice such as shifting cultivation is one of the kinds of agroforestry systems followed in India. Agroforestry has potential to address the problems of food insecurity, especially in developing countries on one side and conservation of natural resources on the other. The diversifying nature of this system allows farmers to make the best use of their land, by maximizing the crop yields as well as diversify income and helps in increasing resilience to the global threat of climate change.

As per India State Forest Report, 2013, data, it is estimated that total tree green cover in the agroforestry system of the country is around 111,554 sq km representing 3.39 % of countries geographical area. Maharashtra (11,806 sq km), Gujarat (11,591 sq km) and Rajasthan (8373 sq km) are top-ranking states in tree green cover in agroforestry. The maximum growing stock in agroforestry is recorded in Maharashtra (98.95 m.m³), Andhra Pradesh (92.29 m.m³) and Gujarat (81.98 m.m³). Similarly, carbon stock potential of Gujarat is 26.41 m. tonne in agroforestry land-use system. Considering a number of stems in Agroforestry, *Mangifera indica* has recorded maximum stems of 9.25%, followed by *Areca catechu* (7.26%), *Cocos nucifera* (5.6%), *Azadirachta indica* (5.59%), *Acacia nilotica* (4.09%), *Butea monosperma* (3.54%), *Eucalyptus species*. (3.19%) and *Pinus roxburghii* (3.12%). The overall picture shows that there is an ample scope for improving green cover in the agricultural land through agroforestry approaches.

Vision:

Improve the productivity; employment, income and livelihood opportunities of rural households, especially of the smallholder farmers through agroforestry and to meet the regular demand of timber, food, fuel, fodder, and other forest products through agroforestry and to protect the environment, soil and water conservation through wind or shelterbelts.

Mission:

Improvement of farm productivity, tree crop diversity and farm income through agroforestry practices in the farmland to ensures the requirement of timber, food, fuel, fodder, and other forest products to the farming community and rural households. Protection of farm through agroforestry plantation like windbreak, shelter belt, control of soil erosion through bund plantation, soil enrichment through planting nitrogen-fixing trees and improving the green cover and carbon sequestration potential. To meet the raw material requirements of wood-based industries so that import of wood and wood products from foreign can be reduced.

4.3.4.2 Crop/Area Issues of Agroforestry:

- Most of the tree species are long rotation crops requiring a minimum of 5-60 years, depending upon the species. Short rotation species are now preferred by the farmers for agroforestry
- Lack of wood-based industries to utilize agroforestry produce
- Lack of local market and irregular demand for timber and nontimber forest produce including medicinal and aromatic plants

- The restrictive regulatory regime, *i.e.*, restrictions imposed by the state Governments on harvesting and transportation of agroforestry produce
- Information gap regarding the suitability of economically important tree species in different site situations like salt-affected areas, coastal area, marshy areas and others

4.3.4.3 Priority for Comprehensive Agroforestry Plantation:

- Selection and multiplication of high yielding genotypes for agroforestry plantations
- Implication and improvement of industrial agroforestry concept
- Improvement of the domestic and national market for agroforestry produce
- Storage and processing facilities for agroforestry produce
- Immediate need of liberalization of restrictive regulations for harvesting and transportation of agroforestry produce

4.3.4.4 Current Status of Area, Production and Productivity of Forest and Agroforest:

Total reporting area for land utilization of Gujarat is 19,069,000 ha with a forest area of 1,834,000 ha (9.62%) and 851,000 ha (4.46%) area of permanent pasture and other grazing lands. Total forest cover of the State is 14,757 sq km including tree outside the forest area), which contributes 7.52 percent of the State's geographical area. The highest forest cover is 77.5 percent in The Dangs district, followed by Narmada (34.2%; ISFR, 2017).

Total tree green cover in the agroforestry system of the country is around 111,554 sq km representing 3.39 % of countries geographical area. Maharashtra (11,806 sq km), Gujarat (11,591 sq km) and Rajasthan (8373 sq km) occupy top rank in tree green cover in agroforestry. The maximum growing stock in agroforestry is recorded in Maharashtra (98.95 m.m³), Andhra Pradesh (92.29 m.m³) and Gujarat (81.98 m.m³). Similarly, carbon stock potential of Gujarat is 26.41 m. tonnes in agroforestry land-use system. Details of District-wise forest cover of Gujarat during 2016-17 are given in Table 4.3.122.

Table-4.3.122 District-wise Forest area of Gujarat during 2016-17 [Source: GFD, 2017]

Districts	Geographical area (Sq. Km)	Forest Area (Sq. Km)	% Forest area to State's geographical area
Ahmedabad	7170	106.82	1.49
Amreli	7397	339.93	4.60
Anand	2941	0.00	0.00
Aravalli	3210	448.57	13.97
Banaskantha	10757	1107.20	10.29
Bharuch	6527	245.85	3.77
Bhavnagar	8335	267.79	3.21
Botad	2563	20.88	0.81
Chhotaudepur	3436	741.54	21.58
Dahod	3646	952.52	26.13
Devbhumi Dwarka	5684	517.45	9.10
Gandhinagar	2163	24.96	1.63
Gir Somnath	3754	189.00	5.03
Jamnagar	8441	1077.60	12.77
Junagadh	5092	1572.40	30.88

Districts	Geographical area (Sq. Km)	Forest Area (Sq. Km)	% Forest area to State's geographical area
Kachchh	45652	5599.40	12.27
Kheda	3667	21.05	0.57
Mahesana (Mehsana)	4384	71.52	1.63
Mahisagar	2546	619.45	24.33
Morbi	4871	302.83	6.22
Narmada	2755	1142.90	41.48
Navsari	2209	274.69	12.44
Panchmahal	3226	685.76	21.26
Patan	5730	484.64	8.46
Porbandar	2298	246.90	10.74
Rajkot	7550	171.56	2.27
Sabarkantha	4180	815.03	19.50
Surat	4418	496.72	11.24
Surendranagar	9271	474.68	5.12
Tapi	3239	907.61	28.02
The Dangs	1764	1034.68	58.66
Vadodara	4113	0.00	0.00
Valsad	3035	937.53	30.89
Total	196024.00	21899.46	11.17

Ref: GFD (2017) Gujarat Forest Statistics-2016-17. Gujarat Forest Department, Gandhinagar

4.3.4.5 Major Tree Species of Gujarat:

The forest areas of Gujarat are unevenly distributed. The major concentration of forests is found all along the eastern border of the state and the hilly portion of Saurashtra. The forests are found mainly in the districts of Dangs, Valsad, Surat, Narmada, Navsari, Junagadh and Sabarkantha. In Gujarat, following four major forest types were recorded: 1. Tropical Moist Deciduous Forest, 2. Tropical Dry Deciduous Forest, 3. Northern Tropical Thorn Forest and Littoral and Swamp Forest. As per Forest Department report, there are about 410 forest tree species in Gujarat. Out of which, 202 tree species are mostly grown in natural forests of the state and remaining species are introduced by the plantation activities of horticulture, forestry and gardening. Data show that, out of 202 indigenous species, 19 species are categorized as endangered and 13 tree species as critically endangered. List of priority tree species of Gujarat is given in Table.

Considering agroforestry plantations, *Mangifera indica*, *Acacia catechu*, *Azadirachta indica*, *Acacia nilotica*, *Butea monosperma*, *Eucalyptus sp.* *Tectona grandis*, *Ailanthus excelsa*, *Prosopis sp.*, *Leucaena leucocephala*, etc., are major species grown on farm bunds as well as the open area of Agricultural lands. Details of growing stock in forest area and tree outside the forest area, bamboo cover and total number of culms estimated in Gujarat is given in table.

As per a recent study conducted in Navsari Agricultural University shows that there are five dominant agroforestry systems such as Agri-horticulture, home garden, Agri-Silvi-horticulture, Agri-Silvi and Horti-Pasture systems have been identified in south Gujarat in general and Navsari district in particular. In Agri-Horti system, farmers mostly preferred mango+rice, where in Agri-Silvi-Horti system, brinjal/okra + mango+teak. In the case of Agri-

Horti system, farmers mostly growing sugarcane + teak and in the case of Horti-Pasture system, grass + sapota is practicing. Details of trees, crops grown in different systems of agroforestry are given in table 4.3.123.

Table - 4.3.123 Major Tree Species of Gujarat (Tree Outside Forest)

Sl. No.	Common Name	Scientific Name
1.	Israel baval	<i>Acacia tortalis</i>
2.	Khair	<i>Acacia catechu</i>
3.	Deshi baval	<i>Acacia nilotica</i>
4.	Gorad	<i>Acacia sengal</i>
5.	Bangali baval	<i>Acacia auriculiformis</i>
6.	Chikoo	<i>Acrus sapota</i>
7.	Ardusa	<i>Alanthus excelsa</i>
8.	Sitafal	<i>Annona squamosa</i>
9.	Limda (Neem)	<i>Azadirachta indica</i>
10.	Khakharo	<i>Butea monosperma</i>
11.	Sharu	<i>Casurina equisetifolia</i>
12.	Limboo	<i>Citrus aurantium</i>
13.	Nariyali	<i>Cocus nucifera</i>
14.	Nilgiri	<i>Eucalyptus spp.</i>
15.	Sevan	<i>Gmelina arborea</i>
16.	Kanji	<i>Holoptelia integrifolia</i>
17.	Subaval	<i>Leucaena leucocephala</i>
18.	Mango	<i>Mangifera indica</i>
19.	Sargvo	<i>Moringa oleifera</i>
20.	Peltroforum	<i>Peltroforum ferruginieum</i>
21.	Goras amlı	<i>Pithecellobium dulce</i>
22.	Karanj	<i>Pongamia pinnata</i>
23.	Gando baval	<i>Prosopis chilensis</i>
24.	Khijdo/sami	<i>Prosopis cineraria</i>
25.	Piloo mithijar	<i>Salvadora oleoides</i>
26.	Piloo kharjar	<i>Salvadora persica</i>
27.	Jambu	<i>Syzygium cumini</i>
28.	Khati amlı	<i>Tamarindus indica</i>
29.	Teak	<i>Tectona grandis</i>
30.	Bordi	<i>Zizyaphus maunitiana</i>

Singh, H.S. (2013), Tree wealth in the non-forest areas (NFA) of Gujarat

Table 4.3.124 Growing stock and carbon stock of Gujarat

Sl. No.	Particulars	Growing stock	% contribution to country
1.	Growing stock in Recorded forest area	52.030 m cum	1.23
2.	Growing stock in Tree Out Side the Forest (TOF)	113.992 m cum	7.11
3.	Potential production of Industrial wood from TOF	6.47 m cum	8.68

4.	Natural Bamboo growing area	3544 sq km	2.26
5.	Total number of bamboo culms	485 million	1.73
6.	Carbon stock of forests	110.69 million tons	1.56

Table 4.3.125 Check tree species and major agricultural crops are grown in different agroforestry systems in Navsari, South Gujarat

Agroforestry System	Trees	Agricultural Crops	Crop Season
Agri-horticultural system (AHS)	<i>Mangifera indica</i>	<i>Oryza sativa</i>	Kharif
		<i>Dalichos lablab</i>	Rabi
		<i>Cicer arietinum</i>	Rabi
Home-Garden System (HGS)	<i>Tectona grandis</i>	<i>Cymbopogon species</i>	Kharif
	<i>Manilkara zapota</i>	<i>Ocimum species</i>	Kharif
	<i>Citrus species</i>	<i>Allium sativum</i>	Kharif
	<i>Annona reticulata</i>	<i>Coriandrum sativum</i>	Kharif/Rabi
	<i>Moringa oleifera</i>	<i>Colocasia e sculenta</i>	Kharif
	<i>Artocarpus heterophyllus</i>	<i>Musa species</i>	Kharif
	<i>Cordia dichotoma</i>	<i>Carica papaya</i>	Rabi
	<i>Mangifera indica</i>	<i>Capsicum annum</i>	Rabi
	<i>Tamarindus indica</i>	<i>Curcuma longa</i>	Kharif
	<i>Averrhoa carambola</i>	<i>Vigna unguiculata</i>	Rabi
	<i>Cocus nucifera</i>	<i>Trigonella foenum – graecum</i>	Rabi
		<i>Cajanus cajan</i>	Kharif
		<i>Spinacia oleracea</i>	Rabi
	<i>Cyamopsis tetragonoloba</i>	Rabi	
Agri-Horti-Silvicultural System (ASHS)	<i>Tectona grandis</i>	<i>Abelmoschus esculentus</i>	Kharif
	<i>M. indica</i>	<i>Solanum melongena</i>	Kharif
		<i>Solanum lycopersicum</i>	Rabi
Agri-Silvicultural system (ASS)	<i>T. grandis</i> (Boundary plantation)	<i>Saccharum officinarum</i>	Rabi
Horti-Pastoral System (HPS)	<i>Manilkara zapota</i>	<i>Sorghum species</i>	Kharif

4.3.4.6 Input Management:

Production of quality planting materials of multi-purpose tree species is very essential for agroforestry plantations. Some of the horticultural nurseries are also raising horticultural tree species as well as medicinal plants for commercial plantations. Therefore, training to the foresters and farmers regarding agroforestry plantations and nurseries, clonal plantations, etc are proposed in the SAP.

4.3.4.7 Constraints Analysis and Recommended Interventions for Yield Gaps Analysis:

Various constraints associated with low productivity or biomass of tree species in agroforestry are as follows:

- Mostly trees are grown on farm bunds, culturable wastelands or open areas or boundaries
- No proper care and silvicultural management
- No proper choice of species to specific site condition
- No high yielding genotypes, except in few short rotation tree species like eucalyptus, casuarinas, are available
- Lack of initial care at seedling to pole stage and improper canopy management
- Type of quality seedlings planted and season of planting are also responsible for low productivity
- Unspecified season or time for harvesting/ felling of trees and lack of market information
- Nonapplication of fertilizer, manure, irrigation, *etc.*
- Lack of tree-crop interaction studies
- Lack of information regarding volume, yield, biomass of tree species grown in agroforestry condition. However, the decrease in the forest cover could be due to deforestation, forest fire, encroachment, *etc.*

Various constraints, strategies and technological interventions to improve the production or yield of agroforestry produces are given in below Tables. In view of doubling the farm income, roadmap for enhancement of farm production through Agroforestry is described in Table 4.3.128.

Table-4.3.126 Sustainability Issues and Gap Analysis of Productivity of Agroforestry and its Products

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
i	Lesser Adoption of Agroforestry system	Lack of knowledge regarding agroforestry and tree-crop interactions	To popularize agroforestry practices in the agricultural and horticultural field	Training and demonstration of agroforestry for enhancement of farm productive potential as well as to create awareness regarding ecological benefits of trees on farmlands	Green cover, carbon sequestration and tree products from agricultural land	Improvement of farm income and diverse farm products through agroforestry
ii	Lesser known of forest crops	Lack of knowledge on the selection of suitable tree species for agroforestry for different regions	To provide extension bulletins/ educations for proper selection of tree species region wise	Training and demonstration regarding the choice of species for various agroforestry systems	Proper selection of species for higher productivity	Enhanced productivity and economic returns through agroforestry
lii	Nonavailability of quality clonal planting materials	Research on clonal selection and multiplication of high yielding genotypes of commercial agroforestry species	To strengthen the research on tree improvement in terms of selection and multiplication of genotypes	Initiation of research projects in Forest Department, Research Institutes or Agricultural Universities and training/ demonstration to foresters for production of clonal materials	Reduction of rotation and higher yield	Increased production through clonal materials

Sr. No.	Gap	Factors/Constraints Leading to Gaps	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
iv	Lack of silvicultural management of forest crops	Information available on different operation and time of cultural operations are scanty	To provide knowledge on different silvicultural operations and time of operations to be taken for tree species in agroforestry through extension bulletins	Development of package of practices for the growing of commercial tree species in an agroforestry system	Higher productivity	More yield and early returns in shorter time span
v	Need of Agroforestry consortium	Lack of information on wood-based industries in terms of demand and supply and market of agroforestry produce Tree grower associations/co-operatives	A consortium of wood-based industries and agroforestry practitioners to strengthen the linkages	Creation of industrial agroforestry chain among farmers, industries, stakeholders, policymakers through workshop or training programme Linking tree grower associations/co-operatives	Establishment of proper market for agroforestry produce Development of Agroforestry chain	Generation of regular and sustained income to the farmers, regular supply of raw materials to the wood-based industries

Table-4.3.127 Bridging the Gaps for Realizing the Agroforestry Vision

Activity/Crop/Commodity	Activity Output Matrix			
	Issues	Mode of Action	Collaborator/Target	Cost
1. Development of agroforestry models in different regions	There is a wide climatic situation in the state. Therefore, agroclimatic zone wise suitable agroforestry system and suitable tree-crop are needs to be developed	Development of suitable agroforestry systems/ models among agroclimatic zones of Gujarat for higher productivity and farm income along with ecological benefits	State Agricultural Universities in collaboration with Forest Department and NGOs	Long-term Research and Extension projects are required
2. Production of quality planting material and social forestry action plan	To improve the productive potential and reduction of rotation age of forest crops in agroforestry	Forest department has already initiated in the production of quality clonal material of few fast-growing species in some forest nurseries. Therefore, there is a need to replicate the same in other high-tech nurseries to reach the planting material to various places	Forest department, farmers, horticulture department and Agricultural Universities	Projects proposed
3. Forestry extension	Poor information among farmers regarding agroforestry practices and lack of collaboration among forest department and farmers	Training and demonstration regarding agroforestry plantation and quality planting materials and silvicultural practices	Forest department, farmers, horticulture department and Agricultural Universities	Demonstration, training proposed for forestry farmers and forest staff

Table 4.3.128 Road map for enhancement of farm production through Agroforestry

Challenges	Action	Implementation
1. To increase tree cover in the agricultural land through Agroforestry plantation for higher productivity and climate change mitigation	<ul style="list-style-type: none"> • Every year six districts may be targeted for development of agroforestry plantation in agricultural land 	
	<ul style="list-style-type: none"> a. Production of quality planting stock/clonal materials of Forest species through Modern Forest Nurseries 	<ul style="list-style-type: none"> • Gujarat Forest Department for the supply of quality planting materials • Agricultural Universities/AFRI, Jodhpur/GFD for technical information
	<ul style="list-style-type: none"> • Production of quality planting stock/clonal materials of Medicinal and Aromatic trees: Sandal, Arjun, Ashoka, Harad, Beheda, Amla, Eucalyptus citradora, neem, Tetu and other important species 	<ul style="list-style-type: none"> • Gujarat Forest Department/ Horticulture Nursery/ Certified nursery for the supply of quality planting materials • Agricultural Universities/ DMAPR, Anand/line departments for technical information
2. Lack of Market Facilities for agroforestry produces	<ul style="list-style-type: none"> • The need of Market and marketing Channel for sale of products of Medicinal and Aromatic trees, Non-Timber Forest Products (like APMC) • Need Market Information System 	<ul style="list-style-type: none"> • GoG • Gujarat Forest Corporation/ TRIFED -Tribal Co-operative Marketing Development Federation of India/ Horticulture department/ • State Medicinal Plant Board
3. Lack of Regulatory mechanism for agroforestry produces	<ul style="list-style-type: none"> • Need of simple regulatory mechanism to regulate the harvesting and transit of wood, timber and NTFP products from Agroforestry land use system (permission for felling and transport of Nilgiri, Suru, Subabul and other few species is exempted; however, for other species such facilities needs to be worked out) 	<ul style="list-style-type: none"> • GoG • Gujarat Forest Department/Gujarat Forest Corporation
4. Lack of training and capacity building for agroforestry plantation	<ul style="list-style-type: none"> • There is a need of training for Farmers and Functionaries of Panchayati Raj Institutions for the promotion of Agroforestry plantations in agriculture land 	<ul style="list-style-type: none"> • Forest Department/ Horticulture department/Agriculture department/Training and Extension department
5. Lack of Incentive & Insurance for Agroforestry trees	<ul style="list-style-type: none"> • There is a need of mechanism of incentives; credit facilities and Tree insurance for the promotion of agroforestry plantation in Gujarat 	<ul style="list-style-type: none"> • GoG/NABARD • Co-operative Banks/ societies • State Bamboo Mission/State Medicinal Plant Board
	<ul style="list-style-type: none"> • Linkage of Agroforestry with carbon credit scheme 	<ul style="list-style-type: none"> • GoG/Gol/MoEFCC

4.3.4.8 Recommended interventions for the state with detail Action plan with cost

- 4.1 Training proposed for capacity building of field foresters/Guards. (Rs.900/day /person)
- 4.2 Training proposed for capacity building of tree farmers (District wise) on different technologies. (Rs.600/day /farmer)
- 4.3 Demonstration of agroforestry practices (Physical and financial- 2017-18 to 2019-20) (Rs.4000/demonstration)
- 4.4 FFSc for agroforestry/social forestry activities (Forest nurseries/ Clonal nurseries and/or cluster approach for forest/tree product development & marketing) (Rs.29000/FFSs)
- 4.5 Group formation for agroforestry/social forestry activities (Forest nurseries/ Clonal nurseries and/or cluster approach for forest/tree product development & marketing) (Rs.29000/Group formation)
- 4.6 Supply of tall seedlings of timber trees/NTFPS/Fruit trees/Fodder trees (clones/grafted plants) for farm field, agroforestry, windbreak, roadside plantation, etc., (Phy= Seedlings number in lakh; Finance=Avg. Rs.25 per seedlings)

Table 4.3.129 Training proposed for capacity building of field foresters/Guards in Gujarat. (Rs.900/day /person)

District & Forest Divison/ SAUs	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	1	0.18	1	0.18	1	0.18	3	0.54
Amreli	1	0.18	1	0.18	1	0.18	3	0.54
Anand	1	0.18	1	0.18	1	0.18	3	0.54
Banaskantha (Palanpur +AICRP-AF, SK Nagar)	2	0.36	2	0.36	2	0.36	6	1.08
Bharuch	1	0.18	1	0.18	1	0.18	3	0.54
Bhavnagar	1	0.18	1	0.18	1	0.18	3	0.54
Dahod	1	0.18	1	0.18	1	0.18	3	0.54
Jamnagar	1	0.18	1	0.18	1	0.18	3	0.54
Junagadh	1	0.18	1	0.18	1	0.18	3	0.54
Kheda (Nadiyad)	1	0.18	1	0.18	1	0.18	3	0.54
Mahesana	1	0.18	1	0.18	1	0.18	3	0.54
Narmada (Mehsana)	1	0.18	1	0.18	1	0.18	3	0.54
Navsari (Navsari FD+ CoF-NAU)	2	0.36	2	0.36	2	0.36	6	1.08

District & Forest Divison/ SAUs	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Panchmahal (Godra)	1	0.18	1	0.18	1	0.18	3	0.54
Rajkot	1	0.18	1	0.18	1	0.18	3	0.54
Sabarkantha (Himmatnagar)	1	0.18	1	0.18	1	0.18	3	0.54
Surat	1	0.18	1	0.18	1	0.18	3	0.54
Surendranagar	1	0.18	1	0.18	1	0.18	3	0.54
Vadodara	1	0.18	1	0.18	1	0.18	3	0.54
Valsad	1	0.18	1	0.18	1	0.18	3	0.54
Total	22	3.96	22	3.96	22	3.96	66	11.88

Table 4.3.130 Training proposed for capacity building of tree farmers (District wise) on different technologies in Gujarat.
(Rs.600/day /farmer)

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	2	0.30	2	0.30	2	0.30	6	0.90
Amreli	2	0.30	2	0.30	2	0.30	6	0.90
Anand	4	0.60	4	0.60	4	0.60	12	1.80
Aravalli	2	0.30	2	0.30	2	0.30	6	0.90
Banaskantha	4	0.60	4	0.60	4	0.60	12	1.80
Bharuch	2	0.30	2	0.30	2	0.30	6	0.90
Bhavnagar	2	0.30	2	0.30	2	0.30	6	0.90
Botad	2	0.30	2	0.30	2	0.30	6	0.90
Chhotaudepur	2	0.30	2	0.30	2	0.30	6	0.90
Dahod	4	0.60	4	0.60	4	0.60	12	1.80
Devbhumi Dwarka	2	0.30	2	0.30	2	0.30	6	0.90
Gandhinagar	2	0.30	2	0.30	2	0.30	6	0.90
Gir Somnath	2	0.30	2	0.30	2	0.30	6	0.90

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Jamnagar	2	0.30	2	0.30	2	0.30	6	0.90
Junagadh	4	0.60	4	0.60	4	0.60	12	1.80
Kachchh	2	0.30	2	0.30	2	0.30	6	0.90
Kheda	2	0.30	2	0.30	2	0.30	6	0.90
Mahesana (Mehsana)	2	0.30	2	0.30	2	0.30	6	0.90
Mahisagar	2	0.30	2	0.30	2	0.30	6	0.90
Morbi	2	0.30	2	0.30	2	0.30	6	0.90
Narmada	4	0.60	4	0.60	4	0.60	12	1.80
Navsari	4	0.60	4	0.60	4	0.60	12	1.80
Panchmahal	2	0.30	2	0.30	2	0.30	6	0.90
Patan	2	0.30	2	0.30	2	0.30	6	0.90
Porbandar	2	0.30	2	0.30	2	0.30	6	0.90
Rajkot	2	0.30	2	0.30	2	0.30	6	0.90
Sabarkantha	2	0.30	2	0.30	2	0.30	6	0.90
Surat	4	0.60	4	0.60	4	0.60	12	1.80
Surendranagar	2	0.30	2	0.30	2	0.30	6	0.90
Tapi	4	0.60	4	0.60	4	0.60	12	1.80
The Dangs	4	0.60	4	0.60	4	0.60	12	1.80
Vadodara	2	0.30	2	0.30	2	0.30	6	0.90
Valsad	4	0.60	4	0.60	4	0.60	12	1.80
Total	86	12.90	86	12.90	86	12.90	258	38.70

Table 4.3.131 Demonstration of agroforestry practices including Social Forestry/Forest Nursery/Apiculture (Physical and financial- 2017-18 to 2019-20)
(Rs.4000/demonstration)

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	4	0.16	4	0.16	4	0.16	12	0.48
Amreli	4	0.16	4	0.16	4	0.16	12	0.48
Anand	4	0.16	4	0.16	4	0.16	12	0.48
Aravalli	4	0.16	4	0.16	4	0.16	12	0.48
Banaskantha	4	0.16	4	0.16	4	0.16	12	0.48
Bharuch	4	0.16	4	0.16	4	0.16	12	0.48
Bhavnagar	4	0.16	4	0.16	4	0.16	12	0.48
Botad	4	0.16	4	0.16	4	0.16	12	0.48
Chhotaudepur	4	0.16	4	0.16	4	0.16	12	0.48
Dahod	4	0.16	4	0.16	4	0.16	12	0.48
Devbhumi Dwarka	4	0.16	4	0.16	4	0.16	12	0.48
Gandhinagar	4	0.16	4	0.16	4	0.16	12	0.48
Gir Somnath	4	0.16	4	0.16	4	0.16	12	0.48
Jamnagar	4	0.16	4	0.16	4	0.16	12	0.48
Junagadh	4	0.16	4	0.16	4	0.16	12	0.48
Kachchh	4	0.16	4	0.16	4	0.16	12	0.48
Kheda	4	0.16	4	0.16	4	0.16	12	0.48
Mahesana (Mehsana)	4	0.16	4	0.16	4	0.16	12	0.48
Mahisagar	4	0.16	4	0.16	4	0.16	12	0.48
Morbi	4	0.16	4	0.16	4	0.16	12	0.48
Narmada	4	0.16	4	0.16	4	0.16	12	0.48
Navsari	4	0.16	4	0.16	4	0.16	12	0.48

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Panchmahal	4	0.16	4	0.16	4	0.16	12	0.48
Patan	4	0.16	4	0.16	4	0.16	12	0.48
Porbandar	4	0.16	4	0.16	4	0.16	12	0.48
Rajkot	4	0.16	4	0.16	4	0.16	12	0.48
Sabarkantha	4	0.16	4	0.16	4	0.16	12	0.48
Surat	4	0.16	4	0.16	4	0.16	12	0.48
Surendranagar	4	0.16	4	0.16	4	0.16	12	0.48
Tapi	4	0.16	4	0.16	4	0.16	12	0.48
The Dangs	4	0.16	4	0.16	4	0.16	12	0.48
Vadodara	4	0.16	4	0.16	4	0.16	12	0.48
Valsad	4	0.16	4	0.16	4	0.16	12	0.48
Total	132	5.28	132	5.28	132	5.28	396	15.84

Table 4.3.132 FFSc for agroforestry/social forestry activities (Forest nurseries/ Clonal nurseries and/or cluster approach for forest/tree product development & marketing) (Rs.29000/FFSs)

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	1	0.29	1	0.29	1	0.29	3	0.87
Amreli	1	0.29	1	0.29	1	0.29	3	0.87
Anand	1	0.29	1	0.29	1	0.29	3	0.87
Aravalli	1	0.29	1	0.29	1	0.29	3	0.87
Banaskantha	1	0.29	1	0.29	1	0.29	3	0.87
Bharuch	1	0.29	1	0.29	1	0.29	3	0.87
Bhavnagar	1	0.29	1	0.29	1	0.29	3	0.87
Botad	1	0.29	1	0.29	1	0.29	3	0.87

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Chhotaudepur	1	0.29	1	0.29	1	0.29	3	0.87
Dahod	1	0.29	1	0.29	1	0.29	3	0.87
Devbhumi Dwarka	1	0.29	1	0.29	1	0.29	3	0.87
Gandhinagar	1	0.29	1	0.29	1	0.29	3	0.87
Gir Somnath	1	0.29	1	0.29	1	0.29	3	0.87
Jamnagar	1	0.29	1	0.29	1	0.29	3	0.87
Junagadh	1	0.29	1	0.29	1	0.29	3	0.87
Kachchh	1	0.29	1	0.29	1	0.29	3	0.87
Kheda	1	0.29	1	0.29	1	0.29	3	0.87
Mahesana (Mehsana)	1	0.29	1	0.29	1	0.29	3	0.87
Mahisagar	1	0.29	1	0.29	1	0.29	3	0.87
Morbi	1	0.29	1	0.29	1	0.29	3	0.87
Narmada	1	0.29	1	0.29	1	0.29	3	0.87
Navsari	1	0.29	1	0.29	1	0.29	3	0.87
Panchmahal	1	0.29	1	0.29	1	0.29	3	0.87
Patan	1	0.29	1	0.29	1	0.29	3	0.87
Porbandar	1	0.29	1	0.29	1	0.29	3	0.87
Rajkot	1	0.29	1	0.29	1	0.29	3	0.87
Sabarkantha	1	0.29	1	0.29	1	0.29	3	0.87
Surat	1	0.29	1	0.29	1	0.29	3	0.87
Surendranagar	1	0.29	1	0.29	1	0.29	3	0.87
Tapi	1	0.29	1	0.29	1	0.29	3	0.87
The Dangs	1	0.29	1	0.29	1	0.29	3	0.87
Vadodara	1	0.29	1	0.29	1	0.29	3	0.87
Valsad	1	0.29	1	0.29	1	0.29	3	0.87
Total	33	9.57	33	9.57	33	9.57	99	28.71

Table 4.3.133 Group formation for agroforestry/social forestry activities (Forest Nursery/ cluster formation of Development of Value added products/NTFP processing/Apiculture) (Rs.29000/Group formation)

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	1	0.29	1	0.29	1	0.29	3	0.87
Amreli	1	0.29	1	0.29	1	0.29	3	0.87
Anand	1	0.29	1	0.29	1	0.29	3	0.87
Aravalli	1	0.29	1	0.29	1	0.29	3	0.87
Banaskantha	1	0.29	1	0.29	1	0.29	3	0.87
Bharuch	1	0.29	1	0.29	1	0.29	3	0.87
Bhavnagar	1	0.29	1	0.29	1	0.29	3	0.87
Botad	1	0.29	1	0.29	1	0.29	3	0.87
Chhotaudepur	1	0.29	1	0.29	1	0.29	3	0.87
Dahod	1	0.29	1	0.29	1	0.29	3	0.87
Devbhumi Dwarka	1	0.29	1	0.29	1	0.29	3	0.87
Gandhinagar	1	0.29	1	0.29	1	0.29	3	0.87
Gir Somnath	1	0.29	1	0.29	1	0.29	3	0.87
Jamnagar	1	0.29	1	0.29	1	0.29	3	0.87
Junagadh	1	0.29	1	0.29	1	0.29	3	0.87
Kachchh	1	0.29	1	0.29	1	0.29	3	0.87
Kheda	1	0.29	1	0.29	1	0.29	3	0.87
Mahesana (Mehsana)	1	0.29	1	0.29	1	0.29	3	0.87
Mahisagar	1	0.29	1	0.29	1	0.29	3	0.87
Morbi	1	0.29	1	0.29	1	0.29	3	0.87
Narmada	1	0.29	1	0.29	1	0.29	3	0.87
Navsari	1	0.29	1	0.29	1	0.29	3	0.87
Panchmahal	1	0.29	1	0.29	1	0.29	3	0.87
Patan	1	0.29	1	0.29	1	0.29	3	0.87
Porbandar	1	0.29	1	0.29	1	0.29	3	0.87

Districts	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Rajkot	1	0.29	1	0.29	1	0.29	3	0.87
Sabarkantha	1	0.29	1	0.29	1	0.29	3	0.87
Surat	1	0.29	1	0.29	1	0.29	3	0.87
Surendranagar	1	0.29	1	0.29	1	0.29	3	0.87
Tapi	1	0.29	1	0.29	1	0.29	3	0.87
The Dangs	1	0.29	1	0.29	1	0.29	3	0.87
Vadodara	1	0.29	1	0.29	1	0.29	3	0.87
Valsad	1	0.29	1	0.29	1	0.29	3	0.87
Total	33	9.57	33	9.57	33	9.57	99	28.71

Table 4.3.134 Supply of tall seedlings of timber trees/NTFPs/NWFPs Fruit trees/Fodder trees (clones/grafted plants) for farm field, agroforestry, windbreak, roadside plantation, etc., (Phy= Seedlings number in lakh; Finance=Avg. Rs.25 per seedlings)

District & Forest Division/ SAUs	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	1	25.00	1	25.00	1	25.00	3	75.00
Dahod	1	25.00	1	25.00	1	25.00	3	75.00
Panchmahals (Godra)	1	25.00	1	25.00	1	25.00	3	75.00
Kheda (Nadiyad)	1	25.00	1	25.00	1	25.00	3	75.00
Anand (FD, Anand + AAU Nursery)	2	50.00	2	50.00	2	50.00	6	150.00
Surendranagar	1	25.00	1	25.00	1	25.00	3	75.00
Rajkot	1	25.00	1	25.00	1	25.00	3	75.00
Amereli	1	25.00	1	25.00	1	25.00	3	75.00
Bhavnagar	1	25.00	1	25.00	1	25.00	3	75.00
Jamnagar	1	25.00	1	25.00	1	25.00	3	75.00
Junagadh (FD, Junagadh + JAU nursery)	2	50.00	2	50.00	2	50.00	6	150.00
Mahesana	1	25.00	1	25.00	1	25.00	3	75.00
Sabarkantha (Himmatnagar)	1	25.00	1	25.00	1	25.00	3	75.00
Banaskantha (Palanpur +AICRP-AF, SK Nagar)	2	50.00	2	50.00	2	50.00	6	150.00
Bharuch	1	25.00	1	25.00	1	25.00	3	75.00
Surat	1	25.00	1	25.00	1	25.00	3	75.00
Narmada	1	25.00	1	25.00	1	25.00	3	75.00
Navsari (Navsari FD+ CoF-NAU)	2	50.00	2	50.00	2	50.00	6	150.00
Valsad	1	25.00	1	25.00	1	25.00	3	75.00
Vadodara	1	25.00	1	25.00	1	25.00	3	75.00
Total	24	600.00	24	600.00	24	600.00	72	1800.00

4.3.4.9 Researchable Issues:

Research

- Development of Agroforestry models based on the Agroecological zones of Gujarat
- Agroforestry and Wasteland development
- Tree-crop interaction studies in Agroforestry
- Strengthening of Industrial Agroforestry
- Selection, multiplication and evaluation of forest genetic resources (FGR) for timber, NWFP like minor fruits, gums, resins and Medicinal and aromatic plants, and pulp-paper-veneer industries under different Agroforestry systems
- Improvement and development of Bamboo resources
- Improvement and development of Biofuel (TBOs) resources
- Mangroves and rehabilitation of coastal belt by tree plantation
- Climate change, Carbon Sequestration and agroforestry
- *In-situ* and *Ex-situ* Conservation of Forest Genetic Resources
- Short-rotation forestry and Clonal Forestry
- Studies on diversity, ecological and economic benefit of birds/ animals in agroforestry
- Agro-ecotourism/Agro-biodiversity
- Improvement and nutritional quality of fodder yielding species
- Management of Insect-pests and Diseases of forest crops in Agroforestry land-use system and Forest Nurseries
- Protocol development and large scale production of Tissue culture plants of priority species of Agroforestry
- Soil and water conservation research to improve the agroforestry produces
- Research on environmental issues related Forestry including Agroforestry
- Sustainable harvesting, utilization and value addition of agroforestry produces
- Strengthening of different Agro-forestry modules like Aqua-forestry, Silvi-pasture, Horti-silvi-pasture and others
- Selection and evaluation of salt-tolerant, drought tolerant genotypes in the salt affected areas/ problematic area
- Selection and promotion of different tree species for bio-drainage
- Multi-location trial to testing of genotypes of different agroforestry species for suitability in different agro-ecological zones in consultation with social forestry wing of Forest Department/ SAUs
- Strengthening of Urban and Recreational forestry and landscape management
- Conservation of rare and threatened forest species for future agroforestry
- Mandatory promotion of agroforestry/forestry responsibility under Corporate Social Responsibility programme
- Identification and promotion of ligno-cellulosic raw materials for pulp and paper industry through agroforestry
- Certification of Agroforestry nurseries and agroforestry produces including wood
- Development of innovative technology or Value addition for agroforestry produces for proper market and to improve the socioeconomic condition
- Utilization of waste products from the wood and non-wood forest produce from agroforestry
- Strengthening of aesthetic values of Urban and Peri-urban area by tree plantation
- Biotechnological approaches for improvement of forest species for agroforestry development

Extension and Training:

- Training and Field orientation programme in cultivation of important Tree Genetic Resources, rearing of Lac insect, Tasar silkworm, Eri silkworm, Muga silkworm, production of honey, sustainable harvesting of minor fruits, tapping of gums and resins and other forest resources
- Capacity building of social forestry staff, extension of Fincer, VLAW (Village level Agriculture Worker), Panchayat members, etc. to promote agroforestry at district level
- Promotion of soil and water conservation programmes in agroforestry
- Strengthening of Joint Forest Management aspects to improve the forest, community forest and agroforestry land use systems, especially for FRA (Forest Right Act) land beneficiaries
- Promotion of Organic Composting using agroforestry tree residues
- Training and exposure visits to farmers on various aspects of agroforestry within and outside the states.
- Publication of extension literature in Agroforestry
- Knowledge centre and Museum on Agroforestry in each KVKs
- Promotion of agro-silvi-pasture or Silvi-pasture systems for Rangeland, Grassland management
- Promotion of skills of Wood/ bamboo artisans to improve the markets of Agroforestry products

4.4 CASH CROPS:

4.4.1 Cotton:

4.4.1.1 Background:

Cotton is cultivated in all the districts of the state except Valsad, Navsari and Dang. The major cotton growing districts are Surendranagar, Rajkot, Bhavnagar, Amreli, Ahmedabad, Junagadh, Jamnagar, Sabarkantha, Vadodara and Bharuch. Nearly 26.8 % cropped area of the state is occupied by cotton, which played a pivotal role in the economy of the state providing employment to rural people. Increasing area of Bt hybrid cotton year by year reaching to the record cultivation of 30 lakh ha in 2014-15. Even after foregoing the higher cost of cultivation for Bt cotton due to higher seed cost, net profit is reported to increase by 75 percent with the adoption of Bt cotton, thus explaining the success of Bt cotton in Gujarat. This might be due to (a) low cost of cultivation, (b) resilient to pest and diseases and (c) high revenue. In Gujarat, cotton occupied 26.8% of the gross cropped area (9.88 million ha) of the state; however, the productivity is stagnant since last five years (from 2012-13 to 2016-17) around 550 to 650 kg/ha. During 2017-18, cotton lint productivity raised to 819 kg/ha, which is two to three times lower than Brazil and Australia (2000 to 2500 kg/ha) which provide ample scope for improvement. Cotton is one of the key drivers in Gujarat agricultural development from 1980-81 to 2017-18. During 2015-16, the total increase in value output was 6162.90 corers with 15.0 percent contribution to the value increase in gross of agricultural output.

Vision:

Gujarat state a harbinger in cotton production and yield through technology and innovations.

Mission:

To augment the production and yield of quality cotton in the state, narrow the yield gap in irrigated and rainfed without risking natural resources, further accelerate technology development process to meet ensuing climatic changes as also the needs/expectation of all stakeholders.

4.4.1.2 Crop/Area Issues:

Cotton cultivation:

- Cotton Area: Cotton area increasing year by year replacing food crops and oilseeds crops needs regulation in the state
- Cotton Productivity: Area wise fluctuation for yield have to minimize the gap between zone, area and soil type widely differed needs reduce
- Bt cotton: Monocropping and >85 % area under Bt cotton
- Bt hybrids: Multiplicity of Bt hybrids >600 Bt hybrids – the choice is difficult for farmers
- Scattered / uneven distribution of rainfall, often flood and draught situation risk in some pockets
- Seed supply: supply illegal/spurious seeds
- Poor mechanization and acute labour shortage in the major area of the state
- High-cost input year by year
- Emerging pests and diseases and injudicious use of insecticides rendered Bt cotton ineffective and uneconomical
- Climate change impact
- Sustainability of cotton cultivation
- Poor waste /stalk management
- Quality of cotton: Trade base quality cotton should have to be produced
- Weed management
- Macro/ micronutrient management
- Development of saline resistant genotypes

- Research for emerging/ new issues related to Bt cotton

Post-harvesting:

- Storage and transportation facility to be improved and should be easily available
- Old ginning and processing machinery at many of the research centers of SAU which may replace by a new one and poor storage facilities
- Poor infrastructure for grading and analyzing fiber quality
- Fluctuating prices of cotton and in general not economical
- Poor cotton quality / high trash content

4.4.1.3. Priority for Comprehensive Cotton Cultivation:

- Yield stability and narrowing gap in yield level between different districts and rainfed and irrigated areas through ICM
- Improvement in the genetic architecture of variety suited to closer spacing and earliness
- Advance area of research on robotics, drone and sensor-based technology for increased accuracy and efficiency of cotton cultivation
- Enforcing sowing of refuge in Bt cotton cultivation and monitoring bollworm incidence in cotton
- Encourage the use of bio-fertilizers and bio-control means
- Micro-irrigation/ water harvesting structure in water deficient area and effective drainage structure in flood-prone/ low lying area
- Promoting contract farming for organic cotton cultivation and establishing organic input supply chain and collection center
- Promotion of export through contamination free cotton with the labeling of quality parameters and traceability of each and every cotton bale
- Establishment of modern HVI fibre testing facilities at selected APMC
- Research needs for climate resilient as well as physiological wilting, development of compact genotypes, early maturing, drought and salinity tolerant Bt hybrids
- Development of ELF cotton varieties/ hybrids
- Crop residue management for improvement of soil organic carbon content/ soil health
- Promoting solar spray pump, shredder machine,
- Empowering woman force for social upliftment through promoting small ginning machine, spindle units and handlooms for value addition and thereby generating extra income.
- Imparting knowledge to farmers through mobile app and krushi portal

4.4.1.4 Research Network of Cotton in Gujarat State

Surat works as Main Cotton Research Station of the state. In AICCIP set up, Surat and Junagadh are working. At present, cotton research is carried out through a well-knit system, at 1 main, 8 regional and 6 substations, distributed all over the state. Since cotton is widely grown, practically in all the districts of the state excepting parts of Navsari, Dang and Valsad districts. It is divided into four well-defined cotton zones based on soil, climate and type of cotton grown.

4.4.1.5 Current Status of Area, Production and Productivity:

Table- 4.4.1 District-wise Area, Production and Productivity of Irrigated Cotton Lint (Area: 00" hectare, Prod: 00 MT" Yield : kg/ha)

SN	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Kachchh	764	3745	833	614	2915	807	689	3852	951	548	3013	934	463	2581	948
2	Banaskantha	247	1439	990	456	1607	599	458	631	234	411	1309	541	342	804	400
3	Patan	357	1735	825	268	1415	899	283	1366	822	281	1456	882	220	976	753
4	Mehesana	628	2869	777	583	2409	703	507	1837	616	542	2169	681	432	1514	596
5	Sabarkantha	1362	4430	553	1336	3934	501	1183	2684	386	721	2478	584	767	2548	565
6	Aravalli										654	2102	546	518	1704	559
7	Gandhinagar	331	1365	701	348	1369	668	304	1171	656	311	1239	676	250	1024	697
8	Ahmedabad	452	1426	537	399	1237	527	406	1687	707	200	685	583	203	790	663
9	Surendranagar	2643	13531	870	1742	3361	328	1815	7870	737	1735	7633	748	2070	8648	710
10	Morbi										1125	6150	929	1277	5911	787
11	Rajkot	3378	17158	864	2872	4704	278	2452	14080	976	2279	8966	669	2312	1760	129
12	Jamnagar	2272	10704	801	1116	538	82	1800	11468	1083	1801	6481	612	1228	3753	520
13	Devbhumi Dwarka										474	2052	737	448	428	163
14	Porbandar	210	577	468	55	126	387	15	99	1128	211	759	611	181	192	180
15	Junagadh	625	2791	759	532	1284	410	778	5336	1167	942	5806	1048	623	1349	368
16	Gir Somnath										324	1169	613	292	1004	584
17	Amreli	2716	8827	553	632	1088	293	2170	14322	1122	1665	5227	534	2540	8118	543
18	Bhavnagar	2013	9064	766	1269	3967	532	1600	7682	816	913	3483	649	1043	3866	630
19	Botad										589	2822	815	1174	3103	450
20	Anand	53	227	727	76	208	463	61	297	826	52	271	880	25	114	776
21	Kheda	279	692	422	317	926	497	264	775	498	246	870	602	221	790	608
22	Panchmahal	5	22	727	99	270	463	95	462	826	91	439	820	117	337	491
23	Mahisagar										104	364	595	102	349	583
24	Dahod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Vadodara	1495	5210	593	1571	7127	771	1602	6136	651	1021	3699	616	844	2559	516
26	Chhotaudepur										701	3512	852	508	2328	779

SN	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
27	Narmada	336	1106	560	291	903	527	313	832	451	253	683	459	153	432	480
28	Bharuch	538	1520	480	550	1810	559	554	1671	513	488	1479	515	257	936	620
29	Surat	72	310	727	27	73	463	22	106	826	51	170	565	50	172	580
30	Tapi	83	355	727	30	80	463	40	193	826	28	112	681	26	81	528
	Gujarat State	20859	89103	726	15183	41351	463	17408	84557	826	18761	76598	694	18683	58172	529

Source: Directorate of Agriculture, GoG, Gandhinagar

Table- 4.4.2 District-wise Area, Production and Productivity of Rainfed Cotton Lint (Area: 00" hectare, Prod: 00 MT" Yield : kg/ha)

SN	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Kachchh	109	177	274	14	8	92	97	167	294	19	19	169	26	58	382
2	Banaskantha	233	376	274	0	0	0	0	0	0	3	5	320	3	5	344
3	Patan	370	253	116	284	189	113	346	437	214	296	380	219	113	179	270
4	Mehesana	24	38	274	1	1	92	6	10	294	47	72	264	0	1	344
5	Sabarkantha	204	465	386	47	26	92	78	135	294	21	32	264	0	0	0
6	Ahmedabad	1767	2490	240	1369	1784	221	1373	1965	243	1390	1978	242	1116	2230	340
7	Surendranagar	2129	3618	289	1949	1074	94	1703	3959	395	1939	4145	363	1644	4202	434
8	Morbi										488	1146	399	592	1098	316
9	Rajkot	493	1073	370	191	185	164	319	971	518	20	31	264	20	40	344
10	Jamnagar	38	61	274	0	0	0	5	9	294	0	0	0	708	1432	344
11	Porbandar	26	43	274	0	0	0	74	129	294	1	2	264	25	50	344
12	Junagadh	61	98	274	113	61	92	5	9	294	7	11	264	195	395	344
13	Gir Somnath										21	32	264	0	0	0
14	Amreli	1173	1272	184	2261	1339	101	1302	4828	630	2465	2271	157	1248	2484	338
15	Bhavnagar	1039	1862	305	1866	1088	99	1649	3488	360	1195	2132	303	1174	1879	272
16	Botad										1111	1294	198	484	626	220
17	Anand	0	0	0	0	0	0	0	0	0	0	0	0	5	9	344
18	Kheda	25	41	274	23	12	92	16	27	294	1	1	264	2	4	344

SN	DISTRICT	2011-12			2012-13			2013-14			2014-15			2015-16		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
19	Panchmahal	96	155	274	14	8	92	20	35	294	29	81	468	4	9	438
20	Mahisagar										11	17	264	1	2	344
21	Dahod	2	3	274	16	9	92	18	31	294	10	16	264	5	9	344
22	Vadodara	474	1180	423	467	1320	481	384	1108	490	66	102	264	5	11	344
23	Chhotaudepur										144	508	599	296	760	437
24	Narmada	121	230	322	65	109	286	95	189	337	215	450	356	330	861	443
25	Bharuch	713	1088	260	639	907	241	453	544	204	507	809	271	493	810	279
26	Surat	18	28	274	11	6	92	11	19	294	16	50	533	12	35	483
27	Tapi	57	92	274	59	32	92	75	171	386	56	149	451	34	65	327
GUJARAT STATE		9172	14643	271	9389	8158	148	8030	18232	386	10077	15735	265	8533	17252	344

Source: Directorate of Agriculture, GoG, Gandhinagar

Table -4.4.3 District-wise Area, Production and Productivity of Total Cotton Lint (Area: 00" hectare, Prod: 00 MT" Yield : kg/ha)

SN	District	2011-12			2012-13			2013-14			2014-15			2015-16		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Kachchh	873	3922	764	628	2923	791	785	4019	870	567	3031	876	488	2639	918
2	Banaskantha	480	1815	643	456	1607	599	458	631	234	414	1314	517	344	809	399
3	Patan	727	1988	465	552	1604	494	629	1802	487	577	1837	565	333	1155	590
4	Mehesana	652	2907	758	584	2410	702	513	1847	613	588	2241	538	432	1515	596
5	Sabarkantha	1566	4895	531	1383	3960	487	1261	2819	380	741	2510	676	767	2548	565
6	Aravalli										654	2103	583	518	1704	559
7	Gandhinagar	331	1365	701	348	1369	669	304	1171	656	311	1239	523	250	1024	697
8	Ahmedabad	2219	3916	300	1768	3021	290	1779	3652	349	1590	2663	571	1319	3020	389
9	Surendranagar	4772	17149	611	3691	4435	204	3517	11829	572	3674	11778	621	3714	12850	588
10	Morbi										1613	7296	608	1869	7009	638
11	Rajkot	3871	18231	801	3063	4889	271	2771	15052	924	2299	8997	737	2332	1800	131
12	Jamnagar	2310	10765	792	1116	538	82	1805	11477	1081	1801	6481	611	1936	5185	455

SN	District	2011-12			2012-13			2013-14			2014-15			2015-16		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
13	Devbhumi Dwarka										474	2052	1047	448	428	163
14	Porbandar	236	620	447	55	126	389	89	228	434	212	761	606	206	242	200
15	Junagadh	686	2889	716	645	1345	354	783	5345	1161	949	5817	530	818	1744	362
16	Gir Somnath										345	1202	290	292	1004	584
17	Amreli	3889	10099	441	2893	2427	143	3472	19150	938	4130	7498	472	3788	10602	476
18	Bhavnagar	3052	10926	609	3135	5055	274	3249	11170	584	2108	5615	229	2216	5745	441
19	Botad										1699	4117	602	1658	3729	382
20	Anand	53	227	728	76	208	465	61	297	825	52	271	815	29	123	709
21	Kheda	304	733	410	340	938	469	280	802	487	247	872	567	223	794	605
22	Panchmahal	101	177	298	113	278	418	116	498	732	120	520	245	121	347	489
23	Mahisagar										115	380	613	103	351	581
24	Dahod	2	3	0	16	9	96	18	31	294	11	16	801	5	9	344
25	Vadodara	1969	6390	552	2038	8447	705	1986	7244	620	1087	3801	510	849	2569	515
26	Chhotaudepur										845	4020	466	804	3088	653
27	Narmada	457	1336	497	356	1012	483	409	1021	425	468	1134	298	483	1293	455
28	Bharuch	1251	2608	354	1189	2717	388	1008	2215	374	996	2288	533	750	1746	396
29	Surat	90	338	638	38	79	353	33	124	649	67	220	0	63	207	0
30	Tapi	140	447	543	89	112	214	115	364	538	84	261	265	60	146	414
GUJARAT STATE		30031	103746	587	24572	49509	343	21489	90499	716	28838	92333	544	27216	75424	471

Source: Directorate of Agriculture, GoG, Gandhinagar

Table 4.4.4: District-wise Total Average Area ('oo ha), Production ('00 MT) and Productivity(kg/ha) of Cotton (2011-12 to 2015-16)

SN	DISTRICT	Irrigated			Unirrigated			Total		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
1	Kachchh	615	3221	890	53	86	276	668	3307	841
2	Banaskantha	383	1158	514	48	77	276	430	1235	488
3	Patan	282	1390	839	282	288	174	564	1677	506
4	Mehesana	538	2160	682	16	24	267	554	2184	670
5	Sabarkantha	744	2513	574	70	132	320	1144	3346	497
6	Arvalli	586	1903	552	0	0	264	235	761	552
7	Gandhinagar	309	1234	679	0	0	0	309	1234	679
8	Ahmedabad	332	1165	597	1403	2089	253	1735	3255	319
9	Surendranagar	2001	8209	697	1873	3399	309	3874	11608	509
10	Morbi	1201	6031	854	216	449	353	696	2861	698
11	Rajkot	2295	5363	397	209	460	375	2867	9794	581
12	Jamnagar	1514	5117	574	150	300	340	1794	6889	653
13	Devbhumi Dwarka	461	1240	458	0	0	0	184	496	458
14	Porbandar	196	476	412	25	45	301	160	395	421
15	Junagadh	782	3578	777	76	115	256	776	3428	751
16	Gir Somnath	308	1087	599	4	6	264	127	441	588
17	Amreli	2102	6672	540	1690	2439	245	3634	9955	466
18	Bhavnagar	978	3675	639	1385	2090	257	2752	7702	476
19	Botad	881	2963	572	319	384	205	671	1569	397
20	Anand	39	192	847	1	2	341	54	225	704
21	Kheda	233	830	605	13	17	218	279	828	505
22	Panchmahal	104	388	635	33	58	300	114	364	542
23	Mahisagar	103	356	589	2	4	269	43	146	572
24	Dahod	0	0	0	10	14	229	10	14	225
25	Vadodara	932	3129	571	279	744	453	1586	5690	610
26	Chhotaudepur	604	2920	821	88	254	490	330	1422	733
27	Narmada	269	791	499	165	368	378	435	1159	453
28	Bharuch	477	1483	528	561	832	252	1039	2315	379

SN	DISTRICT	Irrigated			Unirrigated			Total		
		Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
29	Surat	44	166	635	14	28	344	58	194	567
30	Tapi	41	164	675	56	102	308	98	266	463
GUJARAT STATE		19357	69572	611	9040	14804	278	26429	82302	529
<i>Source: Directorate of Agriculture, GoG, Gandhinagar</i>										

4.4.1.6. Major Cotton Varieties:**Table – 4.4.5 Major Cotton Varieties/Parents for hybrids from Public sector:**

Sr. No.	Variety/Parental Line	Sr. No.	Variety/Parental Line
1	Gujarat-67	14	GSHV-112
2	Am.Nect.	15	GSB-39
3	G.Cot.100	16	G.Cot-16
4	G.Cot.10	17	76-IH-20
5	Surat Dwarf	18	G.Cot-12
6	BC-68-2	19	G.Cot-20
7	LRA-5166 (SB)	20	Deviraj
8	Sujay	21	V-797
9	G-27	22	G.Cot.13
10	4011	23	G.Cot.21
11	824	24	G.Cot.23
12	SRT-GMS-1	25	GN Cot-25
13	GSav-1056	26	Anand Desi Cotton-1

4.4.1.7 Input Management:**4.4.1.7.1 Seed:****Table – 4.4.6 Seed Requirement and Planning of Cotton (in Qtl)**

SR. No.	District	Area (00'ha)	2017-18	2018-19	2019-20
1	Kachchh	668.25	1169	1228	1289
2	Banaskantha	430.35	753	791	830
3	Patan	563.53	986	1035	1087
4	Mehesana	553.86	969	1018	1069
5	Sabarkantha	1143.65	3431	3602	3783
6	Arvalli	234.57	410	431	453
7	Gandhinagar	308.78	540	567	596
8	Ahmedabad	1734.98	9976	10475	10999
9	Surendranagar	3873.68	22274	23387	24557
10	Morbi	696.31	1219	1279	1343
11	Rajkot	2867.00	5017	5268	5532
12	Jamnagar	1793.52	3139	3296	3460
13	Devbhumi Dwarka	184.24	322	339	355
14	Porbandar	159.68	279	293	308
15	Junagadh	776.14	1358	1426	1497
16	Gir Somnath	127.49	223	234	246
17	Amreli	127.49	20897	21942	23039
18	Bhavnagar	3634.29	4816	5057	5310
19	Botad	2752.01	1175	1234	1295
20	Anand	671.35	95	100	105
21	Kheda	54.40	488	512	538
22	Panchmahal	278.70	200	210	220
23	Mahisagar	114.11	76	80	84
24	Dahod	43.43	13	14	14
25	Vadodara	10.38	2775	2914	3059
26	Chhotaudepur	1585.65	577	606	636
27	Narmada	329.80	760	799	838
28	Bharuch	434.56	5972	6271	6584
29	Surat	1038.62	87	91	96

SR. No.	District	Area (00'ha)	2017-18	2018-19	2019-20
30	Tapi	58.09	171	179	188
	Total	27218.97	90169	94678	99412

District-wise Seed Production and Seed Availability at Seed Farm/Research Station

The MCRS, Surat in association with the regional centers of Gujarat state, produced breeder seed of various parents of released hybrids and stable varieties especially for own use and in limited quantity for supplying to farmers.

Table – 4.4.7 District-wise Seed Production and Seed Availability of Cotton at Seed Farm/Research Station

SN	Variety / Parental line	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	Gujarat-67	33	2	3	6	3	16	22
2	Am.Nect.	3	1	5	2	0	19	16
3	G.Cot.100	9	24	310	172	190	169	163
4	G.Cot.10 (Non Bt)	130.8	53.4	33	13	4	19	10
5	Surat Dwarf	30.4	31.58	545	208	460	555	448
6	BC-68-2 (Non Bt)	28.2	22.11	40	8	1	11	19
7	LRA-5166 (SB)	99.1	14.93	25	7	1	0	156
8	G.Cot-16 (Non Bt)	29	45.17	130	5	4	111	25
9	76 IH-20	1	23.96	250	12	24	31	18
10	Sujay	117.2	3.5	2	0	0	3	8
11	G-27	68.1	14	21	0	15	10	10
12	4011	0	7.5	9	0	3	5	5
13	824	29.5	6.5	2	0	18	3	5
14	SRT- GMS-1	86.5	1	7	0	2	2	2
15	GSav-1056	29	4.5	12	0	5	1	4
16	GSHV-112	1.5	3.25	15	0	11	3	20
17	GSB-39	24.5	0	2	0	1	1	9
18	G.Cot-20	260	4.5	12	0	9	15	18
19	Deviraj	0	0	0	0	20	24	78
20	G. Cot. 23	0	60	60	9	9	0	0
21	G.N Cot.25	134	0	100	0	25	0	9
22	V-797	1322	521	150	111	699	648	102
23	G. Cot. 13	108	552	600	153	264	723	354
24	G. Cot. 21	3626	3213	1820	2442	2118	4701	4764
25	Anand Desi Cotton-1	0	0	650	375	372	441	75
	Grand Total	6170	4609	4803	3522	4258	7510	6340

4.4.1.7.2 Fertilizer:

Table – 4.4.8 District-wise and year-wise N and P₂O₅ requirement and projection for the cotton crop (in Tonnes)

(Projected Use of Fertilizers, in T)

SR. No.	DISTRICT	2015-16 (E)*		2016-17 (E)		2017-18		2018-19		2019-20	
		N	P ₂ O ₅	N	P ₂ O ₅	N	P ₂ O ₅	N	P ₂ O ₅	N	P ₂ O ₅
1	Kachchh	114.12	18.51	119.83	19.43	124.62	20.21	128.36	20.82	130.93	21.23
2	Banaskantha	82.34	13.67	86.45	14.36	89.91	14.93	92.61	15.38	94.46	15.69
3	Patan	66.37	8.81	69.69	9.25	72.48	9.62	74.65	9.90	76.15	10.10
4	Mehesana	103.72	17.28	108.91	18.14	113.26	18.87	116.66	19.44	118.99	19.83
5	Sabarkantha	184.03	30.67	193.23	32.21	200.96	33.49	206.99	34.50	211.13	35.19
6	Arvali	124.44	20.74	130.66	21.78	135.88	22.65	139.96	23.33	142.76	23.79
7	Gandhinagar	59.99	10.00	62.98	10.50	65.50	10.92	67.47	11.24	68.82	11.47
8	Ahmedabad	182.58	8.11	191.71	8.51	199.38	8.86	205.36	9.12	209.47	9.30
9	Surendranagar	694.08	82.79	728.78	86.93	757.93	90.41	780.67	93.12	796.29	94.99
10	Morbi	377.53	51.09	396.40	53.65	412.26	55.79	424.63	57.46	433.12	58.61
11	Rajkot	557.21	92.47	585.07	97.09	608.47	100.98	626.73	104.00	639.26	106.08
12	Jamnagar	379.58	49.10	398.56	51.56	414.50	53.62	426.94	55.23	435.48	56.33
13	Devbhumi Dwarka	107.45	17.91	112.82	18.80	117.33	19.56	120.85	20.14	123.27	20.55
14	Porbandar	46.43	7.24	48.75	7.61	50.70	7.91	52.22	8.15	53.26	8.31
15	Junagadh	172.94	24.92	181.59	26.16	188.85	27.21	194.52	28.03	198.41	28.59
16	Gir Somnath	70.16	11.69	73.66	12.28	76.61	12.77	78.91	13.15	80.49	13.41
17	Amreli	759.26	101.58	797.22	106.66	829.11	110.93	853.99	114.26	871.07	116.54
18	Bhavnagar	391.11	41.71	410.66	43.80	427.09	45.55	439.90	46.92	448.70	47.85
19	Botad	339.73	46.94	356.72	49.29	370.99	51.26	382.12	52.80	389.76	53.85
20	Anand	6.51	1.00	6.84	1.04	7.11	1.09	7.33	1.12	7.47	1.14
21	Kheda	53.30	8.84	55.97	9.29	58.20	9.66	59.95	9.95	61.15	10.15
22	Panchmahal	28.49	4.67	29.91	4.91	31.11	5.10	32.04	5.26	32.68	5.36
23	Mahisagar	24.53	4.07	25.76	4.28	26.79	4.45	27.59	4.58	28.15	4.67
24	Dahod	0.54	0.00	0.57	0.00	0.59	0.00	0.61	0.00	0.62	0.00
25	Vadodara	203.07	33.74	213.22	35.43	221.75	36.84	228.40	37.95	232.97	38.71

SR. No.	DISTRICT	2015-16 (E)*		2016-17 (E)		2017-18		2018-19		2019-20	
		N	P ₂ O ₅	N	P ₂ O ₅	N	P ₂ O ₅	N	P ₂ O ₅	N	P ₂ O ₅
26	Chhotaudepur	157.42	20.32	165.29	21.34	171.90	22.19	177.06	22.86	180.60	23.31
27	Narmada	76.35	6.12	80.17	6.43	83.37	6.69	85.88	6.89	87.59	7.03
28	Bharuch	120.78	10.26	126.82	10.78	131.89	11.21	135.85	11.54	138.57	11.78
29	Surat	13.58	2.02	14.26	2.12	14.83	2.20	15.27	2.27	15.58	2.31
30	Dang	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	Navsari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	Valsad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Tapi	10.28	1.04	10.80	1.09	11.23	1.13	11.56	1.17	11.80	1.19
GUJARAT STATE		5507.91	747.33	5783.31	784.70	6014.64	816.09	6195.08	840.57	6318.98	857.38
		(E)*Consumption estimated based on the actual area				Projected requirement					

4.4.1.7.3 Pesticides/Plant Protection:

Table – 4.4.9 Estimated and Projected Demand of Pesticides for Cotton (T)

(Weedicide, Insecticide and Fungicides) during 3 Years Period

Sr. No.	District	2016-17	2017-18	2018-19	2019-20
1	Ahmedabad	1643	1725	1803	1875
2	Amreli	1991	2091	2185	2272
3	Anand	22	23	24	25
4	Banaskantha	222	233	244	253
5	Bharuch	1003	1053	1101	1145
6	Bhavnagar	2085	2189	2288	2379
7	Dahod	1	1	1	1
8	Dang	0	0	0	0
9	Gandhinagar	204	214	224	233
10	Jamnagar	1307	1372	1434	1491
11	Junagadh	358	376	393	409
12	Kheda	147	154	161	168
13	Kachchh	533	560	585	608
14	Mehsana	405	425	444	462
15	Narmada	320	336	351	365
16	Navsari	0	0	0	0
17	Panchmahal	90	95	99	103
18	Patan	584	613	641	666
19	Porbandar	48	50	53	55
20	Rajkot	2451	2574	2689	2797
21	Sabarkantha	756	794	830	863
22	Surat	10	11	11	11
23	Surendranagar	3805	3995	4175	4342
24	Tapi	40	42	44	46
25	Vadodara	1201	1261	1318	1371
26	Valsad	0	0	0	0
	Total	19226	20187	21096	21940

4.4.1.8 Constraints Analysis and Recommended Interventions for Yield

Gaps Analysis of Cotton:

District-wise Gap Analysis of Cotton Crop: (Consider FLD average/Potential yield)

Table – 4.4.10 District-Wise Gap Analysis of Cotton Crop

SR	District	Irrigated			Rainfed		
		Actual	FLD Average	% Gap	Actual	FLD Average	% Gap
1	Ahmedabad	4.99	11.00	120.64	2.01	5.00	148.74
2	Amreli	6.78	11.00	62.14	3.62	7.00	93.35
3	Anand	6.62	11.00	66.13	0.00	0.00	0.00
4	Banaskantha	6.54	11.00	68.12	2.32	7.00	201.40
5	Bharuch	5.64	11.00	95.10	2.04	5.00	145.39
6	Bhavnagar	6.83	11.00	61.15	3.04	7.00	130.57
7	Dahod	0.00	0.00	0.00	2.27	7.00	208.82
8	Dang	0.00	0.00	0.00	0.00	0.00	0.00

SR	District	Irrigated			Rainfed		
		Actual	FLD Average	% Gap	Actual	FLD Average	% Gap
9	Gandhinagar	6.38	11.00	72.54	0.00	0.00	0.00
10	Jamnagar	7.48	11.00	47.13	2.32	7.00	201.67
11	Junagadh	7.99	11.00	37.69	2.25	7.00	211.41
12	Kheda	6.40	11.00	71.85	2.32	7.00	201.88
13	Kachchh	7.85	11.00	40.13	2.13	7.00	229.24
14	Mehsana	6.98	11.00	57.54	2.33	7.00	200.97
15	Narmada	4.45	11.00	147.01	4.11	7.00	70.37
16	Navsari	0.00	0.00	0.00	0.00	0.00	0.00
17	Panchmahal	6.68	11.00	64.73	2.33	7.00	200.54
18	Patan	8.29	11.00	32.72	1.40	7.00	400.89
19	Porbandar	7.42	11.00	48.34	0.00	0.00	0.00
20	Rajkot	8.12	11.00	35.48	2.96	7.00	136.64
21	Sabarkantha	5.59	11.00	96.71	2.80	7.00	150.37
22	Surat	6.61	11.00	66.35	2.23	7.00	214.06
23	Surendranagar	5.82	11.00	89.17	2.24	5.00	123.24
24	Tapi	6.02	11.00	82.59	2.29	7.00	205.92
25	Vadodara	6.78	11.00	62.22	4.23	7.00	65.62
26	Valsad	0.00	0.00	0.00	0.00	0.00	0.00

Table – 4.4.11 Sustainability Issues and Gap Analysis of Productivity of Cotton Crop and Resources

Sr. No.	Gap	Factors/constrains Leading to Gaps	Strategies	Approach and Methodology	Performance Indicator	Sustainability Outputs
i	Nonavailability of consistent high yielding Bt. hybrids	Too many companies with too many Bt. hybrids	Survey and identification of consistent high yielding Bt. hybrids.	The popularization of identified varieties through demonstration	Entire hybrid cotton growing area of the district may be covered.	Increase in yield and increase in economic returns
ii	Sowing of the F2 seed of Bt. hybrids	The high cost of Bt. hybrid seeds and lack of awareness among the farmers	The farmers need to be convinced about the cost-effectiveness of using F1 seeds of high yielding Bt. variety, Make available seeds to small and marginal farmers at subsidized rate	Demonstration and field days	Entire hybrid cotton growing area of the district may be covered	Increase in yield and increase in economic returns
iii	Poor fertilizer management	Low awareness, Nonavailability of inputs in time, Injudicious use of chemical fertilizer. Very low utilization of organic manures.	Educating farmers on the importance of fertilizer management and its effects on yield enhancement. Use an only recommended dose of chemical fertilizer after soil testing. Add organic matter	Demonstration and field days.	20% growth in the area every year.	Improvement in the yield on a sustainable basis.
iv	Nonadoption of IPM practices	Low awareness, Excessive & indiscriminate use of chemicals	Awareness campaign for the adoption of IPM and Popularization of judicious use of chemicals.	Farmer's field schools, campaigns, demonstrations	Ten percent growth in area under IPM every year.	Improvement in the yield on a sustainable basis.

Sr. No.	Gap	Factors/constrains Leading to Gaps	Strategies	Approach and Methodology	Performance Indicator	Sustainability Outputs
v	No intra row spacing in deshi cotton	Lack of awareness	The popularization of the importance plant geometry among farmers	Demonstration and field day	Entire deshi cotton growing area of the district may be covered	Improvement in yield
vi	No use of refugee crop	Lack of awareness, Wrong belief	Wide level effective publicity	Training, radio talk, TV talk and khedut shibir		
vi	No use of Organic Manure	Non-availability of organic manure due to fewer animals rearing	Encouraging farmers for livestock rearing/ residue management	Field day and training	10% growth in the area every year	Improvement in soil physical conditions, better soil health
vii	Excess irrigation in irrigated cotton	Slackness of farmer, Other farmers follow it	Motivating farmers for adoption of drip irrigation system in hybrid cotton. Popularizing alternate furrow irrigation method in deshi cotton.	Farmer's participatory approach. Training and demonstrations	20% growth in the area every year	Increase in water use efficiency and sustain soil health.
viii	Poor Soil health	Excess use of irrigation water and Chemical fertilizer. Knowledge gap regarding soil health.	To give guidance to farmers about soil health. To establish soil testing laboratory	Educating framers towards soil health through farming	Improvement up to 5 to 15 % should be achieved in next 5 to 7 years	Long-term benefit is achieved
ix	Use of un recommended varieties (Bt/ Non-Bt)	Lack of awareness The high price of Bt hybrids.	Location-specific recommendation of Bt varieties. Lower the price of Bt varieties.	To give awareness to farmers through demonstration	The increased area under variety which is good in quality and production	Increase the yield as well as the quality of lint.

Sr. No.	Gap	Factors/constrains Leading to Gaps	Strategies	Approach and Methodology	Performance Indicator	Sustainability Outputs
x	Poor water management	Flooded the field with canal irrigation. Poor quality water utilization of underground water.	More weight on the micro irrigation system Apply irrigation on a critical stage of the crop. Alternate farming	Front line demonstration on the micro irrigation system. Water management training to farmers	Improvement of soil health after a long period.	Increase in water use efficiency.
xi	Low plant density	Farmers growing the crop at wider spacing	Awareness to farmers through training	Field demonstration of farming practices	Adaptation of recommended practices.	Improvement in crop yield.
xii	Labour intensive crop	Less availability of labour mechanization is not popularized.	Popularize the use of mechanization in the picking of cotton	Training and demonstration of mechanization	5-10% area under mechanization	Reduction in depended on labour.
xiii	Use of non-monetary or low input cost technologies	Lack of awareness	Appropriate sowing time Minimum Tillage Organic input, spraying of micronutrients, SHC, crop rotation and ICM	Training and demonstration	Reduction in cost input	Increase in income of the farmers

4.4.1.9 District-wise Recommended Interventions for the State

Table – 4.4.12 Recommended Interventions of Cotton for the State with Detailed Action Plan with Cost (District-wise)

No.	District	Existing area (00ha)	Major Problem	Solutions
1	Ahmedabad	1896	Waterlogging and salinity in Bhal and coastal area Labour scarcity and problematic soil.	Need to develop salt-tolerant genotype, Research needs for GMS line, ridge sowing, crop residue and INM and MIS, intercropping and farmers training, effective drainage structure
2	Anand	44	Salinity problem in the coastal area, Indiscriminate use of Fertilizer and pesticides, old market yards with poor storage facilities.	Strengthening watershed development programme, farm pond, drainage structure in the coastal area and farmers training, need full fledged market yards for sale and purchase
3	Banaskantha	405	Depletion of groundwater at a faster rate, poor soil org. C, labour scarcity	Rainwater harvesting and Micro irrigation, shredder, mechanization
4	Bharuch	954	Salinity problem in the coastal area The wide yield gap between irrigated and rainfed area	Need to develop salt-tolerant variety, reclamation of soil with suitable amendment, promotion of HDPS concept in rainfed areas and ICM in irrigated area and farmers training,
5	Dahod	12	Limited irrigation facilities, poor soil organic carbon	Need to strengthen of HDPS technology
6	Gandhinagar	297	Labour scarcity, water shortage, no refuge	Promotion of movable shredder, MIS, Water harvest, mechanization
7	Kheda	247	Salinity ingress, acute weed problem, Poor soil org. C., Monocropping, labour shortage	Need to develop salt-tolerant genotype, Mobile shredder for residue management, Mechanization and farmers training
8	Mehsana	545	Labour scarcity, water shortage, no refuge, lowering the water table	Promotion of movable shredder, MIS, Water harvest, partial mechanization
9	Narmada	468	Lack of irrigation facility in some area, light and hilly soil	Extension of existing canal may provide irrigation facility, use of organic manuring should be promoted, water harvesting through check dams

No.	District	Existing area (00ha)	Major Problem	Solutions
10	Panchmahal	121	Limited irrigation facilities, poor soil organic carbon	Promotion of HDPS, Mobile shredder, ICM and water harvesting
11	Patan	592	Labour scarcity, water shortage, no refuge, lowering the water table	Promotion of movable shredder, MIS, Water harvest, partial mechanization
12	Sabarkantha	1400	Labour scarcity, poor soil, labour migration	Promotion of movable shredder, MIS, training, water harvesting
13	Surat	27	Urbanization, labour shortage, salinity, water logging, poor storage, no refuge, indiscriminate use of pesticide	Mechanization, contract farming, resistance monitoring, IPM, Promotion of drainage structures, reclamation of soil with suitable amendments
14	Tapi	84	Illegal seeds, poor infrastructure	Promotion of Good Agriculture Practices, establishment of modern marketing yard easy and wide range seed supply
15	Vadodara	1297	Salinity and water logging, Urbanization and industrialization	Promotion of drainage structure, residue management, mechanization and MIS
16	Amreli	4135	Labour scarcity	Contract farming and mechanization
17	Bhavnagar	3864	Limited irrigation, poor soil	Water harvesting structure, ground water recharging, Residue management, shredder
18	Jamnagar	1423	Mono cropping, no refuge and improper input use	Resistance monitoring, inter cropping, shredder, mechanization
19	Junagadh	1298	Erratic and uneven rainfall, imbalance fertilizer ratio, The problem of a Wild cow (<i>need gai</i>) and pig, no refuge	MIS, ICM, Organic farming and inter cropping, shredder, fencing, Resistance monitoring
20	Kutch	575	Poor soil, salinity ingress, limited irrigation, labour scarcity, erratic rainfall	Mobile shredder, mechanization, MIS, Organic farming

No.	District	Existing area (00ha)	Major Problem	Solutions
21	Porbandar	211	Erratic and uneven rainfall, imbalance fertilizer ratio, salinity, no refuge, drought-prone area	MIS, ICM, Organic farming and intercropping, shredder, Resistance monitoring, Need to develop drought-resistant genotype
22	Rajkot	4646	Erratic and uneven rainfall, imbalance fertilizer ratio, Wild cow (<i>neel ga</i>) and pig, no refuge	MIS, ICM, Organic farming and intercropping , shredder, fencing, Resistance monitoring
23	Surendranagar	3776	Labour scarcity, Too many Bt hybrids, high input use in irrigated cotton, no refuge	Contract farming and mechanization, promoting organic farming and HDPS, Resistance monitoring

4.4.1.10 District-wise Detailed Action Plan with Cost:

Table 4.4.13: District Level Training of Agricultural Staff for Capacity Building and Skill Up-gradation in Cotton Crop for 2017-18 to 2019-20
[Physical- No. of trainees, Financial - Rs.in lakhs]

SR. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Kachchh	45	0.41	45	0.41	45	0.41	135	1.22
2	Banaskantha	25	0.23	25	0.23	25	0.23	75	0.68
3	Patan	35	0.32	35	0.32	35	0.32	105	0.95
4	Mehsana	35	0.32	35	0.32	35	0.32	105	0.95
5	Sabarkantha	75	0.68	75	0.68	75	0.68	225	2.03
6	Aravalli	15	0.14	15	0.14	15	0.14	45	0.41
7	Gandhinagar	20	0.18	20	0.18	20	0.18	60	0.54
8	Ahmedabad	110	0.99	110	0.99	110	0.99	330	2.97
9	Surendranagar	250	2.25	250	2.25	250	2.25	750	6.75
10	Morbi	40	0.36	40	0.36	40	0.36	120	1.08
11	Rajkot	160	1.44	160	1.44	160	1.44	480	4.32
12	Jamnagar	110	0.99	110	0.99	110	0.99	330	2.97
13	Devbhumi Dwarka	12	0.11	12	0.11	12	0.11	36	0.32
14	Porbandar	10	0.09	10	0.09	10	0.09	30	0.27
15	Junagadh	40	0.36	40	0.36	40	0.36	120	1.08
16	Gir Somnath	8	0.07	8	0.07	8	0.07	24	0.22
17	Amreli	200	1.80	200	1.80	200	1.80	600	5.40
18	Bhavnagar	160	1.44	160	1.44	160	1.44	480	4.32
19	Botad	40	0.36	40	0.36	40	0.36	120	1.08
20	Anand	5	0.05	5	0.05	5	0.05	15	0.14
21	Kheda	20	0.18	20	0.18	20	0.18	60	0.54
22	Panchmahal	8	0.07	8	0.07	8	0.07	24	0.22
23	Mahisagar	3	0.03	3	0.03	3	0.03	9	0.08
24	Dahod	2	0.02	2	0.02	2	0.02	6	0.05
25	Vadodara	100	0.90	100	0.90	100	0.90	300	2.70
26	ChotaUdepur	20	0.18	20	0.18	20	0.18	60	0.54
27	Narmada	25	0.23	25	0.23	25	0.23	75	0.68
28	Bharuch	70	0.63	70	0.63	70	0.63	210	1.89
29	Surat	5	0.05	5	0.05	5	0.05	15	0.14
30	Tapi	6	0.05	6	0.05	6	0.05	18	0.16
	Gujarat State	1654	14.89	1654	14.89	1654	14.89	4962	44.66

Cost Norms: @ Rs.900

Training for Farmers on Capacity Building and Skill Up-gradation for Cotton Crop during 2017-18 to 2019-20

Table 4.4.14: District-wise training of farmers on organic farming in cotton Crop (2017-18 to 2019-20), (Phy - No. groups, Fin - Rs. in Lakh)

Sr. No.	Zone and District	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
(I)	KUTCH								
1	Kutch	1000	6.00	1000	6.00	1000	6.00	3000	18.00
(II)	MIDDLE GUJARAT								
2	Ahmedabad	1000	6.00	1000	6.00	1000	6.00	3000	18.00
3	Anand	0	0.00	0	0.00	0	0.00	0	0.00
4	Chhota udaipur	0	0.00	0	0.00	0	0.00	0	0.00
5	Dahod	0	0.00	0	0.00	0	0.00	0	0.00
6	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
7	Mahisagar	0	0.00	0	0.00	0	0.00	0	0.00
8	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
9	Vadodara	0	0.00	0	0.00	0	0.00	0	0.00
(III)	NORTH GUJARAT								
10	Aravali	0	0.00	0	0.00	0	0.00	0	0.00
11	Banaskantha	0	0.00	0	0.00	0	0.00	0	0.00
12	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
13	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
14	Patan	0	0.00	0	0.00	0	0.00	0	0.00
15	Sabarkantha	0	0.00	0	0.00	0	0.00	0	0.00
(V)	SOUTH GUJARAT								
16	Bharuch	0	0.00	0	0.00	0	0.00	0	0.00
17	Narmada	0	0.00	0	0.00	0	0.00	0	0.00
18	Surat	0	0.00	0	0.00	0	0.00	0	0.00
19	Tapi	0	0.00	0	0.00	0	0.00	0	0.00
(IV)	SAURASHTRA								
20	Amreli	200	1.20	200	1.20	200	1.20	600	3.60
21	Bhavnagar	500	3.00	500	3.00	500	3.00	1500	9.00
22	Botad	200	1.20	200	1.20	200	1.20	600	3.60
23	Dev bhumi dwarka	0	0.00	0	0.00	0	0.00	0	0.00
24	Gir somnath	0	0.00	0	0.00	0	0.00	0	0.00
25	Jamnagar	0	0.00	0	0.00	0	0.00	0	0.00
26	Junagadh	0	0.00	0	0.00	0	0.00	0	0.00
27	Morbi	200	1.20	200	1.20	200	1.20	600	3.60
28	Porbandar	0	0.00	0	0.00	0	0.00	0	0.00
29	Rajkot	500	3.00	500	3.00	500	3.00	1500	9.00
30	Surendranagar	1000	6.00	1000	6.00	1000	6.00	3000	18.00
	Gujarat State	4600	27.60	4600	27.60	4600	27.60	13800	82.80

Cost Norms: @ Rs.600

Table 4.4.15: District-wise training of farmers on ICM in cotton Crop (2017-18 to 2019-20),
(Phy - No. groups, Fin - Rs. in Lakh)

Sr. No.	Zone and District	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
(I)	KUTCH								
1	Kutch	50	0.30	50	0.30	50	0.30	150	0.90
(II)	MIDDLE GUJARAT								
2	Ahmedabad	1000	6.00	1000	6.00	1000	6.00	3000	18.00
3	Anand	50	0.30	50	0.30	50	0.30	150	0.90
4	Chhota udaipur	500	3.00	500	3.00	500	3.00	1500	9.00
5	Dahod	100	0.60	100	0.60	100	0.60	300	1.80
6	Kheda	100	0.60	100	0.60	100	0.60	300	1.80
7	Mahisagar	200	1.20	200	1.20	200	1.20	600	3.60
8	Panchmahal	200	1.20	200	1.20	200	1.20	600	3.60
9	Vadodara	800	4.80	800	4.80	800	4.80	2400	14.40
(III)	NORTH GUJARAT								
10	Aravali	200	1.20	200	1.20	200	1.20	600	3.60
11	Banaskantha	200	1.20	200	1.20	200	1.20	600	3.60
12	Gandhinagar	100	0.60	100	0.60	100	0.60	300	1.80
13	Mehsana	300	1.80	300	1.80	300	1.80	900	5.40
14	Patan	1000	6.00	1000	6.00	1000	6.00	3000	18.00
15	Sabarkantha	1000	6.00	1000	6.00	1000	6.00	3000	18.00
(V)	SOUTH GUJARAT								
16	Bharuch	1000	6.00	1000	6.00	1000	6.00	3000	18.00
17	Narmada	100	0.60	100	0.60	100	0.60	300	1.80
18	Surat	50	0.30	50	0.30	50	0.30	150	0.90
19	Tapi	50	0.30	50	0.30	50	0.30	150	0.90
(IV)	SAURASHTRA								
20	Amreli	1000	6.00	1000	6.00	1000	6.00	3000	18.00
21	Bhavnagar	1000	6.00	1000	6.00	1000	6.00	3000	18.00
22	Botad	200	1.20	200	1.20	200	1.20	600	3.60
23	Dev bhumi dwarka	200	1.20	200	1.20	200	1.20	600	3.60
24	Gir somnath	300	1.80	300	1.80	300	1.80	900	5.40
25	Jamnagar	1000	6.00	1000	6.00	1000	6.00	3000	18.00
26	Junagadh	500	3.00	500	3.00	500	3.00	1500	9.00
27	Morbi	1000	6.00	1000	6.00	1000	6.00	3000	18.00
28	Porbandar	200	1.20	200	1.20	200	1.20	600	3.60
29	Rajkot	1000	6.00	1000	6.00	1000	6.00	3000	18.00
30	Surendranagar	200	1.20	200	1.20	200	1.20	600	3.60
	Gujarat State	13600	81.60	13600	81.60	13600	81.60	40800	244.80

Cost Norms: @ Rs.600

Table 4.4.16: District-wise training of farmers on seed production (variety) in cotton Crop (2017-18 to 2019-20), (Phy - No. groups, Fin - Rs. in Lakh)

Sr. No.	Zone and District	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
(I)	KUTCH								
1	KUTCH	12	0.07	12	0.07	12	0.07	36	0.22
(II)	MIDDLE GUJARAT								
2	AHMEDABAD	200	1.20	200	1.20	200	1.20	600	3.60
3	ANAND	10	0.06	10	0.06	10	0.06	30	0.18
4	CHHOTA UDAIPUR	10	0.06	10	0.06	10	0.06	30	0.18
5	DAHOD	10	0.06	10	0.06	10	0.06	30	0.18
6	KHEDA	20	0.12	20	0.12	20	0.12	60	0.36
7	MAHISAGAR	20	0.12	20	0.12	20	0.12	60	0.36
8	PANCHMAHAL	0	0.00	0	0.00	0	0.00	0	0.00
9	VADODARA	40	0.24	40	0.24	40	0.24	120	0.72
(III)	NORTH GUJARAT								
10	ARAVALI	0	0.00	0	0.00	0	0.00	0	0.00
11	BANASKANTHA	0	0.00	0	0.00	0	0.00	0	0.00
12	GANDHINAGAR	0	0.00	0	0.00	0	0.00	0	0.00
13	MEHSANA	0	0.00	0	0.00	0	0.00	0	0.00
14	PATAN	0	0.00	0	0.00	0	0.00	0	0.00
15	SABARKANTHA	0	0.00	0	0.00	0	0.00	0	0.00
(V)	SOUTH GUJARAT								
16	BHARUCH	200	1.20	200	1.20	200	1.20	600	3.60
17	NARMADA	100	0.60	100	0.60	100	0.60	300	1.80
18	SURAT	0	0.00	0	0.00	0	0.00	0	0.00
19	TAPI	0	0.00	0	0.00	0	0.00	0	0.00
(IV)	SAURASHTRA								
20	AMRELI	400	2.40	400	2.40	400	2.40	1200	7.20
21	BHAVNAGAR	0	0.00	0	0.00	0	0.00	0	0.00
22	BOTAD	0	0.00	0	0.00	0	0.00	0	0.00
23	DEV BHUMI DWARKA	0	0.00	0	0.00	0	0.00	0	0.00
24	GIR SOMNATH	0	0.00	0	0.00	0	0.00	0	0.00
25	JAMNAGAR	0	0.00	0	0.00	0	0.00	0	0.00
26	JUNAGADH	0	0.00	0	0.00	0	0.00	0	0.00
27	MORBI	0	0.00	0	0.00	0	0.00	0	0.00
28	PORBANDAR	0	0.00	0	0.00	0	0.00	0	0.00
29	RAJKOT	0	0.00	0	0.00	0	0.00	0	0.00
30	SURENDRANAGAR	800	4.80	800	4.80	800	4.80	2400	14.40
	Gujarat State	182	10.9	182	10.9	182	10.9	546	32.8
		2	3	2	3	2	3	6	0

Cost Norms: @ Rs.600

Table 4.4.17: District-wise training of farmers on seed production (hybrid) in cotton Crop (2017-18 to 2019-20), (Phy - No. groups, Fin - Rs. in Lakh)

Sr. No.	Zone and District	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
(I)	KUTCH								
1	KUTCH	0	0.00	0	0.00	0	0.00	0	0.00
(II)	MIDDLE GUJARAT								
2	AHMEDABAD	0	0.00	0	0.00	0	0.00	0	0.00
3	ANAND	0	0.00	0	0.00	0	0.00	0	0.00
4	CHHOTA UDAIPUR	0	0.00	0	0.00	0	0.00	0	0.00
5	DAHOD	0	0.00	0	0.00	0	0.00	0	0.00
6	KHEDA	0	0.00	0	0.00	0	0.00	0	0.00
7	MAHISAGAR	0	0.00	0	0.00	0	0.00	0	0.00
8	PANCHMAHAL	0	0.00	0	0.00	0	0.00	0	0.00
9	VADODARA	0	0.00	0	0.00	0	0.00	0	0.00
(III)	NORTH GUJARAT								
10	ARAVALI	200	1.20	200	1.20	200	1.20	600	3.60
11	BANASKANTHA	500	3.00	500	3.00	500	3.00	1500	9.00
12	GANDHINAGAR	0	0.00	0	0.00	0	0.00	0	0.00
13	MEHSANA	200	1.20	200	1.20	200	1.20	600	3.60
14	PATAN	0	0.00	0	0.00	0	0.00	0	0.00
15	SABARKANTHA	500	3.00	500	3.00	500	3.00	1500	9.00
(V)	SOUTH GUJARAT								
16	BHARUCH	0	0.00	0	0.00	0	0.00	0	0.00
17	NARMADA	0	0.00	0	0.00	0	0.00	0	0.00
18	SURAT	0	0.00	0	0.00	0	0.00	0	0.00
19	TAPI	0	0.00	0	0.00	0	0.00	0	0.00
(IV)	SAURASHTRA								
20	AMRELI	0	0.00	0	0.00	0	0.00	0	0.00
21	BHAVNAGAR	0	0.00	0	0.00	0	0.00	0	0.00
22	BOTAD	0	0.00	0	0.00	0	0.00	0	0.00
23	DEV BHUMI DWARKA	0	0.00	0	0.00	0	0.00	0	0.00
24	GIR SOMNATH	0	0.00	0	0.00	0	0.00	0	0.00
25	JAMNAGAR	0	0.00	0	0.00	0	0.00	0	0.00
26	JUNAGADH	0	0.00	0	0.00	0	0.00	0	0.00
27	MORBI	0	0.00	0	0.00	0	0.00	0	0.00
28	PORBANDAR	0	0.00	0	0.00	0	0.00	0	0.00
29	RAJKOT	0	0.00	0	0.00	0	0.00	0	0.00
30	SURENDRANAGAR	0	0.00	0	0.00	0	0.00	0	0.00
	Gujarat State	1400	8.40	1400	8.40	1400	8.40	4200	25.20

Cost Norms: @ Rs.600

Table 4.4.18: District-wise training of farmers on HDPS in cotton Crop (2017-18 to 2019-20),
Phy - No. groups, Fin - Rs. in Lakh)

Sr. No.	Zone and District	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
(I)	KUTCH								
1	KUTCH	0	0.00	0	0.00	0	0.00	0	0.00
(II)	MIDDLE GUJARAT								
2	AHMEDABAD	1000	6.00	1000	6.00	1000	6.00	3000	18.00
3	ANAND	0	0.00	0	0.00	0	0.00	0	0.00
4	CHHOTA UDAIPUR	0	0.00	0	0.00	0	0.00	0	0.00
5	DAHOD	0	0.00	0	0.00	0	0.00	0	0.00
6	KHEDA	20	0.12	20	0.12	20	0.12	60	0.36
7	MAHISAGAR	0	0.00	0	0.00	0	0.00	0	0.00
8	PANCHMAHAL	0	0.00	0	0.00	0	0.00	0	0.00
9	VADODARA	1000	6.00	1000	6.00	1000	6.00	3000	18.00
(III)	NORTH GUJARAT								
10	ARAVALI	0	0.00	0	0.00	0	0.00	0	0.00
11	BANASKANTHA	200	1.20	200	1.20	200	1.20	600	3.60
12	GANDHINAGAR	0	0.00	0	0.00	0	0.00	0	0.00
13	MEHSANA	0	0.00	0	0.00	0	0.00	0	0.00
14	PATAN	0	0.00	0	0.00	0	0.00	0	0.00
15	SABARKANTHA	0	0.00	0	0.00	0	0.00	0	0.00
(V)	SOUTH GUJARAT								
16	BHARUCH	1000	6.00	1000	6.00	1000	6.00	3000	18.00
17	NARMADA	100	0.60	100	0.60	100	0.60	300	1.80
18	SURAT	0	0.00	0	0.00	0	0.00	0	0.00
19	TAPI	200	1.20	200	1.20	200	1.20	600	3.60
(IV)	SAURASHTRA								
20	AMRELI	1000	6.00	1000	6.00	1000	6.00	3000	18.00
21	BHAVNAGAR	700	4.20	700	4.20	700	4.20	2100	12.60
22	BOTAD	170	1.02	170	1.02	170	1.02	510	3.06
23	DEV BHUMI DWARKA	50	0.30	50	0.30	50	0.30	150	0.90
24	GIR SOMNATH	35	0.21	35	0.21	35	0.21	105	0.63
25	JAMNAGAR	450	2.70	450	2.70	450	2.70	1350	8.10
26	JUNAGADH	200	1.20	200	1.20	200	1.20	600	3.60
27	MORBI	175	1.05	175	1.05	175	1.05	525	3.15
28	PORBANDAR	40	0.24	40	0.24	40	0.24	120	0.72
29	RAJKOT	720	4.32	720	4.32	720	4.32	2160	12.96
30	SURENDRANAGAR	1000	6.00	1000	6.00	1000	6.00	3000	18.00
	Gujarat State	8060	48.36	8060	48.36	8060	48.36	24180	145.08

Cost Norms: @ Rs.600

Table 4.4.19: District-wise training of farmers on Insecticide/ transgenes resistance management in cotton Crop (2017-18 to 2019-20),
(Phy - No. groups, Fin - Rs. in Lakh)

Sr. No.	Zone and District	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
(I)	Kutch								
1	Kutch	200	1.20	200	1.20	200	1.20	600	3.60
(II)	MIDDLE GUJARAT								
2	Ahmedabad	500	3.00	500	3.00	500	3.00	1500	9.00
3	Anand	0	0.00	0	0.00	0	0.00	0	0.00
4	Chhota udaipur	0	0.00	0	0.00	0	0.00	0	0.00
5	Dahod	0	0.00	0	0.00	0	0.00	0	0.00
6	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
7	Mahisagar	0	0.00	0	0.00	0	0.00	0	0.00
8	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
9	Vadodara	200	1.20	200	1.20	200	1.20	600	3.60
(III)	NORTH GUJARAT								
10	Aravali	0	0.00	0	0.00	0	0.00	0	0.00
11	Banaskantha	0	0.00	0	0.00	0	0.00	0	0.00
12	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
13	Mehsana	200	1.20	200	1.20	200	1.20	600	3.60
14	Patan	0	0.00	0	0.00	0	0.00	0	0.00
15	Sabarkantha	0	0.00	0	0.00	0	0.00	0	0.00
(V)	SOUTH GUJARAT								
16	Bharuch	0	0.00	0	0.00	0	0.00	0	0.00
17	Narmada	0	0.00	0	0.00	0	0.00	0	0.00
18	Surat	0	0.00	0	0.00	0	0.00	0	0.00
19	Tapi	0	0.00	0	0.00	0	0.00	0	0.00
(IV)	SAURASHTRA								
20	Amreli	500	3.00	500	3.00	500	3.00	1500	9.00
21	Bhavnagar	400	2.40	400	2.40	400	2.40	1200	7.20
22	Botad	0	0.00	0	0.00	0	0.00	0	0.00
23	Dev bhumi dwarka	0	0.00	0	0.00	0	0.00	0	0.00
24	Gir somnath	0	0.00	0	0.00	0	0.00	0	0.00
25	Jamnagar	500	3.00	500	3.00	500	3.00	1500	9.00
26	Junagadh	200	1.20	200	1.20	200	1.20	600	3.60
27	Morbi	500	3.00	500	3.00	500	3.00	1500	9.00
28	Porbandar	0	0.00	0	0.00	0	0.00	0	0.00
29	Rajkot	500	3.00	500	3.00	500	3.00	1500	9.00
30	Surendranagar	600	3.60	600	3.60	600	3.60	1800	10.80
	Gujarat State	4300	25.80	4300	25.80	4300	25.80	12900	77.40

Cost Norms: @ Rs.600

Table 4.4.20: District-wise Varietal Demonstrations for Cotton Crop

(2017-18 to 2019-20), Phy - No. groups, Fin - Rs. in Lakh

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Kachchh	45	2.25	45	2.25	45	2.25	135	6.75
2	Banaskantha	25	1.25	25	1.25	25	1.25	75	3.75
3	Patan	35	1.75	35	1.75	35	1.75	105	5.25
4	Mehsana	40	2.00	40	2.00	40	2.00	120	6.00
5	Sabarkantha	75	3.75	75	3.75	75	3.75	225	11.25
6	Aravalli	15	0.75	15	0.75	15	0.75	45	2.25
7	Gandhinagar	20	1.00	20	1.00	20	1.00	60	3.00
8	Ahmedabad	120	6.00	120	6.00	120	6.00	360	18.00
9	Surendranagar	280	14.00	280	14.00	280	14.00	840	42.00
10	Morbi	45	2.25	45	2.25	45	2.25	135	6.75
11	Rajkot	200	10.00	200	10.00	200	10.00	600	30.00
12	Jamnagar	120	6.00	120	6.00	120	6.00	360	18.00
13	Devbhumi Dwarka	12	0.60	12	0.60	12	0.60	36	1.80
14	Porbandar	10	0.50	10	0.50	10	0.50	30	1.50
15	Junagadh	50	2.50	50	2.50	50	2.50	150	7.50
16	Gir Somnath	8	0.40	8	0.40	8	0.40	24	1.20
17	Amreli	230	11.50	230	11.50	230	11.50	690	34.50
18	Bhavnagar	200	10.00	200	10.00	200	10.00	600	30.00
19	Botad	40	2.00	40	2.00	40	2.00	120	6.00
20	Anand	5	0.25	5	0.25	5	0.25	15	0.75
21	Kheda	20	1.00	20	1.00	20	1.00	60	3.00
22	Panchmahal	8	0.40	8	0.40	8	0.40	24	1.20
23	Mahisagar	3	0.15	3	0.15	3	0.15	9	0.45
24	Dahod	2	0.10	2	0.10	2	0.10	6	0.30
25	Vadodara	100	5.00	100	5.00	100	5.00	300	15.00
26	ChotaUdepur	20	1.00	20	1.00	20	1.00	60	3.00
27	Narmada	25	1.25	25	1.25	25	1.25	75	3.75
28	Bharuch	70	3.50	70	3.50	70	3.50	210	10.50
29	Surat	5	0.25	5	0.25	5	0.25	15	0.75
30	Tapi	6	0.30	6	0.30	6	0.30	18	0.90
	Gujarat State	1834	91.70	1834	91.70	1834	91.70	5502	275.10

Cost Norms: @ Rs.5000

Table 4.4.21: District-wise INM Demonstrations for Cotton Crop

(2017-18 to 2019-20), Phy - No. groups, Fin - Rs. in Lakh

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Kachchh	60	3.00	60	3.00	60	3.00	180	9.00
2	Banaskantha	40	2.00	40	2.00	40	2.00	120	6.00
3	Patan	50	2.50	50	2.50	50	2.50	150	7.50
4	Mehsana	52	2.60	52	52.00	40	2.00	144	56.60
5	Sabarkantha	100	5.00	100	5.00	100	5.00	300	15.00
6	Aravalli	22	1.10	22	1.10	22	1.10	66	3.30
7	Gandhinagar	30	1.50	30	1.50	30	1.50	90	4.50
8	Ahmedabad	180	9.00	180	9.00	180	9.00	540	27.00
9	Surendranagar	380	19.00	380	19.00	380	19.00	1140	57.00
10	Morbi	65	3.25	65	3.25	65	3.25	195	9.75
11	Rajkot	260	13.00	260	13.00	260	13.00	780	39.00
12	Jamnagar	180	9.00	180	9.00	180	9.00	540	27.00
13	Devbhumi Dwarka	18	0.90	18	0.90	18	0.90	54	2.70
14	Porbandar	16	0.80	16	0.80	16	0.80	48	2.40
15	Junagadh	80	4.00	80	4.00	80	4.00	240	12.00
16	Gir Somnath	12	0.60	12	0.60	12	0.60	36	1.80
17	Amreli	350	17.50	350	17.50	350	17.50	1050	52.50
18	Bhavnagar	250	12.50	250	12.50	250	12.50	750	37.50
19	Botad	60	3.00	60	3.00	60	3.00	180	9.00
20	Anand	5	0.25	5	0.25	5	0.25	15	0.75
21	Kheda	25	1.25	25	1.25	25	1.25	75	3.75
22	Panchmahal	12	0.60	12	0.60	12	0.60	36	1.80
23	Mahisagar	4	0.20	4	0.20	4	0.20	12	0.60
24	Dahod	2	0.10	2	0.10	2	0.10	6	0.30
25	Vadodara	140	7.00	140	7.00	140	7.00	420	21.00
26	ChotaUdepur	30	1.50	30	1.50	30	1.50	90	4.50
27	Narmada	40	2.00	40	2.00	40	2.00	120	6.00
28	Bharuch	100	5.00	100	5.00	100	5.00	300	15.00
29	Surat	6	0.30	6	0.30	6	0.30	18	0.90
30	Tapi	9	0.45	9	0.45	9	0.45	27	1.35
	Gujarat State	2578	128.90	2578	178.30	2566	128.30	7722	435.50

Cost Norms: @ Rs.5000

Table 4.4.22: Resource Conservation (Inter Cropping) Demonstrations for Cotton Crop (2017-18 to 2019-20), Phy - No. groups, Fin - Rs. in Lakh

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Kachchh	50	2.50	50	2.50	50	2.50	150	7.50
2	Banaskantha	40	2.00	40	2.00	40	2.00	120	6.00
3	Patan	60	3.00	60	3.00	60	3.00	180	9.00
4	Mehsana	52	2.60	52	2.60	52	2.60	156	7.80
5	Sabarkantha	75	3.75	75	3.75	75	3.75	225	11.25
6	Aravalli	70	3.50	70	3.50	70	3.50	210	10.50
7	Gandhinagar	30	1.50	30	1.50	30	1.50	90	4.50
8	Ahmedabad	150	7.50	150	7.50	150	7.50	450	22.50
9	Surendranagar	320	16.00	320	16.00	320	16.00	960	48.00
10	Morbi	60	3.00	60	3.00	60	3.00	180	9.00
11	Rajkot	230	11.50	230	11.50	230	11.50	690	34.50
12	Jamnagar	150	7.50	150	7.50	150	7.50	450	22.50
13	Devbhumi Dwarka	45	2.25	45	2.25	45	2.25	135	6.75
14	Porbandar	30	1.50	20	1.00	20	1.00	70	3.50
15	Junagadh	100	5.00	100	5.00	100	5.00	300	15.00
16	Gir Somnath	35	1.75	35	1.75	35	1.75	105	5.25
17	Amreli	400	20.00	400	20.00	400	20.00	1200	60.00
18	Bhavnagar	220	11.00	220	11.00	220	11.00	660	33.00
19	Botad	170	8.50	170	8.50	170	8.50	510	25.50
20	Anand	5	0.25	5	0.25	5	0.25	15	0.75
21	Kheda	25	1.25	25	1.25	25	1.25	75	3.75
22	Panchmahal	12	0.60	12	0.60	12	0.60	36	1.80
23	Mahisagar	13	0.65	13	0.65	13	0.65	39	1.95
24	Dahod	2	0.10	2	0.10	2	0.10	6	0.30
25	Vadodara	110	5.50	110	5.50	110	5.50	330	16.50
26	ChotaUdepur	25	1.25	25	1.25	25	1.25	75	3.75
27	Narmada	50	2.50	50	2.50	50	2.50	150	7.50
28	Bharuch	100	5.00	100	5.00	100	5.00	300	15.00
29	Surat	5	0.25	5	0.25	5	0.25	15	0.75
30	Tapi	10	0.50	10	0.50	10	0.50	30	1.50
	Gujarat State	2644	132.20	2634	181.10	2634	131.70	7912	445.00

Cost Norms: @ Rs.5000

Table 4.4.23: District-wise IPM Demonstrations for Cotton Crop

(2017-18 to 2019-20), Phy - No. groups, Fin - Rs. in Lakh

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Kachchh	12	0.60	12	0.60	12	0.60	36	1.80
2	Banaskantha	8	0.40	8	0.40	8	0.40	24	1.20
3	Patan	12	0.60	12	0.60	12	0.60	36	1.80
4	Mehsana	15	0.75	15	52.00	15	0.75	45	53.50
5	Sabarkantha	20	1.00	20	1.00	20	1.00	60	3.00
6	Aravalli	5	0.25	5	0.25	5	0.25	15	0.75
7	Gandhinagar	6	0.30	6	0.30	6	0.30	18	0.90
8	Ahmedabad	36	1.80	36	1.80	36	1.80	108	5.40
9	Surendranagar	76	3.80	76	3.80	76	3.80	228	11.40
10	Morbi	38	1.90	38	1.90	38	1.90	114	5.70
11	Rajkot	52	2.60	52	2.60	52	2.60	156	7.80
12	Jamnagar	36	1.80	36	1.80	36	1.80	108	5.40
13	Devbhumi Dwarka	9	0.45	9	0.45	9	0.45	27	1.35
14	Porbandar	4	0.20	4	0.20	4	0.20	12	0.60
15	Junagadh	20	1.00	20	1.00	20	1.00	60	3.00
16	Gir Somnath	7	0.35	7	0.35	7	0.35	21	1.05
17	Amreli	80	4.00	80	4.00	80	4.00	240	12.00
18	Bhavnagar	50	2.50	50	2.50	50	2.50	150	7.50
19	Botad	30	1.50	30	1.50	30	1.50	90	4.50
20	Anand	2	0.10	2	0.10	2	0.10	6	0.30
21	Kheda	5	0.25	5	0.25	5	0.25	15	0.75
22	Panchmahal	3	0.15	3	0.15	3	0.15	9	0.45
23	Mahisagar	3	0.15	3	0.15	3	0.15	9	0.45
24	Dahod	5	0.25	5	0.25	5	0.25	15	0.75
25	Vadodara	30	1.50	30	1.50	30	1.50	90	4.50
26	ChotaUdepur	18	0.90	18	0.90	18	0.90	54	2.70
27	Narmada	10	0.50	10	0.50	10	0.50	30	1.50
28	Bharuch	20	1.00	20	1.00	20	1.00	60	3.00
29	Surat	2	0.10	2	0.10	2	0.10	6	0.30
30	Tapi	2	0.10	2	0.10	2	0.10	6	0.30
	Gujarat State	616	30.80	616	82.05	616	30.80	1848	143.65

Cost Norms: @ Rs.5000

Table 4.4.24: District-wise Seed Treatment Demonstrations for Desi Cotton – Seed Prod. (2017-18 to 2019-20), Phy - No. groups, Fin - Rs. in Lakh

SR. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Kachchh	12	0.60	12	0.60	12	0.60	36	1.80
2	Banaskantha	0	0.00	0	0.00	0	0.00	0	0.00
3	Patan	0	0.00	0	0.00	0	0.00	0	0.00
4	Mehsana	0	0.00	0	52.00	0	0.00	0	52.00
5	Sabarkantha	0	0.00	0	0.00	0	0.00	0	0.00
6	Aravalli	0	0.00	0	0.00	0	0.00	0	0.00
7	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
8	Ahmedabad	200	10.00	200	10.00	200	10.00	600	30.00
9	Surendranagar	800	40.00	800	40.00	800	40.00	2400	120.00
10	Morbi	0	0.00	0	0.00	0	0.00	0	0.00
11	Rajkot	0	0.00	0	0.00	0	0.00	0	0.00
12	Jamnagar	0	0.00	0	0.00	0	0.00	0	0.00
13	Devbhumi Dwarka	0	0.00	0	0.00	0	0.00	0	0.00
14	Porbandar	0	0.00	0	0.00	0	0.00	0	0.00
15	Junagadh	0	0.00	0	0.00	0	0.00	0	0.00
16	Gir Somnath	0	0.00	0	0.00	0	0.00	0	0.00
17	Amreli	400	20.00	400	20.00	400	20.00	1200	60.00
18	Bhavnagar	0	0.00	0	0.00	0	0.00	0	0.00
19	Botad	0	0.00	0	0.00	0	0.00	0	0.00
20	Anand	10	0.50	10	0.50	10	0.50	30	1.50
21	Kheda	20	1.00	20	1.00	20	1.00	60	3.00
22	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
23	Mahisagar	20	1.00	20	1.00	20	1.00	60	3.00
24	Dahod	5	0.25	5	0.25	5	0.25	15	0.75
25	Vadodara	40	2.00	40	2.00	40	2.00	120	6.00
26	ChotaUdepur	0	0.00	0	0.00	0	0.00	0	0.00
27	Narmada	100	5.00	100	5.00	100	5.00	300	15.00
28	Bharuch	200	10.00	200	10.00	200	10.00	600	30.00
29	Surat	0	0.00	0	0.00	0	0.00	0	0.00
30	Tapi	0	0.00	0	0.00	0	0.00	0	0.00
	Gujarat State	1807	90.35	1807	142.35	1807	90.35	5421	323.05

Cost Norms: @ Rs.5000

Table 4.4.25: District-wise Detopping Demonstrations for Cotton Crop

(2017-18 to 2019-20), Phy - No. groups, Fin - Rs. in Lakh

Sr. No.	District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Kachchh	0	0.00	0	0.00	0	0.00	0	0.00
2	Banaskantha	0	0.00	0	0.00	0	0.00	0	0.00
3	Patan	0	0.00	0	0.00	0	0.00	0	0.00
4	Mehsana	0	0.00	0	0.00	0	0.00	0	0.00
5	Sabarkantha	0	0.00	0	0.00	0	0.00	0	0.00
6	Aravalli	0	0.00	0	0.00	0	0.00	0	0.00
7	Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
8	Ahmedabad	0	0.00	0	0.00	0	0.00	0	0.00
9	Surendranagar	240	12.00	240	12.00	240	12.00	720	36.00
10	Morbi	50	2.50	50	2.50	50	2.50	150	7.50
11	Rajkot	160	8.00	160	8.00	160	8.00	480	24.00
12	Jamnagar	100	5.00	100	5.00	100	5.00	300	15.00
13	Devbhumi Dwarka	10	0.50	10	0.50	10	0.50	30	1.50
14	Porbandar	10	0.50	10	0.50	10	0.50	30	1.50
15	Junagadh	50	2.50	50	2.50	50	2.50	150	7.50
16	Gir Somnath	10	0.50	10	0.50	10	0.50	30	1.50
17	Amreli	200	10.00	200	10.00	200	10.00	600	30.00
18	Bhavnagar	150	7.50	150	7.50	150	7.50	450	22.50
19	Botad	40	2.00	40	2.00	40	2.00	120	6.00
20	Anand	0	0.00	0	0.00	0	0.00	0	0.00
21	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
22	Panchmahal	0	0.00	0	0.00	0	0.00	0	0.00
23	Mahisagar	0	0.00	0	0.00	0	0.00	0	0.00
24	Dahod	0	0.00	0	0.00	0	0.00	0	0.00
25	Vadodara	0	0.00	0	0.00	0	0.00	0	0.00
26	ChotaUdepur	0	0.00	0	0.00	0	0.00	0	0.00
27	Narmada	0	0.00	0	0.00	0	0.00	0	0.00
28	Bharuch	0	0.00	0	0.00	0	0.00	0	0.00
29	Surat	0	0.00	0	0.00	0	0.00	0	0.00
30	Tapi	0	0.00	0	0.00	0	0.00	0	0.00
	Gujarat State	1020	51.00	1020	51.00	1020	51.00	3060	153.00

Cost Norms: @ Rs.5000

Table 4.4.26: District level planning for Farmers Field School (FFS) for 2017-18 to 2019-20, (Physical(phy)- No. of FFS, Financial(Fin) Rs.in lakhs)

SR. No.	Zone and District	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
(I)	KUTCH								
1	Kutch	10	2.0	10	2.0	10	2.0	30	6.0
(II)	MIDDLE GUJARAT								
2	Ahmedabad	30	6.0	30	6.0	30	6.0	90	18.0
3	Anand	2	0.4	2	0.4	2	0.4	6	1.2
4	Chhota udaipur	19	3.8	19	3.8	19	3.8	57	11.4
5	Dahod	1	0.2	1	0.2	1	0.2	3	0.6
6	Kheda	4	0.8	4	0.8	4	0.8	12	2.4
7	Mahisagar	2	0.4	2	0.4	2	0.4	6	1.2
8	Panchmahal	2	0.4	2	0.4	2	0.4	6	1.2
9	Vadodara	20	4.0	20	4.0	20	4.0	60	12.0
(III)	NORTH GUJARAT								
10	Aravali	12	2.4	12	2.4	12	2.4	36	7.2
11	Banaskantha	8	1.6	8	1.6	8	1.6	24	4.8
12	Gandhinagar	6	1.2	6	1.2	6	1.2	18	3.6
13	Mehsana	11	2.2	11	2.2	11	2.2	33	6.6
14	Patan	12	2.4	12	2.4	12	2.4	36	7.2
15	Sabarkantha	15	3.0	15	3.0	15	3.0	45	9.0
(IV)	SOUTH GUJARAT								
16	Bharuch	19	3.8	19	3.8	19	3.8	57	11.4
17	Narmada	10	2.0	10	2.0	10	2.0	30	6.0
18	Surat	1	0.2	1	0.2	1	0.2	3	0.6
19	Tapi	2	0.4	2	0.4	2	0.4	6	1.2
(V)	SAURASHTRA								
20	Amreli	60	12.0	60	12.0	60	12.0	180	36.0
21	Bhavnagar	40	8.0	40	8.0	40	8.0	120	24.0
22	Botad	30	6.0	30	6.0	30	6.0	90	18.0
23	Dev bhumi dwarka	10	2.0	10	2.0	10	2.0	30	6.0
24	Gir somnath	7	1.4	7	1.4	7	1.4	21	4.2
25	Jamnagar	35	7.0	35	7.0	35	7.0	105	21.0
26	Junagadh	19	3.8	19	3.8	19	3.8	57	11.4
27	Morbi	38	7.6	38	7.6	38	7.6	114	22.8
28	Porbandar	4	0.8	4	0.8	4	0.8	12	2.4
29	Rajkot	50	10.0	50	10.0	50	10.0	150	30.0
30	Surendranagar	110	22.0	110	22.0	110	22.0	330	66.0
	Gujarat State	589	117.8	589	117.8	589	117.8	1767	353.4

Cost norms – Rs 20,000/ FFS

Table 4.4.27: Group Formation/Commodity Interest Group Formation for Specific Activities for Cotton Crop

District	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
(I) Organic Farming								
Kutch	2	0.40	2	0.40	2	0.40	6	1.20
Ahmedabad	10	2.00	10	2.00	10	2.00	30	6.00
Surendranagar	15	3.00	15	3.00	15	3.00	45	9.00
Amreli	15	3.00	15	3.00	15	3.00	45	9.00
Bhavnagar	10	2.00	10	2.00	10	2.00	30	6.00
Botad	3	0.60	3	0.60	3	0.60	9	1.80
Devbhumi Dwarka	1	0.20	1	0.20	1	0.20	3	0.60
Gir Somnath	1	0.20	1	0.20	1	0.20	3	0.60
Jamnagar	3	0.60	3	0.60	3	0.60	9	1.80
Junagadh	2	0.40	2	0.40	2	0.40	6	1.20
Morbi	3	0.60	3	0.60	3	0.60	9	1.80
Porbandar	1	0.20	1	0.20	1	0.20	3	0.60
Rajkot	12	2.40	12	2.40	12	2.40	36	7.20
Sub total (Org. Farm.)	78	15.60	78	15.60	78	15.60	234	46.80
Solar charkha spinning, weaving								
Kutch	20	4.00	40	8.00	50	10.00	110	22.00
Tapi	20	4.00	40	8.00	50	10.00	110	22.00
Sub total (Spinning/ weaving)	40	8.0	80	16.0	100	20.00	220	44.00
(II) HDPS								
Bharuch	4	0.80	4	0.80	4	0.80	12	2.40
Vadodara	5	1.00	5	1.00	5	1.00	15	3.00
Banaskantha	3	0.60	3	0.60	3	0.60	9	1.80
Sabarkantha	3	0.60	3	0.60	3	0.60	9	1.80
Narmada	2	0.40	2	0.40	2	0.40	6	1.20
Tapi	1	0.20	1	0.20	1	0.20	3	0.60
Ahmedabad	5	1.00	5	1.00	5	1.00	15	3.00
Surendranagar	15	3.00	15	3.00	15	3.00	45	9.00
Amreli	15	3.00	15	3.00	15	3.00	45	9.00
Bhavnagar	11	2.20	11	2.20	11	2.20	33	6.60
Botad	3	0.60	3	0.60	3	0.60	9	1.80
Devbhumi Dwarka	2	0.40	2	0.40	2	0.40	6	1.20
Gir Somnath	2	0.40	2	0.40	2	0.40	6	1.20
Jamnagar	8	1.60	8	1.60	8	1.60	24	4.80
Junagadh	3	0.60	3	0.60	3	0.60	9	1.80
Morbi	3	0.60	3	0.60	3	0.60	9	1.80
Porbandar	2	0.40	2	0.40	2	0.40	6	1.20
Rajkot	12	2.40	12	2.40	12	2.40	36	7.20
Sub total (HDPS)	99	19.80	99	19.80	99	19.80	297	59.40
Total	217	43.40	257	51.40	277	55.40	751	150.20

Cost norms- Rs.0.20 lakhs/group

Table 4.4.28: Physical (nos.) and Financial (Rs. In lakhs) Program Proposed for Development of Cotton under SAP (Sum of All Districts) – 2017-18 to 2019-20

SN	Activity /Projects	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	Staff training (skill upgradation)	1654	14.89	1654	14.89	1654	14.89	4962	44.66
	Farmers	38082	228.49	38082	228.49	38082	228.49	114246	685.48
	Total	39736	243.38	39736	243.38	39736	243.38	119208	730.13
2	Demonstration								
	Varietal	1834	91.70	1834	91.70	1834	91.70	5502	275.10
	INM	2578	128.90	2578	128.90	2578	128.90	7734	386.70
	Intercropping	2644	132.20	2644	132.20	2644	132.20	7932	396.60
	IPM	616	30.80	616	30.80	616	30.80	1848	92.40
	Seed Treatment (Desi)	1807	90.35	1807	90.35	1807	90.35	5421	271.05
	Detopping	1020	51.00	1020	51.00	1020	51.00	3060	153.00
	Total	10499	524.95	10499	524.95	10499	524.95	31497	1574.85
	Other Activities								
3	FFS	589	117.80	589	117.80	589	117.80	1767	353.40
4	FG	217	43.40	257	51.40	277	55.40	751	150.20
	Total	806	161.20	846	169.20	866	173.20	2518	503.60
	Grand Total	51041	929.53	51081	937.53	51101	941.53	153223	2808.58

4.4.1.10 Researchable Issues:

- Cropping sequence
- Breed varieties having compact plant habit
- Research in different cropping systems,
- Relook at soil test values, change in the recommendations
- Soil test crop response studies should on the basis for nutrient recommendations, besides the cropping systems, and targeted crop yields
- Research on micro nutrient should be strengthened
- Standardize plant geometry
- Breed / identify suitable variety
- To breed / identify tolerant and early maturing varieties/ hybrids
- Need to develop salinity tolerance genotype,
- Research needs for GMS line,
- Need to Research on HDPS technology in rainfed areas

4.4.2 SUGARCANE:**4.4.2.1 Background:**

Sugarcane is an important international cash crop and in India, it has economical, political and sociological significance. It is the second largest agro-industry next to textiles. It is a major source of food, fuel, fodder and fibers. Sugarcane is a tropical crop and is the major source of sucrose. Cane sugar constitutes around 77 % of total production in the world, the rest being contributed by beet sugar and other sources such as hydrolyzed products from starches. Sugarcane is cultivated in around 4.95 million hectares, producing 304 million tonnes of cane at approximately 61.3 tonnes/ha in India.

4.4.2.2 Area, Production, Productivity and Recovery of Sugarcane in Gujarat:

**Table – 4.4.29 District-wise Sugarcane - Area Production and Productivity
2014-15 and 2015-16**

Sr. No.	District	Area: 00" hact. Prod: 00 MT"			Yield : kg/ha			Average		
		2014-15			2015-16			Average		
		A	P	Y	A	P	Y	A	P	Y
1	Kachchh	6.19	0	0	0.00	0	0	3.10	0	0
2	Banaskantha	0.00	0	0	0.00	0	0	0.00	0	0
3	Patan	0.00	0	0	0.00	0	0	0.00	0	0
4	Mehesana	0.00	0	0	0.00	0	0	0.00	0	0
5	Sabarkantha	0.00	0	0	0.00	0	0	0.00	0	0
6	Arvali	0.00	0	0	0.00	0	0	0.00	0	0
7	Gandhinagar	0.00	0	0	0.00	0	0	0.00	0	0
8	Ahmedabad	0.00	0	0	0.00	0	0	0.00	0	0
9	Surendranagar	0.00	0	0	0.00	0	0	0.00	0	0
10	Morbi	0.73	0	0	0.50	0	0	0.62	0	0
11	Rajkot	0.23	0	0	2.10	0	0	1.17	0	0
12	Jamnagar	0.85	0	0	0.00	0	0	0.43	0	0
13	Devbhumi Dwarka	0.00	0	0	0.00	0	0	0.00	0	0
14	Porbandar	0.00	0	0	0.00	0	0	0.00	0	0
15	Junagadh	0.00	0	0	0.05	0	0	0.03	0	0
16	Gir Somnath	76.70	0	0	34.40	0	0	55.55	0	0
17	Amreli	0.40	0	0	0.57	0	0	0.49	0	0
18	Bhavnagar	0.41	0	0	12.05	0	0	6.23	0	0
19	Botad	0.00	0	0	0.00	0	0	0.00	0	0
20	Anand	0.00	0	0	0.00	0	0	0.00	0	0
21	Kheda	0.02	0	0	0.02	0	0	0.02	0	0
22	Panchmahal	0.00	0	0	0.00	0	0	0.00	0	0
23	Mahisagar	0.00	0	0	0.30	0	0	0.15	0	0

CASH CROPS

24	Dahod	0.00	0	0	0.00	0	0	0.00	0	0
25	Vadodara	64.90	0	0	100.10	0	0	82.50	0	0
26	Chhotaudepur	0.00	0	0	0.00	0	0	0.00	0	0
27	Narmada	67.15	0	0	67.92	0	0	67.54	0	0
28	Bharuch	364.25	0	0	214.55	0	0	289.40	0	0
29	Surat	980.25	0	0	663.10	0	0	821.68	0	0
30	Dang	1.63	0	0	1.67	0	0	1.65	0	0
31	Navsari	179.22	0	0	144.98	0	0	162.10	0	0
32	Valsad	71.72	0	0	72.80	0	0	72.26	0	0
33	Tapi	270.88	0	0	256.19	0	0	263.54	0	0
	Gujarat state	2085.53	0	0	1571.30	0	0	1828.42	0	0

Table – 4.4.30 District-wise Sugarcane - Area Production and Productivity (2011 to 2014)

Sr. No	DISTRICT	2011-12			2012-13			2013-14			AVERAGE		
		A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	Ahmedabad	0	0	0	0	0	0	0	0	0	0	0	0
2	Anand	0	0	0	0	0	0	0	0	0	0	0	0
3	Banaskantha	0	0	0	0	0	0	0	0	0	0	0	0
4	Bharuch	188	11630	61860	275	17739	64599	210	15662	74600	224	15010	66955
5	Dahod	0	0	0	0	0	0	0	0	0	0	0	0
6	Dang	1	55	54500	0	0	0	0	0	0	1.00	54.50	54500
7	Gandhinagar	0	0	0	0	0	0	0	0	0	0	0	0
8	Kheda	0	0	0	3	216	71760	0.02	0.00	0.00	2.27	161.46	71285
9	Mehsana	0	0	0	0	0	0	0	0	0	0	0	0
10	Narmada	100	7040	70400	94	7191	76613	52.35	3556	67920	82.07	5929	72241
11	Navsari	210	13270	63190	151	10836	72072	110	6409	58170	156.84	10171	64853
12	Panchmahal	0	0	0	0.2	13.63	71760	0.00	0.00	0.00	0.19	14	71760
13	Patan	0	0	0	0	0	0	0	0	0	0	0	0
14	Sabarkantha	0	0	0	0	0	0	0	0	0	0	0	0
15	Surat	1059	69418	65550	844	61126	72448	879.	62492	71090	927.26	64345	69393
16	Tapi	181	8028	44350	224	16728	74672	256	14337	56000	220.34	13031	59138
17	Vadodara	70	3175	45350	74	4516	60976	75	4545	61000	72.85	4078	55979
18	Valsad	76	5320	70000	86	6555	76565	86.0	3759	43700	82.54	5211	63134
19	Amreli	0	0	0	0.06	0.00	0.00	0.03	0	0	0.14	0	0
20	Bhavnagar	4	213	53200	1	68.17	71760	0.21	0	0	2.21	120	54452
21	Jamnagar	0	0	0	0	0.00	0.00	3.45	241	69980	3.45	241	69980
22	Junagadh	128	9229	72100	15	1037	71760	58	4041	69980	66.73	4769	71464
23	Kutch	0	0	0	0.65	46.64	71760	0.00	0.00	0.00	0.65	46.64	71760
24	Porbandar	0	0	0	0	0	0	0	0	0	0	0	0
25	Rajkot	1	54	54100	0.35	25.12	71760	0.59	41	69980	0.65	40.17	62116
26	Surendranagar	1	60	59900	0.45	32.29	71760	0.55	39	69980	0.67	43.56	65341
Gujarat state		2019	127489	63145	1767	126129	71408	1731	115121	66519	1844	123267	66847

4.4.2.3 Major Varieties:

Table – 4.4.31 Variety-wise Sugarcane Area (ha) of Gujarat State (Planting Season)

Sr. No	Varieties	2009-10 (12 Sugar Factory)		2010-11 (13 Sugar Factory)		2011-12 (18 Sugar Factory)		2012-13 (13 Sugar Factory)		2013-14 (11 Sugar Factory)		2015-16 (13 Sugar Factory)		2016-17 (14 Sugar Factory)	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1	CoC 671	2163.05	1.56	2026	01.30	2025.45	1.38	775.12	0.51	272.95	0.25	1646	1.41	2054.69	1.11
2	Co 86032	49831.8	35.85	53784	36.70	53788.11	36.63	60590.7	39.84	35509.04	32.79	23489	20.06	30839.35	16.60
3	Co Si 95071	4998.26	3.60	9578	06.50	10418.59	7.09	7246.9	4.77	5411.76	5.00	6482	5.54	11091.24	5.97
4	Co 97009	6114.24	4.40	7963	05.40	7963.4	5.42	10175.6	6.69	920.51	0.85	9548	8.16	9270.68	4.99
5	Co 86002	15521.46	11.17	15618	10.60	15621.26	10.64	20898.2	13.74	17571.00	16.22	18876	16.13	26975.54	14.52
6	Co 8338	1233.45	0.89	-	-	612.5	0.42	162.33	0.11	-	-	-	-	157	0.08
7	Co 6304	3010	2.17	-	-	2912	1.98	45	0.03	238	0.22	-	-	-	-
8	Co 86249	16590.41	11.93	10848	07.40	11094.07	7.55	13015.1	8.56	9860.01	9.10	2230	1.91	1674.18	0.90
9	Co 99004	1476.4	1.06	597	00.40	597.79	0.41	1977.81	1.30	1434.39	1.32	914	0.78	523.13	0.28
10	CoN 91132	972.26	0.70	-	-	254.69	0.17	97.18	0.06	104.85	0.10	592	0.50	250.45	0.13
11	CoN 05071	24820.17	17.85	24964	17.40	24357.92	16.59	19093.6	12.55	12478.10	11.52	21933	18.74	21127.7	11.37
12	CoN 05072	3109.86	2.24	-	-	1386.6	0.94	433.88	0.29	576.77	0.53	777	0.66	1496.42	0.81
13	CoN 04131	623.73	0.45	-	-	511.33	0.35	20.62	0.01	15.36	0.01	150	0.13	206.99	0.11
14	CoN 07072	-	-	-	-	-	-	77.02	0.05	5499.08	5.08	3147	2.69	15443.11	8.31
15	CoM 0265	499.4	0.36	3565	02.40	3566.14	2.43	9589.19	6.31	13682.06	12.63	22229	18.99	42444.89	22.85
16	CoN 13073	-	-	-	-	-	-	-	-	-	-	-	-	371	0.20
17	Co 0238	-	-	-	-	-	-	-	-	-	-	-	-	339.07	0.18
18	Co 985117	-	-	-	-	-	-	-	-	-	-	-	-	7034.75	3.79
19	MS 10001	-	-	-	-	-	-	-	-	-	-	-	-	3180.7	1.71
	Others	8052.1	5.79	17484	11.90	11746.72	8.00	6900.8	4.54	4723.00	4.36	50.34	4.30	11274.57	6.06
	Total	139016.6	100	146427	100	146856.6	100.00	152083	100	108058.8	100	117047	100.00	185755.50	100.00

Table-4.4.32 Sugarcane Varieties Endorsed by G.A.U./N.A.U.

Sr. No.	Variety	Parentage	Year of Release
1	Co 6806	Co 775 X Co798	1981-82
2	Co 6304	Co 419 X Co 605	1981-82
3	CoA7602	Co 1287 x Co 775	1982-83
4	CoC671	Q 63 X Co 775	1984-85
5	Co 7527	Co 62175 X Co 658	1986-87
6	Co 62175	Co 951 X Co 419	1986-87
7	Co 8338	Co 7413 X Co 6806	1990-91
8	CoLk 8001	Co 62174 X Co 1	1996-97
9	Co 87263	Co 312 X Co 6806	1997-98

Table- 4.4.33 Sugarcane Varieties Released by Main Sugarcane Research Station, Navsari (Through Hybridization Programme)

Sr. No.	Variety	Parentage	Year of Release
1	GS-1 (CoN 91132)	BO 91 X Co 1148	1996-97
2	GS-2 (CoN 85134)	BO 91 X Co 775	2000-01
3	GS-3 (CoN 95132)	Co 8213 X Co 62198	2001-02
4	GS-4 (CoN 03131)	BO 108 X CoS 510	2004-05
5	GS-5 (CoN 05071) *	CoJn 86310 X Co 86249	2007-08
6	GS-6 (CoN 05072)	Co 8213 X BO 91	2007-08
7	GNS-7 (CoN 04131)	Co 95021 X Co 8347	2011-12
8	GNS-8 (CoN 07072)	CoS 8436 X Co 86002	2013-14
9	GNS-9 (CoN 09072)	Co 0217 GC	2015-16
10	GNS-10 (CoN 13073)	CoN 91132 X CoC 671	2016-17

* Very first Navsari (Gujarat) clone has been identified and released at National level for commercial cultivation in Peninsular Zone

4.4.2.4 Crop Area Issues:

Major Reasons for Low Productivity of Cane in Gujarat:

- ▶ The continuous growing of cane on the same piece of land year after year which affected the soil fertility and productivity. (Monocropping: No crop rotation-Diversification)
- ▶ Planting of high sucrose but diseases and pests susceptible varieties which are not recommended by the University/ State Government.
- ▶ Lack of addition of organic matter (Compost, green manuring, vermicompost and trash)
- ▶ Lack of quality planting material due to no systematic seed production channel.
- ▶ Miss management of irrigation
- ▶ Imbalanced use of fertilizers
- ▶ Negligence of ratoon management
- ▶ Lack of timely plant protection measures
- ▶ Disturbance of cyclic nature on sugar production
- ▶ Shortage of manpower, electric power and lack of mechanization.
- ▶ Fragmentation of land
- ▶ And lastly, the most important reason is burnt cane

4.4.2.5. Strategies:

Strategy to develop high yielding, high sugar variety with disease and pest resistant.

4.4.2.5.1 Encourage farmers to adopt high yielding package of practices.

- Identify potential area and adopt progressive farmers for demonstration purpose
- Extended the technical know-how through training, farmers meeting, exhibition and distribution of literature
- Encourage progressive farmers group in the specific area as model farmers

4.4.2.5.2 Ensure quality seed availability

- Establishment of T.C. production units
- Establishment of seed treatment unit like Hot Air treatments
- Organized seed production programme in different sugarcane growing areas through sugar factory
- Encourage farmers to adopt SSI (sustainable Sugarcane initiatives) i.e. single eye bud nursery

4.4.2.5.3 Strengthen Research & Development activities

- Development of high yielding, high recovery variety at Navsari Agricultural University research farm
- Development of salinity, alkalinity, water logging, drought-resistant variety
- Quality seed production and distribution of sugarcane improved varieties
- Demonstration plot of variety, intercrop, drip irrigation

4.4.2.5.4 Demonstration and upgradation of mechanization particularly in sugarcane farming

Sugarcane crop is planted mostly at 90-100 cm distances and there has been a chance for mechanization, where almost all farm operations being labourers dependent in South Gujarat. This is one of the reasons for the higher cost of cultivation. To overcome this situation, wide row planting may help to provide abundant sunlight for increasing cane yield, provide proper space for intercropping, intercultural operations and adoption of mechanization thereby increasing the per unit profitability.

4.4.2.5.5 Promote value addition of sugarcane product and bye product like sugar, jaggery, molasses, ethanol, bagasse, pressmud, bio compost, electricity.

The soil is heterogeneous in nature. Fertility varies from place to place. Fertilizer dose needed is different for different soil. Improper use of fertilizer can harm productivity of the soil. Subsequently, crop yield goes down. So that combination of bio-compost, bio-fertilizer and chemical fertilizers are needed for getting good quality of production and decrease the cost of cultivation, which increases total income of the farmer. Moreover, there are so many product and a by-product of sugarcane which can be utilized in industry as well as in farm. These value addition will also increase sugarcane farmers income.

4.4.2.5.6 Promote organic sugarcane and jaggery production.

By adopting organic farming in sugarcane, food safety, quality, maintenance of biodiversity as well as environmental protection can be ensured.

4.4.2.5.7 Encourage farmers to take one or two ratoon crop to ensure maximum benefits.

Ratoon frequency in Gujarat shows that it only limited to 1st or 2nd ratoon. At present on an average hardly one ratoon crop was harvested by the farmers. To minimize the cost of production and to get maximum net profit sugarcane farmers should be encouraged for taking one to two ratoon crop.

4.4.2.6 Detailed Action Plan with Costs:

Table- 4.4.34 Sugar Factory- wise Training Proposed for Capacity Building of Agricultural Staff of Sugarcane

(Phy - No. of Trainees, Fin – Rs. in Lakh)

Sr. No	Name of Sugar Factory	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bardoli	100	0.8	100	0.8	100	0.8	300	2.4
2	Chalthan	100	0.8	100	0.8	100	0.8	300	2.4
3	Kamrej	100	0.8	100	0.8	100	0.8	300	2.4
4	Sayan	100	0.8	100	0.8	100	0.8	300	2.4
5	Gandevi	100	0.8	100	0.8	100	0.8	300	2.4
6	Maroli	100	0.8	100	0.8	100	0.8	300	2.4
7	Valsad	100	0.8	100	0.8	100	0.8	300	2.4
8	Madhi	100	0.8	100	0.8	100	0.8	300	2.4
9	Mahuva	100	0.8	100	0.8	100	0.8	300	2.4
10	Valod	100	0.8	100	0.8	100	0.8	300	2.4
11	Vyara	100	0.8	100	0.8	100	0.8	300	2.4
12	Narmada	100	0.8	100	0.8	100	0.8	300	2.4
13	Vataria	100	0.8	100	0.8	100	0.8	300	2.4
14	Pandvai	100	0.8	100	0.8	100	0.8	300	2.4
15	Gandhara	100	0.8	100	0.8	100	0.8	300	2.4
16	Kantha	100	0.8	100	0.8	100	0.8	300	2.4
17	Mandvi	100	0.8	100	0.8	100	0.8	300	2.4
18	Kodinar	100	0.8	100	0.8	100	0.8	300	2.4
	Total	1800	14.4	1800	14.4	1800	14.4	5400	43.2

Cost Norms: @ Rs.800/day /person

Table- 4.4.35 Training Proposed for Capacity Building of Farmers (Sugar Factory Wise) on Different Technologies of Sugarcane

(Phy - No. of Trainee, Fin – Rs. in Lakh)

Sr. No	Name of Sugar Factory	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bardoli	500	3.0	500	3.0	500	3.0	1500	9.0
2	Chalthan	500	3.0	500	3.0	500	3.0	1500	9.0
3	Kamrej	500	3.0	500	3.0	500	3.0	1500	9.0
4	Sayan	500	3.0	500	3.0	500	3.0	1500	9.0
5	Gandevi	500	3.0	500	3.0	500	3.0	1500	9.0
6	Maroli	500	3.0	500	3.0	500	3.0	1500	9.0
7	Valsad	500	3.0	500	3.0	500	3.0	1500	9.0
8	Madhi	500	3.0	500	3.0	500	3.0	1500	9.0
9	Mahuva	500	3.0	500	3.0	500	3.0	1500	9.0
10	Valod	500	3.0	500	3.0	500	3.0	1500	9.0
11	Vyara	500	3.0	500	3.0	500	3.0	1500	9.0
12	Narmada	500	3.0	500	3.0	500	3.0	1500	9.0
13	Vataria	500	3.0	500	3.0	500	3.0	1500	9.0
14	Pandvai	500	3.0	500	3.0	500	3.0	1500	9.0
15	Gandhara	500	3.0	500	3.0	500	3.0	1500	9.0
16	Kantha	500	3.0	500	3.0	500	3.0	1500	9.0
17	Mandvi	500	3.0	500	3.0	500	3.0	1500	9.0
18	Kodinar	500	3.0	500	3.0	500	3.0	1500	9.0
	Total	9000	54.0	9000	54.0	9000	54.0	27000	162

Cost Norms: @ Rs.600/day /farmer

Table- 4.4.36 Sugar Factory-wise Varietal Demonstration on Sugarcane

(Phy - No. , Fin – Rs. in Lakh)

Sr. No	Name of Sugar Factory	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bardoli	160	8.0	160	8.0	160	8.0	480	24.0
2	Chalthan	160	8.0	160	8.0	160	8.0	480	24.0
3	Kamrej	160	8.0	160	8.0	160	8.0	480	24.0
4	Sayan	160	8.0	160	8.0	160	8.0	480	24.0
5	Gandevi	160	8.0	160	8.0	160	8.0	480	24.0
6	Maroli	160	8.0	160	8.0	160	8.0	480	24.0
7	Valsad	160	8.0	160	8.0	160	8.0	480	24.0
8	Madhi	160	8.0	160	8.0	160	8.0	480	24.0
9	Mahuva	160	8.0	160	8.0	160	8.0	480	24.0
10	Valod	160	8.0	160	8.0	160	8.0	480	24.0

11	Vyara	160	8.0	160	8.0	160	8.0	480	24.0
12	Narmada	160	8.0	160	8.0	160	8.0	480	24.0
13	Vataria	160	8.0	160	8.0	160	8.0	480	24.0
14	Pandvai	160	8.0	160	8.0	160	8.0	480	24.0
15	Gandhara	160	8.0	160	8.0	160	8.0	480	24.0
16	Kantha	160	8.0	160	8.0	160	8.0	480	24.0
17	Mandvi	160	8.0	160	8.0	160	8.0	480	24.0
18	Kodinar	160	8.0	160	8.0	160	8.0	480	24.0
	Total	2880	144	2880	144	2880	144	8640	432

Cost Norms: @ Rs.5000/demonstration

**Table - 4.4.37 Sugar Factory-wise INM Demonstrations on Sugarcane
(Phy and Fin- 2017-18 to 2019-20)**

(Phy - No., Fin – Rs. in Lakh)

Sr. No	Name of Sugar Factory	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bardoli	160	8.0	160	8.0	160	8.0	480	24.0
2	Chalthan	160	8.0	160	8.0	160	8.0	480	24.0
3	Kamrej	160	8.0	160	8.0	160	8.0	480	24.0
4	Sayan	160	8.0	160	8.0	160	8.0	480	24.0
5	Gandevi	160	8.0	160	8.0	160	8.0	480	24.0
6	Maroli	160	8.0	160	8.0	160	8.0	480	24.0
7	Valsad	160	8.0	160	8.0	160	8.0	480	24.0
8	Madhi	160	8.0	160	8.0	160	8.0	480	24.0
9	Mahuva	160	8.0	160	8.0	160	8.0	480	24.0
10	Valod	160	8.0	160	8.0	160	8.0	480	24.0
11	Vyara	160	8.0	160	8.0	160	8.0	480	24.0
12	Narmada	160	8.0	160	8.0	160	8.0	480	24.0
13	Vataria	160	8.0	160	8.0	160	8.0	480	24.0
14	Pandvai	160	8.0	160	8.0	160	8.0	480	24.0
15	Gandhara	160	8.0	160	8.0	160	8.0	480	24.0
16	Kantha	160	8.0	160	8.0	160	8.0	480	24.0
17	Mandvi	160	8.0	160	8.0	160	8.0	480	24.0
18	Kodinar	160	8.0	160	8.0	160	8.0	480	24.0
	Total	2880	144	2880	144.0	2880	144.0	8640	432

Cost Norms: @ Rs.5000/demonstration

Table- 4.4.38 Resource Conservation (Inter-cropping) Demonstrations on Sugarcane (Phy and Fin- 2017-18 to 2019-20)

(Phy - No., Fin – Rs. in Lakh)

Sr. No	Name of Sugar Factory	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bardoli	160	8.0	160	8.0	160	8.0	480	24.0
2	Chalthan	160	8.0	160	8.0	160	8.0	480	24.0
3	Kamrej	160	8.0	160	8.0	160	8.0	480	24.0
4	Sayan	160	8.0	160	8.0	160	8.0	480	24.0
5	Gandevi	160	8.0	160	8.0	160	8.0	480	24.0
6	Maroli	160	8.0	160	8.0	160	8.0	480	24.0
7	Valsad	160	8.0	160	8.0	160	8.0	480	24.0
8	Madhi	160	8.0	160	8.0	160	8.0	480	24.0
9	Mahuva	160	8.0	160	8.0	160	8.0	480	24.0
10	Valod	160	8.0	160	8.0	160	8.0	480	24.0
11	Vyara	160	8.0	160	8.0	160	8.0	480	24.0
12	Narmada	160	8.0	160	8.0	160	8.0	480	24.0
13	Vataria	160	8.0	160	8.0	160	8.0	480	24.0
14	Pandvai	160	8.0	160	8.0	160	8.0	480	24.0
15	Gandhara	160	8.0	160	8.0	160	8.0	480	24.0
16	Kantha	160	8.0	160	8.0	160	8.0	480	24.0
17	Mandvi	160	8.0	160	8.0	160	8.0	480	24.0
18	Kodinar	160	8.0	160	8.0	160	8.0	480	24.0
	Total	2880	144.0	2880	144.0	2880	144.0	8640	432

Cost Norms: @ Rs.5000/demonstration

Table- 4.4.39 IPDM Demonstrations on Sugarcane including Seed/Sett Treatment (Phy and Fin- 2017-18 to 2019-20)

(Phy - No., Fin – Rs. in Lakh)

Sr. No	Name of Sugar Factory	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bardoli	160	8.0	160	8.0	160	8.0	480	24.0
2	Chalthan	160	8.0	160	8.0	160	8.0	480	24.0
3	Kamrej	160	8.0	160	8.0	160	8.0	480	24.0
4	Sayan	160	8.0	160	8.0	160	8.0	480	24.0
5	Gandevi	160	8.0	160	8.0	160	8.0	480	24.0
6	Maroli	160	8.0	160	8.0	160	8.0	480	24.0
7	Valsad	160	8.0	160	8.0	160	8.0	480	24.0
8	Madhi	160	8.0	160	8.0	160	8.0	480	24.0
9	Mahuva	160	8.0	160	8.0	160	8.0	480	24.0

10	Valod	160	8.0	160	8.0	160	8.0	480	24.0
11	Vyara	160	8.0	160	8.0	160	8.0	480	24.0
12	Narmada	160	8.0	160	8.0	160	8.0	480	24.0
13	Vataria	160	8.0	160	8.0	160	8.0	480	24.0
14	Pandvai	160	8.0	160	8.0	160	8.0	480	24.0
15	Gandhara	160	8.0	160	8.0	160	8.0	480	24.0
16	Kantha	160	8.0	160	8.0	160	8.0	480	24.0
17	Mandvi	160	8.0	160	8.0	160	8.0	480	24.0
18	Kodinar	160	8.0	160	8.0	160	8.0	480	24.0
	Total	2880	144.0	2880	144.0	2880	144.0	8640	432

Cost Norms: @ Rs.5000/demonstration

Table- 4.4.40 Farmers Field School Covering Identified Critical Technologies of Sugarcane.

(Phy - No. , Fin – Rs. in Lakh)

Sr. No	Name of Sugar Factory	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bardoli	160	8.0	160	8.0	160	8.0	480	24.0
2	Chalthan	160	8.0	160	8.0	160	8.0	480	24.0
3	Kamrej	160	8.0	160	8.0	160	8.0	480	24.0
4	Sayan	160	8.0	160	8.0	160	8.0	480	24.0
5	Gandevi	160	8.0	160	8.0	160	8.0	480	24.0
6	Maroli	160	8.0	160	8.0	160	8.0	480	24.0
7	Valsad	160	8.0	160	8.0	160	8.0	480	24.0
8	Madhi	160	8.0	160	8.0	160	8.0	480	24.0
9	Mahuva	160	8.0	160	8.0	160	8.0	480	24.0
10	Valod	160	8.0	160	8.0	160	8.0	480	24.0
11	Vyara	160	8.0	160	8.0	160	8.0	480	24.0
12	Narmada	160	8.0	160	8.0	160	8.0	480	24.0
13	Vataria	160	8.0	160	8.0	160	8.0	480	24.0
14	Pandvai	160	8.0	160	8.0	160	8.0	480	24.0
15	Gandhara	160	8.0	160	8.0	160	8.0	480	24.0
16	Kantha	160	8.0	160	8.0	160	8.0	480	24.0
17	Mandvi	160	8.0	160	8.0	160	8.0	480	24.0
18	Kodinar	160	8.0	160	8.0	160	8.0	480	24.0
	Total	2880	144.0	2880	144.0	2880	144.0	8640	432

4.5 Animal Husbandry, Animal Health, Dairying, Poultry and Fishery Sectors:

4.5.1 Large Animal (Cattle and Buffalo) Production:

4.5.1.1 Background:

The livestock sector, especially bovine rearing and dairy farming, regarded as the powerhouse of growth, is most vibrant in Gujarat. It plays a pivotal role in rural livelihood, nutritional security and national economy by contributing significantly to the agricultural gross domestic product. Cattle and buffalo contribute to food and nutritional security through milk, meat (buffalo meat), provide draught animal power, manure for crop production and various raw materials for several industries.

The contribution of milk alone is higher than the major agricultural crops like paddy, wheat and sugarcane. Nonetheless, the contribution of Gross Domestic Product from livestock to agriculture and livestock sector improved consistently from 15% in 1981-82 to 23% in 2011-12. Total 42.66 Lakh families keep livestock as a primary or secondary source of income and contribution of Gross Domestic Product Gross value output from Livestock to total GSDP is Rs. 30.24 crores during the year 2011-12 as per quick estimates. In Gujarat, livestock sector has achieved remarkable milestones of over 103 Lakh tones annual milk production in the year 2012-13 with the collective efforts of government organizations, non-government organizations and our farmers- the key players of the livestock sector. As result of the sustainable and steady growth of livestock sector, consumption of livestock products is growing faster than cereals.

Status and progress in dairy husbandry sector are or indirectly affected by a number of factors viz., breeding and health coverage programmes, various inputs and infrastructure facilities and change in demand and price of livestock production. Region -wise and State Agriculture Plan (SAP) and State Infrastructure Development Plan (SIDP) are utmost important for future large animal production, dairy farming planning and expansion in this sector.

Vision:

Enhancement of animal production, animal health and animal products in view of the future requirement of ever increasing human population

Mission:

To promote livestock health and productivity i.e., total milk production and per animal productivity in general and to improve the economic condition of dairy farmers and rural community in particular through the integration of input facilities and extension education.

4.5.1.2 Issues and Gap Analysis for Large Animal Production and Dairy Farming:

Sustainability issues and gap analysis of cattle and buffalo production are breed of animals on account of natural mating with non-descript bulls, poor housing management due to lack of awareness and poor economic condition of the farmers , imbalanced feeding due to lack of green fodder, shortage and high cost of concentrate feed, poor nutrient / micronutrient status of soil as well as feeds leading to mineral deficiency in animals, poor health of animal on account of poor feed and fodder availability and poor body conditions, high calf mortality and delayed age of first calving and lack of awareness about scientific calf rearing.

Strategies, approach and methodology, performance indicators and sustainability outputs pertinent to large animal production and dairy farming are detailed in Table-4.5.1.

Table-4.5.1 Sustainability Issues and Gap Analysis of Productivity in Dairy Husbandry

Sr. No	Particular	Factors/Constraints leading to gap	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
a	Breed of Animals	Natural mating with a non-descript bull	Strengthening A.I. facility, Community Bulls	Extension and development agencies A.H department and co-operatives should jointly approach in farmers participatory approach	Strengthening AI by establishing new AI centers, Mobile AI centers and semen storage facilities	Improvement in livestock breed which increases the milk production.
b	Poor Housing management	Lack of awareness and poor economic condition of farmers	Proper housing management	Creating awareness and increase adoption of proper housing management through training, demonstrations and literature	Improvement in health, hygiene and increase in milk production	Increase in milk production
c	Imbalanced feeding	Lack of green fodder	Cultivation of green fodders and establishing fodder bank	Demonstration, Training, the supply of seed of fodder crops and establishing fodder bank at the block level	Improvement in animal health and increase in milk production	Increase in milk production
		Shortage and the high cost of concentrate feed	Providing concentrate feed at a cheaper rate by producing in bulk at co-operative levels	Supply of concentrate feed to buffalo /cattle farmers establishment of concentrate production unit at co-operative level	Improvement in animal health and increase milk production	Increase in income of farmers
		Poor nutrient/ micronutrient status of soil as well as	Mineral mixture supplementation directly to animals	Supply of mineral mixture to buffalo /cattle farmers	Correction of mineral status and improvement in animal health and	Increase in income of farmers

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Sr. No	Particular	Factors/Constraints leading to gap	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
		feeds/fodders leading to a mineral deficiency in animals	or mixing in animal feed		increase in milk production	
d	Poor Health of animals	Poor feed and fodder availability and poor body condition score	Popularize health package (deworming, mineral mixture and concentrate feeding)	Creating awareness and increase adoption of popularized health package through training, demonstrations and literature	Improve health and increase in milk production	Increase in income of the farmers
e	High calf mortality and delayed age at first calving	Lack of awareness about scientific calf rearing	Popularize scientific calf rearing	Creating awareness and increase adoption of scientific calf rearing through training, demonstrations and literature	Reduce calf mortality and production of elite future herds	Increase in income of the farmers

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

4.5.1.3 Priorities:

Areas of interest and activities of priority under animal husbandry in order of priority to bring about development in large animal production and dairy farming are as follows.

- Strengthening A.I. facility, community Bulls under gram panchayats
- Proper housing management
- Popularizing health package (deworming, mineral mixture and concentrate feeding)
- Popularizing scientific calf rearing
- Establishment of commercial dairy farms
- Extension education for scientific animal management of dairy animals
- Raising Bull Calves as a future breeding Sire.

4.5.1.4 Population, Production and Per-animal Productivity Estimates in Relation to Dairy Sector in Gujarat State:

Gujarat is possessing 79.77 Lakh cattle and 87.74 Lakh buffaloes producing over 103 Lakh tonnes annual milk production in the year 2012-13 (Table-4.5.2.). The trend of change in breedable population, productive animals and per-animal productivity along with milk production from cattle and buffalo are presented in Tables. The per-animal productivity of indigenous cow crossbred cow and buffalo during the year 2012-13 is estimated to be 3.9, 8.8 and 4.8 kg per day, respectively.

Table-4.5.2 Large Animal Population (000 Nos.) and Total Milk Production ('000 T) in Gujarat (2012-13)

Districts		Large Animal Population in 000 No.		Total Milk Production ('000 T)
		Cattle	Buffaloes	
1	Ahmedabad	217	344	347.93
2	Amreli	269	201	312.92
3	Anand	147	407	486.01
4	Aravalli	143	140	172.48
5	Banaskantha	660	955	1203.58
6	Bharuch	122	154	152.44
7	Bhavnagar	340	334	410.66
8	Botad	99	97	119.09
9	Chota udaypur	247	119	96.86
10	Dahod	589	284	230.62
11	Dang	70	21	22.45
12	Devbhoomi Dwaraka	59	146	169.39
13	Gandhinagar	148	364	423.47
14	Gir Somnath	102	75	94.74
15	Jamnagar	350	257	326.69
16	Junagadh	481	377	523.63
17	Kheda	150	414	361.62
18	Kutchh	389	226	383.43
19	Mahisagar	166	306	257.78
20	Mehsana	216	568	774.95
21	Morbi	44	18	20.38
22	Narmada	141	59	65.73
23	Navsari	156	102	219.80

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Districts		Large Animal Population in 000 No.		Total Milk Production (‘000 T)
		Cattle	Buffaloes	
24	Panchmahal	501	524	405.11
25	Patan	131	364	360.33
26	Porbandar	83	105	134.30
27	Rajkot	452	362	478.52
28	Sabarkantha	621	775	913.98
29	Surat	227	247	374.14
30	Surendranagar	347	290	373.20
31	Tapi	215	176	202.81
32	Vadodara	482	462	401.46
33	Valsad	308	96	167.93
Total for the Gujarat State		8670	9369	10988.42

Table- 4.5.3 Trend of Change in Breedable Cattle and Buffalo Population (000 No.) in Gujarat from 1972 To 2007

Sr. No.	Year	Breedable Cattle			Total Cattle	Breedable Buffaloes			Total Buffaloes
		In milk	Dry	NCEO*		In milk	Dry	NCEO*	
1	1972	903	744	150	6457	1095	779	166	3468
2	1977	835	704	150	6006	1224	685	176	3473
3	1982	1072	752	133	6994	1620	790	148	4443
4	1988	1025	647	109	6240	1729	721	133	4502
5	1992	1315	683	137	6803	2085	899	164	5268
6	1997	1481	689	262	6749	2547	986	402	6285
7	2003	1657	781	184	7424	2794	1144	239	7140
8	2007	1732	797	297	7976	3040	1350	439	8774

*N C E O= Not Calved Even Once

Table- 4.5.4 Trend of Change in No. of Productive Cattle and Buffaloes from 2000-01

Sr. No	Year	Estimated No. of productive Animals (In '00 Nos.)					
		Indigenous Cows		Cross-bred Cows		Buffaloes	
		In-milk	Milch	In-milk	Milch	In-milk	Milch
1	2000-01	13053	21682	960	1390	23916	37612
2	2001-02	13330	21786	1243	1625	26342	41545
3	2002-03	13741	21787	1292	1709	26909	41039
4	2003-04	13959	22037	1426	1887	27557	42038
5	2004-05	14008	21952	1596	2151	28240	42428
6	2005-06	14270	21906	1699	2294	28614	43341
7	2006-07	14469	22739	2797	3766	29405	44522
8	2007-08	14524	22630	3178	4300	30232	45058
9	2008-09	13952	21922	3912	5338	31186	47388
10	2009-10	14233	22878	4589	6256	32113	48928
11	2010-11	14455	23153	5095	7004	32982	50657
12	2011-12	14630	23528	5640	7843	33322	52068
13	2012-13	15109	24532	6205	8697	33832	52693

Table- 4.5.5 Trend of Change in Per-Animal Productivity and Annual Milk Production from 2000-01

Sr. No	Year	Av. Daily Yield / In -milk Anim. (Kgs.)		
		Indigenous cow	C. B. cow	Buffalo
1	2000-01	3.011	7.351	3.886
2	2001-02	3.068	7.935	3.948
3	2002-03	3.153	8.015	3.968
4	2003-04	3.196	8.223	4.081
5	2004-05	3.308	8.183	4.193
6	2005-06	3.344	8.324	4.256
7	2006-07	3.401	8.057	4.343
8	2007-08	3.480	8.230	4.389
9	2008-09	3.634	8.350	4.489
10	2009-10	3.680	8.449	4.509
11	2010-11	3.750	8.567	4.580
12	2011-12	3.845	8.668	4.696
13	2012-13	3.947	8.811	4.778

4.5.1.5 Bridging the Gaps for Realizing the Vision on Dairy Animal Production and Dairy Development:**Table-4.5.6 Bridging the Gaps for Realizing the Vision- Dairy Sector Dairy Development**

Programme	Activities
Capacity building of livestock farmers	Quality improvement of feed, Enhancement of milk Production Improvement of reproductive efficiency
Fertility Improvement Programme	To create awareness and Organization of clinical camps for treatment of infertile animals
Supplementation of the mineral mixture to milch Animals	To supplement mineral mixture to overcome the reproductive problems
Supply of balanced concentrate feed to animals	To improve animal's productive efficiency by providing balanced concentrate ration. Awareness about concentrate feeding and easy availability at a cheaper rate within the district.
Commercial Dairy Farming	To establish a model for others and to motivate others for dairying. Production of Clean milk at the farm level.
Rearing of female cattle/buffalo calf	To provide genetically superior livestock at the doorstep and to produce superior herd stock for future.
Provision of housing for livestock	To protect animals against environmental stress, flies and fleas etc. which helps in improving milk production
Supply of milch animals and dairy utensils to farmers.	To supply economically productive animals. Improving production and quality of milk in district
Supply of health packages for livestock of landless farmers.	Culling out of rearing unproductive animals with no visible signs of improvement

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Fodder production and preservation	Demonstration on fodder production and preservation
Provision of Artificial Insemination/Community Bulls facilities	Breed improvement through AI and breeding bulls
Establishment of State of Art Disease Investigation laboratory with mobile facilities	Prevention, control and monitoring of diseases

4.5.1.6 District-wise Recommended Interventions for the State with Detailed Action Plan along-with Cost:

The activities for development of animal husbandry (large animal production and dairy farming) in the Gujarat state are as follows.

Capacity Building towards i) quality improvement of feed, ii) enhancement of milk production and iii) improvement of reproductive efficiency

Table-4.5.7 District-wise Proposal for Capacity Building Along with Financial Requirements (Quality Improvement of Feed, Enhancement of Milk Production, Improvement of Reproductive Efficiency) of Livestock Farmers in Gujarat State (100 Trainees/Training, Total expense (Lakh) for training @ Rs.0.006 Lakh /trainee/day(Rs. in Lakh)

District	2017-18		2018-19		2019-20		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy.	Fin.
Ahmedabad	1300	7.8	1300	7.8	1300	7.8	3900	23.4
Amreli	1550	9.3	1550	9.3	1550	9.3	4650	27.9
Anand	1550	9.3	1550	9.3	1550	9.3	4650	27.9
Aravalli	2500	15.0	2500	15.0	2500	15.0	7500	45.0
Banaskantha	6800	40.8	6800	40.8	6800	40.8	20400	122.4
Bharuch	1300	7.8	1300	7.8	1300	7.8	3900	23.4
Bhavnagar	1550	9.3	1550	9.3	1550	9.3	4650	27.9
Botad	650	3.9	650	3.9	650	3.9	1950	11.7
Chotaudepur	2250	13.5	2250	13.5	2250	13.5	6750	40.5
Dahod	1300	7.8	1300	7.8	1300	7.8	3900	23.4
Dang	1000	6.0	1000	6.0	1000	6.0	3000	18.0
D. Dwaraka	550	3.3	550	3.3	550	3.3	1650	9.9
Gandhinagar	6000	36.0	6000	36.0	6000	36.0	18000	108.0
Gir Somnath	600	3.6	600	3.6	600	3.6	1800	10.8
Jamnagar	850	5.1	850	5.1	850	5.1	2550	15.3
Junagadh	1400	9.6	1400	9.6	1400	9.6	4200	28.8
Kheda	1700	10.2	1700	10.2	1700	10.2	5100	30.6
Mahisagar	1000	6.0	1000	6.0	1000	6.0	3000	18.0
Morbi	600	3.6	600	3.6	600	3.6	1800	10.8
Kutchh	5300	31.8	5300	31.8	5300	31.8	15900	95.4
Mehsana	5300	31.8	5300	31.8	5300	31.8	15900	95.4
Narmada	1300	7.8	1300	7.8	1300	7.8	3900	23.4

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District	2017-18		2018-19		2019-20		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy.	Fin.
Navsari	350	2.1	350	2.1	350	2.1	1050	6.3
Panchmahal	970	5.8	970	5.8	970	5.8	2910	17.5
Patan	6800	38.4	6800	38.4	6800	38.4	20400	115.2
Porbandar	430	2.6	430	2.6	430	2.6	1290	7.7
Rajkot	1400	9.6	1400	9.6	1400	9.6	4200	28.8
Sabarkantha	3500	21.0	3500	21.0	3500	21.0	10500	63.0
Surat	1300	7.8	1300	7.8	1300	7.8	3900	23.4
Surendranagar	1400	8.4	1400	8.4	1400	8.4	4200	25.2
Tapi	1300	7.8	1300	7.8	1300	7.8	3900	23.4
Vadodara	3100	18.6	3100	18.6	3100	18.6	9300	55.8
Valsad	1300	7.8	1300	7.8	1300	7.8	3900	23.4
TOTAL	68200	409.2	68200	409.2	68200	409.2	204600	1227.6

Fertility Improvement Program

Table-4.5.8 District-wise No. of Fertility Camps and Total Expenditure (Rs. 0.40 Lakh/Camp) (Rs. In Lakh) to be Organized Under Fertility Improvement Program in Various Districts of the State

District	Number of fertility camps and expenditure							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy.	Fin.
Ahmedabad	350	140	350	140	350	140	1050	420
Amreli	350	140	350	140	350	140	1050	420
Anand	350	140	350	140	350	140	1050	420
Aravalli	560	224	560	224	560	224	1680	672
Banaskantha	350	140	350	140	350	140	1050	420
Bharuch	90	36	90	36	90	36	270	108
Bhavnagar	250	100	250	100	250	100	750	300
Botad	350	140	350	140	350	140	1050	420
Chota Udepur	560	224	560	224	560	224	1680	672
Dahod	350	140	350	140	350	140	1050	420
Dang	90	36	90	36	90	36	270	108
D.Dwaraka	525	210	525	210	525	210	1575	630
Gandhinagar	350	140	350	140	350	140	1050	420
Gir Somnath	350	140	350	140	350	140	1050	420
Jamnagar	200	80	200	80	200	80	600	240
Junagadh	250	100	250	100	250	100	750	300
Kheda	250	100	250	100	250	100	750	300
Kutchh	90	36	90	36	90	36	270	108
Mahisagar	525	210	525	210	525	210	1575	630
Mehsana	350	140	350	140	350	140	1050	420
Morbi	350	140	350	140	350	140	1050	420

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District	Number of fertility camps and expenditure							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy.	Fin.
Narmada	90	36	90	36	90	36	270	108
Navsari	90	36	90	36	90	36	270	108
Panchmahal	300	120	300	120	300	120	900	360
Patan	350	140	350	140	350	140	1050	420
Porbandar	90	36	90	36	90	36	270	108
Rajkot	250	100	250	100	250	100	750	300
Sabarkantha	200	80	200	80	200	80	600	240
Surat	90	36	90	36	90	36	270	108
Surendranagar	350	140	350	140	350	140	1050	420
Tapi	90	36	90	36	90	36	270	108
Vadodara	200	80	200	80	200	80	600	240
Valsad	90	36	90	36	90	36	270	108
TOTAL for Gujarat	9080	3632	9080	3632	9080	3632	27240	10896

Proposal for Supply of Breeding Bulls to Villages in the State:

Table-4.5.9 District-wise No. of Villages and Cost of Two Bulls/Village (in Rs. Lakh) @ Rs.0.40lakh/Bull /Village to be Covered Under Proposal for Supply of Breeding Bulls in Different Districts of the State

Districts	2017-18		2018-19		2019-20		Total Expenditure	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Ahmedabad	60	54	60	54	60	54	180	162
Amreli	60	54	60	54	60	54	180	162
Anand	90	81	90	81	90	81	270	243
Aravalli	90	81	90	81	90	81	270	243
Banaskantha	90	81	90	81	90	81	270	243
Bharuch	30	27	30	27	30	27	90	81
Bhavnagar	60	54	60	54	60	54	180	162
Botad	60	54	60	54	60	54	180	162
Chota Udepur	90	81	90	81	90	81	270	243
Dahod	60	54	60	54	60	54	180	162
Dang	30	27	30	27	30	27	90	81
D.Dwaraka	60	54	60	54	60	54	180	162
Gandhinagar	90	81	90	81	90	81	270	243
Gir Somnath	90	81	90	81	90	81	270	243
Jamnagar	60	54	60	54	60	54	180	162
Junagadh	60	54	60	54	60	54	180	162
Kheda	60	54	60	54	60	54	180	162

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Districts	2017-18		2018-19		2019-20		Total Expenditure	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Kutchh	30	27	30	27	30	27	90	81
Mahisagar	90	81	90	81	90	81	270	243
Mehsana	90	81	90	81	90	81	270	243
Morbi	60	54	60	54	60	54	180	162
Narmada	90	81	90	81	90	81	270	243
Navsari	30	27	30	27	30	27	90	81
Panchmahal	30	27	30	27	30	27	90	81
Patan	90	81	90	81	90	81	270	243
Porbandar	30	27	30	27	30	27	90	81
Rajkot	60	54	60	54	60	54	180	162
Sabarkantha	60	54	60	54	60	54	180	162
Surat	30	27	30	27	30	27	90	81
Surendranagar	90	81	90	81	90	81	270	243
Tapi	30	27	30	27	30	27	90	81
Vadodara	60	54	60	54	60	54	180	162
Valsad	30	27	30	27	30	27	90	81
Total	2040	2167	2040	2167	2040	2167	6120	5508

Total Expenditure = Cost of Two Bulls/Village (in Rs.0.40 Lakh)) + District-wise Maintenance Cost
@Rs. 0.50 Lakh/Two Bulls

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Commercial Dairy Farming:

Table-4.5.10 District-wise No. of Units Along with Financial Requirements for Proposal of Commercial Dairy Farming Units

Amount Required (Rs. Lakh) @ Rs. 5.00 Lakh/farm

District	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy	Fin.
Ahmedabad	3	15	3	15	3	15	9	45
Amreli	2	10	2	10	2	10	6	30
Anand	3	15	3	15	3	15	9	45
Aravalli	2	10	2	10	2	10	6	30
Banaskantha	2	10	2	10	2	10	6	30
Bharuch	3	15	3	15	3	15	9	45
Bhavnagar	2	10	2	10	2	10	6	30
Botad	2	10	2	10	2	10	6	30
Chota Udepur	2	10	2	10	2	10	6	30
Dahod	3	15	3	15	3	15	9	45
Dang	2	10	2	10	2	10	6	30
Gandhinagar	2	10	2	10	2	10	6	30
Gir Somnath	2	10	2	10	2	10	6	30
Jamnagar	2	10	2	10	2	10	6	30
Junagadh	3	15	3	15	3	15	9	45
Kheda	3	15	3	15	3	15	9	45
Kutchh	2	10	2	10	2	10	6	30
Mahisagar	2	10	2	10	2	10	6	30
Mehsana	2	10	2	10	2	10	6	30
Morbi	2	10	2	10	2	10	6	30
Narmada	3	15	3	15	3	15	9	45
Navsari	2	10	2	10	2	10	6	30
Panchmahal	2	10	2	10	2	10	6	30
Patan	2	10	2	10	2	10	6	30
Porbandar	2	10	2	10	2	10	6	30
Rajkot	3	15	3	15	3	15	9	45
Sabarkantha	3	15	3	15	3	15	9	45
Surat	3	15	3	15	3	15	9	45
Surendranagar	2	10	2	10	2	10	6	30
Tapi	3	15	3	15	3	15	9	45
Vadodara	3	15	3	15	3	15	9	45
Valsad	3	15	3	15	3	15	9	45
TOTAL	77	385	77	385	77	385	231	1155

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Provision of Shed for Livestock:

Table – 4.5.11 District-wise No. Dairy Farmers to be Covered along with Financial Requirement under Proposal for Provision of Shed

District	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Ahmedabad	700	210	700	210	700	210	2100	630
Amreli	700	210	700	210	700	210	2100	630
Anand	700	210	700	210	700	210	2100	630
Aravalli	1000	300	1000	300	1000	300	3000	900
Banaskantha	1000	300	1000	300	1000	300	3000	900
Bharuch	700	210	700	210	700	210	2100	630
Bhavnagar	1000	300	1000	300	1000	300	3000	900
Botad	700	210	700	210	700	210	2100	630
Chota Udepur	700	210	700	210	700	210	2100	630
Dahod	700	210	700	210	700	210	2100	630
Dang	700	210	700	210	700	210	2100	630
D.Dwaraka	700	210	700	210	700	210	2100	630
Gandhinagar	1000	300	1000	300	1000	300	3000	900
Gir Somnath	1000	300	1000	300	1000	300	3000	900
Jamnagar	1000	300	1000	300	1000	300	3000	900
Junagadh	1000	300	1000	300	1000	300	3000	900
Kheda	1000	300	1000	300	1000	300	3000	900
Kutchh	700	210	700	210	700	210	2100	630
Mahisagar	700	210	700	210	700	210	2100	630
Mehsana	1000	300	1000	300	1000	300	3000	900
Morbi	700	210	700	210	700	210	2100	630
Narmada	700	210	700	210	700	210	2100	630
Navsari	700	210	700	210	700	210	2100	630
Panchmahal	700	210	700	210	700	210	2100	630
Patan	1000	300	1000	300	1000	300	3000	900
Porbandar	700	210	700	210	700	210	2100	630
Rajkot	1000	300	1000	300	1000	300	3000	900
Sabarkantha	1000	300	1000	300	1000	300	3000	900
Surat	700	210	700	210	700	210	2100	630
Surendranagar	1000	300	1000	300	1000	300	3000	900
Tapi	500	150	500	150	500	150	1500	450
Vadodara	1000	300	1000	300	1000	300	3000	900
Valsad	700	210	700	210	700	210	2100	630
Total	27100	8130	27100	8130	27100	8130	81300	24390

Cost Norms: Rs. 0.30 Lakh/Shed

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Supply of Dairy Utensils to A.H. (Dairy) Farmers:

Table - 4.5.12 District-wise No. Dairy Farmers to be Covered and Budgetary

**The requirement under Provision of Dairy Utensils for Livestock
Rs. in Lakh**

District	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Ahmedabad	700	7	700	7	700	7	2100	21
Amreli	700	7	700	7	700	7	2100	21
Anand	700	7	700	7	700	7	2100	21
Aravalli	1000	10	1000	10	1000	10	3000	30
Banaskantha	1000	10	1000	10	1000	10	3000	30
Bharuch	700	7	700	7	700	7	2100	21
Bhavnagar	1000	10	1000	10	1000	10	3000	30
Botad	700	7	700	7	700	7	2100	21
Chota Udepur	700	7	700	7	700	7	2100	21
Dahod	700	7	700	7	700	7	2100	21
Dang	700	7	700	7	700	7	2100	21
D Dwaraka	700	7	700	7	700	7	2100	21
Gandhinagar	1000	10	1000	10	1000	10	3000	30
Gir Somnath	1000	10	1000	10	1000	10	3000	30
Jamnagar	1000	10	1000	10	1000	10	3000	30
Junagadh	1000	10	1000	10	1000	10	3000	30
Kheda	1000	10	1000	10	1000	10	3000	30
Kutchh	700	7	700	7	700	7	2100	21
Mahisagar	700	7	700	7	700	7	2100	21
Mehsana	1000	10	1000	10	1000	10	3000	30
Morbi	700	7	700	7	700	7	2100	21
Narmada	700	7	700	7	700	7	2100	21
Navsari	700	7	700	7	700	7	2100	21
Panchmahal	700	7	700	7	700	7	2100	21
Patan	1000	10	1000	10	1000	10	3000	30
Porbandar	700	7	700	7	700	7	2100	21
Rajkot	1000	10	1000	10	1000	10	3000	30
Sabarkantha	1000	10	1000	10	1000	10	3000	30
Surat	700	7	700	7	700	7	2100	21
Surendranagar	1000	10	1000	10	1000	10	3000	30
Tapi	500	5	500	5	500	5	1500	15
Vadodara	1000	10	1000	10	1000	10	3000	30
Valsad	700	7	700	7	700	7	2100	21
Total	27100	271	27100	271	27100	271	81300	813

Cost Norms: Rs.0.01 Lakh/ Utensils

Female Calf Rearing

Table-4.5.13 Details of Expenditure Per Year (Rs. in Lakh) Per Calf Rearing Unit of 10 Calves

Year	Concentrate	Fodder	Mineral Mixture	Medicines	Housing	Total
First	0.70	0.15	0.10	0.05	1.00	2.00
Second	0.67	0.165	0.11	0.055	0.00	1.00
Third	0.70	0.15	0.12	0.03	0.00	1.00
Cumulative	2.04	0.465	0.33	0.135	1.00	4.00

Table-4.5.14 District-wise No. of Female Calf Rearing Unit (10 Female Calf per Unit) Amount Required (Rs. Lakh (@ Rs.4.00 Lakh)/Unit under Proposal for Calf Rearing Unit in the State

District	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Ahmedabad	5	20	5	20	5	20	15	60
Amreli	8	32	8	32	8	32	24	96
Anand	8	32	8	32	8	32	24	96
Aravalli	8	32	8	32	8	32	24	96
Banaskantha	8	32	8	32	8	32	24	96
Bharuch	5	20	5	20	5	20	15	60
Bhavnagar	6	24	6	24	6	24	18	72
Botad	2	8	2	8	2	8	6	24
Chota Udepur	2	8	2	8	2	8	6	24
Dahod	8	32	8	32	8	32	24	96
Dang	2	8	2	8	2	8	6	24
D Dwaraka	2	8	2	8	2	8	6	24
Gandhinagar	8	32	8	32	8	32	24	96
Gir Somnath	8	32	8	32	8	32	24	96
Jamnagar	5	20	5	20	5	20	15	60
Junagadh	7	28	7	28	7	28	21	84
Kheda	6	24	6	24	6	24	18	72
Kutchh	2	8	2	8	2	8	6	24
Mahisagar	2	8	2	8	2	8	6	24
Mehsana	8	32	8	32	8	32	24	96
Morbi	2	8	2	8	2	8	6	24
Narmada	2	8	2	8	2	8	6	24
Navsari	2	8	2	8	2	8	6	24
Panchmahal	7	28	7	28	7	28	21	84
Patan	8	32	8	32	8	32	24	96
Porbandar	2	8	2	8	2	8	6	24
Rajkot	5	20	5	20	5	20	15	60
Sabarkantha	6	24	6	24	6	24	18	72
Surat	2	8	2	8	2	8	6	24
Surendranagar	4	16	4	16	4	16	12	48
Tapi	2	8	2	8	2	8	6	24
Vadodara	6	24	6	24	6	24	18	72
Valsad	2	8	2	8	2	8	6	24
Total	160	640	160	640	160	640	480	1920

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Provision of Artificial Insemination for Dairy Animals in the State:

Table-4.5.15 Proposal for Provision of Artificial Insemination Facilities in the State

Sr No	Particular	Unit Cost	2017-18		2018-19		2019-20	
			Unit	Total Cost	Unit	Total Cost	Unit	Total Cost
1	No of A.1. Centre		70		70		70	
	Liquid nitrogen containers required							
2	55 liters for Transportation	3	7	21	7	21	7	21
	35 Liters	0.24	70	16.8	70	16.8	70	16.8
	3 Liters	0.09	70	6.3	70	6.3	70	6.3
3	A.I. Equipments with Furniture	0.15	70	10.5	70	10.5	70	10.5
4	Vehicle for Ln2 Transportation	7	1	7	1	7	1	7
5	Trevis	0.06	70	4.2	70	4.2	70	4.2
	Sub Total A			65.8		65.8		65.8
	Liquid nitrogen required							
6	400 liters/year/Centre	0.00018	28000	5.04	28000	5.04	28000	5.04
	Sub Total B			5.04		5.04		5.04
	Training							
7	A.I.Worker	0.3	70	21	140	42	140	42
	A.I.Officer	0.6	4	2.4	8	4.8	8	4.8
8	Vehicle for A.1. Officer	0.55	4	2.2	3	1.65	3	1.65
	Sub Total C			25.6		48.45		48.45
	Semen doses required							
9	5000 Semen Dose req./ Centre/Year	0.00020	700000	140	700000	140	700000	140
10	Multimedia with Computer	1.5	1	1.5	0	0	0	0
11	Phase Contrast Microscope	0.6	1	0.6	0	0	0	0
	Sub Total D			142.1		140		140
	Total (A+B+C+D)			238.54		259.29		259.29

Grand total Rs. 757.12Lakh

Table-4.5.16 Requirements (Rs. Lakh) of Provision of Artificial Insemination Facilities in Various Districts of the State

District	No. of A.I. centers	2017-18	2018-19	2019-20	Total
	Phy.	Fin.	Fin.	Fin.	Fin.
Ahmedabad	15	60	60	60	165
Amreli	15	60	60	60	165
Anand	15	60	60	60	165
Aravalli	15	60	60	60	165
Banaskantha	15	60	60	60	165
Bharuch	15	60	60	60	165
Bhavnagar	15	60	60	60	165
Botad	9	36	36	36	99
Chota Udepur	9	36	36	36	99
Dahod	9	36	36	36	99
Dang	9	36	36	36	99
D.Dwaraka	9	36	36	36	99
Gandhinagar	15	60	60	60	165
Gir Somnath	15	60	60	60	165
Jamnagar	15	60	60	60	165
Junagadh	15	60	60	60	165
Kheda	15	60	60	60	165
Kutchh	15	60	60	60	165
Mahisagar	9	36	36	36	99
Mehsana	15	60	60	60	165
Narmada	9	36	36	36	99
Navsari	9	36	36	36	99
Panchmahal	15	60	60	60	165
Patan	15	60	60	60	165
Porbandar	9	36	36	36	99
Rajkot	15	60	60	60	165
Sabarkantha	15	60	60	60	165
Surat	9	36	36	36	99
Surendranagar	9	36	36	36	99
Tapi	9	36	36	36	99
Vadodara	15	60	60	60	165
Valsad	9	36	36	36	99
Total	402	1608	1608	1608	4824

4.5.1.7 Researchable Issues:

Livestock Improvement

Animal Genetics & Breeding /Animal Biotechnology:

Research in Embryo-transfer Technology/Veterinary Gynecology

Availability of sexed semen

4.5.2 SMALL RUMINANTS AND RABBIT PRODUCTION:

4.5.2.1 Background:

Small ruminants are important to rural landless people and also to small and marginal farmers in India where the crop production is risk-prone enterprise. India possesses 39 breeds of sheep and 23 breeds of goat, with a present population of 74.5 million (7.14% of world population) sheep and 157.0 million (17.93% of world population) goat. Presently India ranks first in goat population and second in sheep population next to China (BAHS, 2013). The current contribution of small ruminants is large, not only associated with the potential capacity for higher levels of production but also increased socio-economic contribution related to large population size, wide distribution across various agro-ecological zones and production systems and diversity of breeds.

Sheep and goats being small animals, maintenance requirement is less and easily managed by the rural poor. Indigenous sheep and goat genetic resources have developed specific adaptations to survive and produce under adverse local environmental conditions viz., climatic stresses, poor quality feed, seasonal feed and water shortage, endemic disease and parasitic challenges that make them suitable for use in the traditional, low input production system. Small ruminants play a pivotal role in supporting the livelihood system of the poor men and women, especially in the marginalized communities.

Sheep and Goat Genetic Resources in Gujarat:

According to Planning Commission of India, Gujarat falls under plain and hill agro-climatic zone. This area is characterized by low hills and dry thorny shrub forest. Rainfall is the most dominant climatic factor. The average rainfall is 828 mm, ranges from 300 mm in North-West to 2000 mm in South-East part of Gujarat. Twelve out of 26 districts of Gujarat are drought prone. In the absence of irrigation, agriculture is limited and livestock particularly sheep and goat are necessary means of livelihood for rural poor. This region is home track to famous nomadic communities like *Bharawad*, *Rabari* and other *Maldharis*.

As per 18th Livestock Census (2007), India possessed 71.56 million sheep and 140.54 million goats with an overall growth rate of 1.5 and 3.6% per annum between 1951 and 2007. The sheep and goat population in Gujarat were respectively 2002 and 4640 thousand and share about 8.5 and 19.7% of total population (18th Livestock Census) of India.

Table 4.5.17 Sheep Breeds of Gujarat:

Sr. No.	Sheep Breeds	No. in '000	%	District
1	Patanwadi	562.60	28.11	Bhavnagar, Kutch, Amreli, Rajkot, Jamnagar
2	Marwari	994.35	49.68	Kutch, Banaskantha, Jamnagar, Rajkot, Bhavnagar
3	Dumba	162.97	8.14	Surendranagar, Rajkot, Bhavnagar, Kutch, Kheda
4	Non-descript	267.55	13.37	--
Total		2001.56	100.0	--

Table 4.5.18 Goat Breeds of Gujarat:

Sr. No.	Goat Breeds	No. in '000	%	District
1	Zalawadi	821.73	17.71	Surendranagar, Jamnagar, Rajkot, Amreli, Junagadh
2	Gohilwadi	321.57	6.93	Bhavnagar, Amreli, Rajkot,

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3	Kutchi	661.20	14.25	Kutch, Banaskantha, Rajkot
4	Mehsani	596.67	12.86	Banaskantha, Patan, Mehsana, Ahmedabad, Sabarkantha
5	Surti	671.49	14.47	Vadodara, Bharuch, Surat, Tapi, Valsad, Navsari
6	Non-descript	1567.49	33.78	--
Total		4640.14	100.0	--

Sheep and Wool Development in Gujarat:

Sheep and wool development activities are significant in Gujarat state as it has 20.02 lakh number sheep (Table-1). In the state of Gujarat, there are three Sheep Breeding Farms under the Animal Husbandry Department at Patan, Morbi and Nalia. A large-scale Sheep Breeding Farm also exists under Gujarat Sheep and Wool Development Corporation (GSWDC) at Jasdan (Bulletin of A.H. and Dairying Statistics, GOG, 2012-13).

In Gujarat state, there are four Intensive Sheep Development Projects (ISDP) - two under Department of Animal Husbandry and two under GSWDC. These projects are associated with imparting technical guidance on sheep rearing and providing basic infrastructural facilities to the professional breeders of Patanwadi, Marwari and Dumba sheep so that they can get maximum returns from the business. The GSWDC also provides all necessary marketing facilities for the sale of wool and other by-products (*ibid*, 2012-13).

Improved rams with superior genetic merit produced at the farms are supplied to the sheep breeders to improve local sheep population. For the proper medication and drenching of the migratory flock of sheep during routine migration, scarcity and other natural calamities the special service center at certain locations (e.g. Modasa and Viramgam) are providing these amenities. The sheep breeders are imparted training for the proper management of the sheep by technical officers engaged in sheep breeding activities.

Goat development in Gujarat

Gujarat state possesses 46.4 lakh goat. The main breeds of goat are Zalawadi, Gohilwadi, Kutchi, Mehsani and Surti (Table-2). Additionally, there are few goat flocks of Marwari and Sirohi breeds. The Animal Husbandry Department has established one small Goat Breeding Farm at Morbi, where Zalawadi goats are maintained and improved by selective breeding. In the special component plan, the subsidy is given to schedule caste people for the establishment of Goat units. Women and general category people also received a subsidy for establishing goat farm. Importance of goat through the establishment of Goat Breeding Farms (GBF) at Kondh, Bharuch District for Surti goat, at Naliya, Kachchh District for Kachchhi (kutchhi) breed and at Mota Jampura, taluka Kankrej, Dist. Banaskantha for the Mehasani breed has been emphasized. Under Anand Agricultural University, Anand at Pashu Sanshodhan Kendra, Ram Na Muwada, Taluka Mahudha Surti Goat Farm is established with the strength of 300 Surti and about 50 Marwari goats.

Vision:

- To generate self-employment in rural/ tribal/peri-urban youth and women to improve their socio-economic status.
- To create entrepreneurship opportunities in marginalized people to improve income and nutritional status by Goat, Sheep and Rabbit production.

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- To improve the productivity of all the produces from small ruminants and rabbit to make it sustainable farming.

Mission:

- To increase productivity through Supply of elite males (bucks and rams) by establishing breeding farms of different breeds of Sheep and Goat.
- To provide various production inputs, viz., feed, vaccination, health cover and management practices.
- Capacity building of stakeholder's viz., rural, urban and tribal youth and women towards the quality improvement of feed, enhancement of production and reproductive efficiency.

4.5.2.2 Issues and Gap Analysis:

Small ruminant production has great potential for livelihood opportunities. Still, the young generation is not attracted to it. The issues and gap analysis is given below.

Table-4.5.19 Issues and Gap Analysis of Productivity in Sheep and Goat Husbandry

Particulars	Factors / Constraints leading to a gap	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
Sheep and Goat Rearing	Lack of knowledge about rearing	Popularize scientific sheep and goat rearing	Creating awareness and increase adoption of scientific sheep and goat rearing through training, demonstrations and literature	Increase milk and meat production	Increase income and improve the health of the farmers

4.5.2.3 Priorities:

The areas of interest and activities of priority under small ruminant husbandry in order to bring about development in sheep and goat production are as follows.

- Establishment of buck and ram mother farms
- Supply of pure bred bucks and rams for breeding at community level under gram panchayats.
- Providing health cover to sheep and goat through mobile clinics.
- Popularizing scientific sheep and goat rearing.

4.5.2.4 Researchable Issues:

- Preparation of low-cost feeding regimens.
- Commercial supply of feed to goat and sheep owners.
- Preparation of kid starter to reduce kid mortality.
- Medicinal properties of goat milk (Value addition)

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Population, production and per-animal productivity in relation to small animal production are given in below tables.

Table-4.5.20 District-wise Sheep and Goat Population (in '000) and Wool Production of Gujarat State

Sr. No	District	Sheep	Goat	Wool, '000 kgs.
1.	Ahmedabad	23	126	21.23
2.	Amreli	137	134	197.08
3.	Anand	11	76	14.23
4.	Banaskantha	161	309	232.07
5.	Bharuch	7	134	7.08
6.	Bhavnagar	258	199	348.78
7.	Dahod	6	505	6.53
8.	Dang	0	37	0
9.	Gandhinagar	17	47	22.25
10.	Jamnagar	208	173	290.48
11.	Junagadh	47	107	51.54
12.	Kheda	29	118	36.95
13.	Kutchh	575	485	790.39
14.	Mehsana	15	88	19.83
15.	Narmada	0	72	0.06
16.	Navsari	2	67	1.98
17.	Panchmahal	4	447	4.59
18.	Patan	54	103	67.8
19.	Porbandar	23	22	24.91
20.	Rajkot	217	197	242.73
21.	Sabarkantha	67	344	80.24
22.	Surat	1	106	0.95
23.	Surendranagar	134	191	194.33
24.	Tapi	1	94	1.17
25.	Vadodara	4	312	4.12
26.	Valsad	3	147	2.96
	Total	2004	4640	2664.28

Table-4.5.21 Trend of Change in No. of Productive Goats from 2000-01 to 2012-13

Sr. No.	Year	Goat (in '00 No.)	
		In-milk	Milch
1	2000-01	17,531	30,203
2	2001-02	17,131	29,038
3	2002-03	17,249	29,803
4	2003-04	17,416	30,191

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5	2004-05	18,024	30,200
6	2005-06	18,204	30,053
7	2006-07	17,875	28,849
8	2007-08	17,454	28,069
9	2008-09	16,013	26,143
10	2009-10	15,776	27,011
11	2010-11	15,978	27,181
12	2011-12	15,874	27,264
13	2012-13	15,605	26,379

Table-4.5.22 Trend of Change in Per-animal Productivity and Total Milk Production in Goat from 2007-08 to 2012-13

Year	Overall Average Daily Milk Yield per Goat (Kg)	Milk Production from Goat (in Lakh Kg)
2007-08	0.388	2,481
2008-09	0.400	2,339
2009-10	0.402	2,312
2010-11	0.404	2,356
2011-12	0.415	2,411
2012-13	0.425	2,421

Table - 4.5.23 Bridging the gaps for realizing the Vision in small ruminant rearing

Issue	Programme	Activities
Sheep and Goat Development	Goat and Sheep farming	<ul style="list-style-type: none"> Income and employment generation for weaker sections of society Targeting rural, tribal and peri-urban youth and women to develop entrepreneurship in this field.

4.5.2.5 Recommended Interventions for the State with Detailed Action Plan along with Cost (District-wise):

Capacity building towards i) quality improvement of feed, ii) enhancement of milk production and iii) improvement of reproductive efficiency is required.

Table-4.5.24 District-wise Proposal for capacity building along with financial requirements in Gujarat state (25 trainees/training, Total expense (Lakh) for training @ Rs.600/-.

Sr. No.	District	Details	2017-18	2018-19	2019-20	Total	Rs. Lakh.
A	For the JAU region (10 Districts)	No. of Training	100	100	100	300	--
		Total expense (Lakh)	15.0	15.0	15.0	--	45.0
B		No. of Training	70	70	70	210	--

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	For the NAU region (7 District)	Total expense (Lakh)	10.5	10.5	10.5	--	31.5
C	For the SDAU region (7 District)	No. of Training	70	70	70	210	--
		Total expense (Lakh)	10.5	10.5	10.5	--	31.5
D	For the AAU region (9 Districts)	No. of Training	90	90	90	270	
			13.50	13.50	13.50		40.50
	Overall (A+B+C+D) 33 Districts	Total expense (Lakh)	49.50	49.50	49.50		148.50

4.5.3 RABBIT PRODUCTION:

4.5.3.1 Background:

Rabbits are potential economic producers of meat and wool/fur and can adopt a wide range of environmental conditions.

Apart from its significance as a laboratory animal, there is a scope of the backyard and commercial rabbitry/hutch for an animal protein source, especially for weaker sections in coastal areas.

Vision:

To popularize rabbit farming for meat and fur purpose

Mission:

- Training to unemployed youth-rural, tribal, urban for livelihood and nutritional security.
- Creating Market for rabbit products.

4.5.3.2 Researchable Issues:

- Preparation of low-cost feeding regimens.
- Commercial supply of feed to rabbit owners.

4.5.3.3 Sustainability Issues and Gap Analysis of Productivity in Rabbit Rearing:

Table-4.5.25 Sustainability Issues and Gap Analysis of Productivity in Rabbit Rearing:

Particulars	Factors / Constraints Leading to Gap	Strategies	Approach and Methodology	Performance Indicators	Sustainability Outputs
Rabbit rearing	Lack of scientific knowledge about rearing	Popularize rabbit rearing rural and urban population and women folk	Creating awareness and increase adoption of rabbit rearing through training, demonstrations and literature	Increase in meat production	Increased income and health of the rabbit keepers

4.5.3.4 Bridging the gaps for realizing the Vision in Rabbit farming

Issue	Program	Activities
Rabbit Development	Rabbit farming	Income and employment generation for weaker section of society

Table 4.5.26 Population of Rabbit in Gujarat

Sr.No.	Region	Rabbit Population
1	JAU Region	1368
2	AAU Region	2246
3	SDAU Region	3972
4	NAU Region	1522
	Overall: Gujarat	9108

Source: Summary Report on 18th Livestock Census 2007 (Provisional), Dir. A.H., GOG

Table 4.5.27 Proposal for Capacity Building for rabbit rearing with financial requirements in Gujarat state (15 trainees/training, the Total expense for training @ Rs.600/-/trainee/day (Rs. in lakhs)

Sr. No.	Region	Number of one-day training	No. of participants per training	No. of Total Participants	Financial Rs. In Lakh
1	South Gujarat (NAU, Navsari)	5	15	75	0.45
2	Middle Gujarat (AAU, Anand)	5	15	75	0.45
3	North Gujarat (SDAU, S.K.Nagar)	5	15	75	0.45
4	Saurashtra (JAU, Junagadh)	5	15	75	0.45
	Total	25	-	-	1.80

4.5.4 POULTRY PRODUCTION AND HEALTH:

4.5.4.1 Background:

The remarkable growth achieved in the Indian poultry sector is due to several factors like pure line breeding within the country in both public and private sectors leading to the availability of elite commercial layer and broiler germplasm. The parallel development of other input sub-sectors like feed industry, hatcheries and farm appliances, poultry biologicals, vertical and horizontal integration in poultry farming and ever-increasing demand for poultry products have contributed to rapid growth. Gujarat ranks 10th and 12th in egg and poultry meat production, respectively in the country. In view of modernization, ever-changing lifestyle and demand of quality protein resources there is tremendous scope for development of poultry farming in the State through improvement in production, infrastructure, better inputs and services, training to youth and women and providing organized marketing networks.

Vision:

Increasing poultry production and self-employment opportunities through a holistic approach to poultry farming in Gujarat.

Mission:

Augmentation of poultry production through infrastructure development, the supply of quality inputs, capacity building of youths and women and by providing market support to poultry farmers in Gujarat.

4.5.4.2 State Scenario:

- As per the livestock census, 2012 (P) of Gujarat state poultry population in the state is 1,50,05,751 which is only 2.06 % of the country and rank 13th in poultry population.
- Poultry population was also noted 150.06 lakhs, registering an increase of 12.21 % over previous census year 2007. The egg is a nutritious product produced by Deshi and improved layers. With a view to getting supplementary income from deshi poultry, people of the rural area, especially in tribal backward areas, keep deshi poultry with minimum input like feeds and other. Deshi layer gives only 110 to 241 eggs per year. When Improved layer farms, are mostly located in the developed area, run by a private organization to earn more benefit. Improved poultry farms are quick and cash unit which attracts people to join this business. Improved layer gives at least 264 to 334 eggs per year. The poultry farms for egg production are run in a scientific way by deep litter as well as cage system of housing facilities with cooling and mechanical ventilation system. A number of layers per unit (i.e. per farm) range from 5000 to 50000.

(a) Status of Layer Farming in Gujarat

i. Deshi Poultry

- ✓ The estimated population of deshi layer works out during the year 2016-17 is 16626 hundred, which shows an increase of 2.06% compared to the previous year. The estimated population of total deshi poultry works out during the year 2016-17 is 50145 hundred, which shows an increase of 2.04% compared to the previous year.
- ✓ The estimated average egg yield per year per layer for deshi poultry for the year 2016-17 comes to 136.75 eggs. The corresponding figure for the year 2015-2016 was 148.06 eggs. Thus, this shows a decrease of 7.64% in productivity of Deshi layer for the year 2016-17 as compared to the previous year.
- ✓ The egg production from deshi layer for the year 2016-17 is estimated to 2273.64 lakh numbers as compared to 2411.84 lakh numbers estimated for the year 2015-16 shows a decrease of 5.73% over the previous year.

ii. Improved poultry

- ✓ The estimated population of the improved layer and improved total poultry works out during the year under report is 52042 hundred and 65741 hundred respectively, showing an increase of 7.93% and 13.76% over previous year respectively.
- ✓ The estimated average egg yield per year per layer for improved poultry for the year 2016-17 comes to 301.04 eggs. The corresponding figure for the year 2015-2016 was 307.03 eggs. Thus, per year egg productivity of improved layer has decreased by 1.95% during 2016-17 over the previous year.
- ✓ The egg production from the improved layer for the year 2016-17 is estimated to 15666.70 lakh numbers as compared to 14804.05 lakh numbers estimated for the year 2015-16 showing an increase of 5.83% over the previous year.
- ✓ Total egg production in Gujarat State during 2016-17 is estimated at 17940.34 lakh eggs, showing an increase of 4.21% over the previous year's production of 17215.89 lakh eggs.

(b) Status of Broiler Farming in Gujarat

- ✓ The estimate of broiler reared in the year 2016-17 is 22868932 compared to previous year's 23562658, showing a decrease of 2.96%.

(c) Total poultry meat production

Total poultry meat production is estimated at 1428.530 metric tonnes from deshi birds, 4473.342 metric tonnes from improved layers and 24512.278 metric tonnes from broiler birds. Overall total meat production works out at 33333.19 metric tonnes, excluding the production at unregistered slaughter houses, showing a decrease of 1.77% over previous year's estimation of 33935.180 metric tonnes.

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Table-4.5.28 Detail of Poultry Production in Gujarat State

Population	2012-13	2013-14	2014-15	2015-16	2016-17	% of Increase or Decrease over previous year (2015-16)
Layer Poultry Population (includes the only Layer)						
<i>Deshi</i> layer	14,56,300	14,69,400	15,80,500	16,29,000	16,62,600	2.06
Improved Layer	43,13,200	46,12,400	47,56,800	48,21,700	52,04,200	7.93
Total Layer	57,69,500	60,81,800	63,37,300	64,50,600	68,66,700	6.45
Total Poultry Population (including Chick, Grower & Layer)						
<i>Deshi</i> Poultry	46,06,700	47,05,800	50,71,100	49,14,400	50,14,500	2.04
Improved Poultry	57,84,200	61,06,700	59,52,600	57,78,700	65,74,100	13.76
Total poultry	1,03,90,900	1,08,12,500	1,10,23,700	1,06,93,100	1,15,88,500	8.37
Broiler Reared	2,46,44,837	2,31,55,602	2,34,37,473	2,35,62,658	2,28,68,932	-2.96
Egg Production (lakh numbers)						
<i>Deshi</i> Poultry	1791.19	1810.44	2078.24	2411.84	2273.64	-5.73
Improved Poultry	12767.19	13739.78	14486.75	14804.05	15666.70	5.83
Total Egg Production	14558.38	15550.22	16564.99	17215.89	17940.31	4.21
Egg yield (Eggs/Bird/Year)						
<i>Deshi</i> Poultry	123.00	123.21	132.00	148.00	136.75	-7.64
Improved Poultry	296.00	297.89	305.00	307.00	301.04	-1.95
Egg availability (Nos/ Person/Year)	23	24	25	26	27	
Est. Number of Bird Slaughtered						
Broiler	2,46,44,837	2,31,55,602	2,34,37,473	2,35,62,658	2,28,65,932	-3.04
Deshi Poultry	13,40,185	13,52,185	14,54,628	14,98,894	15,29,476	+1.99
Improved Poultry	39,68,171	42,44,092	43,75,858	44,36,841	47,89,445	+7.36
Poultry meat (metric tonnes)						
Broiler birds	26419.26	24822.81	25124.97	25259.17	24512.28	-3.04
<i>Deshi</i> Birds	1251.73	1262.94	1358.62	1399.96	1428.53	+1.99
Improved layers	3706.27	3963.98	4087.05	4144.01	4473.34	+7.36
Chicken Meat Production (Tonnes)	34489.10	30049.73	30570.65	30803.15	30414.15	-2.26%

Table-4.5.29 Average Annual Growth Rate (%) as per FYP in Egg Production

Five Year Plan	Growth Rate (%) in Egg Production Gujarat	Growth Rate (%) in Egg Production India
Sixth (1980-81 to 1984-85)	5.54	8.40
Seventh (1985-86 to 1989-90)	8.83	7.23
Eight (1992-93 to 1996-97)	1.92	4.58
Ninth (1997-98 to 2001-02)	-5.08	7.29
Tenth (2002-03 to 2006-07)	16.35	5.61
Eleventh (2007-08 to 2011-12)	14.43	5.53

Table-4.5.30 Per Capita Availability of Eggs in Last 10 years, Gujarat State

Year	Production (in Lakh Nos)	Per capita availability (Nos/Year)
2000-01	3460	7
2001-02	3701	7
2002-03	3848	7
2003-04	4423	8
2004-05	5031	9
2005-06	5775	11
2006-07	7775	14
2007-08	8256	15
2008-09	12675	22
2009-10	12762	22
2010-11	13269	23
2011-12	14269	23
2012-13	14558	23
2013-14	15550	24
2014-15	16565	25
2015-16	17940	26
2016-17	17940	27

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Table-4.5.31 Category and District-wise Egg Production in Gujarat State (2016-17)(Production in lakh nos.)

Deshi Layer				Improved Layer				Total Egg Production			
Rank	Name of the District	Egg Production	%	Rank	Name of the District	Egg Production	%	Rank	Name of the District	Egg Production	%
1	Valsad	395.74	17.41	1	Anand	8540.52	54.51	1	Anand	8549.52	47.66
2	Dahod	267.56	11.77	2	Bhavnagar	2605.41	16.63	2	Bhavnagar	2617.37	14.59
3	Panchmahals	242.49	10.67	3	Ahmedabad	1214.84	7.75	3	Ahmedabad	1227.89	6.84
4	Surat	222.08	9.77	4	Surat	662.87	4.23	4	Surat	884.96	4.93
5	Tapi	215.64	9.48	5	Navsari	578.62	3.69	5	Navsari	762.12	4.25
6	Narmada	193.35	8.50	6	Tapi	356.27	2.27	6	Valsad	695.06	3.87
7	Navsari	183.50	8.07	7	Kheda	350.13	2.23	7	Tapi	571.91	3.19
8	Vadodara	131.97	5.80	8	Valsad	299.33	1.91	8	Kheda	371.75	2.07
9	Dang	97.07	4.27	9	Banaskantha	215.76	1.38	9	Vadodara	312.89	1.74
10	Sabarkantha	82.98	3.65	10	Vadodara	180.92	1.15	10	Dahod	287.36	1.60
11	Bharuch	58.34	2.57	11	Patan	159.95	1.02	11	Banaskantha	261.33	1.46
12	Banaskantha	45.56	2.00	12	Junagadh	116.95	0.75	12	Panchmahals	242.49	1.35
13	Junagadh	22.49	0.99	13	Mahesana	94.29	0.60	13	Narmada	193.35	1.08
14	Kheda	21.63	0.95	14	Rajkot	67.46	0.43	14	Patan	174.66	0.97
15	Patan	14.70	0.65	15	Sabarkantha	60.54	0.39	15	Sabarkantha	143.52	0.80
16	Ahmedabad	13.04	0.57	16	Bharuch	51.89	0.33	16	Junagadh	139.45	0.78
17	Bhavnagar	11.95	0.53	17	Porbandar	48.04	0.31	17	Bharuch	110.23	0.61
18	Anand	9.00	0.40	18	Jamnagar	32.88	0.21	18	Mahesana	102.23	0.57
19	Jamnagar	8.11	0.36	19	Dahod	19.80	0.13	19	Dang	97.07	0.54
20	Mahesana	7.94	0.35	20	Gandhinagar	10.23	0.07	20	Rajkot	74.02	0.41
21	Kachchh	7.28	0.32	21	Amreli	0.00	0.00	21	Porbandar	49.12	0.27
22	Gandhinagar	6.80	0.30	22	Dang	0.00	0.00	22	Jamnagar	40.99	0.23
23	Rajkot	6.56	0.29	23	Kachchh	0.00	0.00	23	Gandhinagar	17.03	0.09
24	Amreli	5.59	0.25	24	Narmada	0.00	0.00	24	Kachchh	7.28	0.04
25	Surendranagar	1.17	0.05	25	Panchmahals	0.00	0.00	25	Amreli	5.59	0.03
26	Porbandar	1.08	0.05	26	Surendranagar	0.00	0.00	26	Surendranagar	1.17	0.01
Gujarat State		2273.64	100.00	Gujarat State		15666.70	100.00	Gujarat State		17940.34	100.00

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Table-4.5.32 Estimated Average Poultry Meat Production, Gujarat State for the year 2016-2017 (in kg)

Sr.No.	Name of the District	Deshi Layer	Improved Layer	Broiler Birds	Meat Prod. of Poultry
1	Ahmedabad	7562	395640	658263	1061465
2	Amreli	3763	0	20524	24287
3	Anand	5655	2426894	5708265	8140814
4	Banaskantha	31504	62296	468573	562374
5	Bharuch	42631	14164	900129	956923
6	Bhavnagar	7548	758206	363748	1129502
7	Dahod	208695	5687	257955	472336
8	Dang	59051	0	58155	117206
9	Gandhinagar	2419	2736	1037002	1042157
10	Jamnagar	6163	8687	563861	578712
11	Junagadh	15958	31109	506709	553775
12	Kachchh	4849	0	0	4849
13	Kheda	13610	99193	2038506	2151309
14	Mahesana	3536	26808	294855	325199
15	Narmada	110303	0	167404	277707
16	Navsari	111243	148799	3225637	3485679
17	Panchmahals	161835	0	334849	496684
18	Patan	7063	44023	164846	215932
19	Porbandar	780	12997	197703	211480
20	Rajkot	4864	17643	554361	576868
21	Sabarkantha	51464	16039	1006021	1073524
22	Surat	124704	178252	1671180	1974136
23	Surendranagar	801	0	42211	43013
24	Vadodara	79856	52559	1863883	1996298
25	Valsad	239744	79606	2180818	2500168
26	Tapi	122931	92004	226820	441754
Gujarat State		1428530	4473342	24512278	30414150

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Table-4.5.33 District wise Total Poultry Population of (Year 2016-17) - Gujarat State.

Sr. No.	District	Deshi	Improved	Broiler birds	Total birds
1.	Ahmedabad	20278	8926	43700	72904
2.	Amreli	8178	1489	0	9667
3.	Anand	15565	1694	1314056	1331315
4.	Banaskantha	92786	17162	85044	194992
5.	Bharuch	27900	1760	11695	41355
6.	Bhavnagar	165772	10241	111840	287853
7.	Dahod	773196	39982	160	813338
8.	Dangs	189570	3128	666	193364
9.	Gandhinagar	6470	1794	13150	21414
10.	Jamnagar	14889	3287	17275	35451
11.	Junagadh	45804	50566	55124	151494
12.	Kachchh	12363	1326	36250	49939
13.	Kheda	44750	24095	364541	433386
14.	Mehsana	10822	1989	171630	184441
15.	Narmada	143474	7332	10900	161706
16.	Navsari	335426	73362	327585	736373
17.	Panchmahals	48980	31765	11200	523945
18.	Patan	4752	540	15749	21041
19.	Porbandar	1957	3925	0	5882
20.	Rajkot	6141	2882	840694	849717
21.	Sabarkantha	159763	23253	139121	322137
22.	Surat	397475	14594	187651	599720
23.	Surendranagar	1917	237	3000	5154
24.	Tapi	334191	20863	102667	457721
25.	Vadodara	656932	86987	324210	1068129
26.	Valsad	437975	4116	700	442791
	TOTAL	4389326	437295	4188608	9015229

Table-4.5.34 Agencies/Organization and activities under poultry sector of Gujarat state**(Bulletin of Animal Husbandry and Dairying Statistics, GOG, 2016-17)**

1	Regional Poultry Breeding Farm	3
2	District Poultry Breeding Farm	9
3	Broiler Farm (i) Government (ii) Private	3 2092
4	Layer Farm (i) Government (ii) Private	3 178
5	Duck Rearing Farm	0
6	Poultry Demonstration Centres	4
7	Hatcheries (i) Government (ii) Private	5 23
8	Chick Rearing Centres	6
9	Intensive Poultry Development Programme (i) Blocks (ii) Service centres	12 65
10	District Poultry Extension Programme (i) Blocks (ii) Service centres	5 20
11	Poultry Feed Compounding Units (a) Government (i) Nos. (ii) Capacity per shift (M. T.) (b) Private (i) Nos.	7 32 38
12	Poultry Farmers' Co-operative Societies	0
13	Poultry Feed Testing Laboratory	1
14	Poultry Farmers' Training Centres	17
15	Farmers' Trained in Poultry Farming	5130
16	Poultry Research Station (under State Agricultural University)	1
17	Poultry Disease Diagnosis Laboratories	2
18	Poultry Vaccine Production Unit	1
19	Pullorum Testing Unit	3

4.5.4.3 Challenges and Issues before Poultry Sector:

With ever rising incomes, the share of calories derived from cereals is declining in India which holds true for Gujarat too and it is going to decline further. Poultry sector is expected to play the most crucial role in transforming the nutritional demography of State with an ever-growing share of protein-based cheap human diets. Some of the specific challenges the poultry sector is faced with are as follows:

- **Regional Imbalances in Poultry Production**
 - The commercial layer farming is yet to make a dent in some of the most populous districts of the State. However, broiler farming is gradually catching up in all parts of the State.
- **Underexploited Poultry Diversity**
 - Among poultry species, chicken production has already acquired large-scale commercial dimensions in Gujarat due to its better efficiency. However, there is a scope for exploitation of other domesticated poultry species.
- **Rising Feed Cost**
 - The growth in poultry has outpaced the growth in cereal production leading to severe feed shortages and consequent rise in feed cost. Cereal by-products and oilseed residues usually constitute more than 80% of poultry diet. Coarse cereals also form the staple diet of millions of marginal farmers and landless labourers. These coarse cereals are the most important and most widely used poultry feed ingredients all over the world. The demand for coarse cereals is continuously increasing at 4% per year due to ever increasing population and their use in livestock rations.
 - The yield of maize grain, the most important ingredient of poultry feed in India is just about 40% of the world's average. The consumption and production gap will keep rising due to the growth of poultry sector as also due to its increasing industrial use (for production of maize starch and high fructose corn syrup etc.).
 - Soybean meal is yet another important poultry feed ingredient used as protein source in poultry rations. Instability in its production and exports has resulted in its shortage for the poultry industry leading to its high prices.
 - Poultry feed accounts for 70% of the total cost of poultry production. This has become one of the most serious challenges for the industry owing to growing population, alternative uses and the resultant increase in demand for the poultry feed ingredients, hence their escalated prices. Therefore, improving feed conversion efficiency would be crucial to profitability apart from the feed cost itself.
 - Over the past two decades, feed conversion rates for poultry have improved by about 40% due to improved productivity and efficient feeding strategies. However, still, only 25-35% of the nutrients consumed by poultry are utilized. Hence, further understanding of digestive physiology and biochemistry can be expected to improve nutrient utilization efficiency.
- **Poultry Health Management:**
 - The available infrastructure to address the health care aspects of poultry such as accredited disease diagnostic laboratories, disease monitoring and surveillance services and training facilities are inadequate in the state. Moreover, the cost of prophylactics and therapeutics is also on the rise.
 - Therefore, technology-driven cost-effective and efficient disease monitoring, diagnosis and combat systems need to be devised to address the health care issues concerning poultry.

- **Emerging and Re-Emerging Poultry Diseases: High vulnerability to disease outbreaks**
 - In the recent past, poultry sector has faced a frequent onslaught of newer poultry diseases like bird flu (Avian Influenza) leading to enormous losses to the poultry sector not only in Gujarat but India and globally.
 - The total losses to the Indian poultry sector till 2009 have been estimated to the tune of over Rs. 2200 crore.
 - In addition to this, other existing diseases viz. Infectious Bronchitis, Infectious Bursal Disease, Ranikhet disease, Marek's Disease and Fowl Pox have emerged in more virulent form. Therefore, scientific interventions are urgently needed to curb the menace of such emerging poultry diseases in the state as well as effective control measures against already existing major poultry diseases.
- **Poultry Waste Disposal and Environmental Concerns**
 - The magnitude of poultry wastes is constantly on increase due to the growth of the poultry industry. The problem of waste disposal is all the graver due to the concentration of poultry in some well-defined pockets or geographical boundaries.
 - There is a need to devise cost-effective ways and means for proper disposal of wastes arising from hatchery and poultry manure to minimize environmental pollution and for putting them to alternative efficient use.
 - Some of the alternative uses of poultry waste are the production of manure or bio-fertilizers (vermicompost) etc. Promotion of cost-effective methods of waste disposal has to be taken up to entice the commercial sector for putting the same into practice.
- **Declining Share of Backyard/Small Scale Poultry**
 - Rural poultry production constitutes an important component of the agricultural economy in State, small poultry holders are practically capable of contributing more significantly to alleviate malnutrition, poverty and unemployment.
 - Gujarat requires both mass production as well as production by masses to cater both its rural and urban population. Hence, fund and R&D support are critical for spread and popularization of small scale poultry amongst farming community having less than 2.0 ha. of land holding.
- **Climate Change and Associated Stresses**
 - Impact of climate change is likely to be observed on a higher scale in poultry sector as poultry is more sensitive to changes in temperature, humidity etc. leading to loss of productivity.
 - Therefore, technology-driven systems need to be evolved to counter such climate associated threats. Hence, strategies are required to be evolved for meeting these challenges.
- **Poultry Marketing Infrastructure**
 - Marketing of poultry products is the major issue faced by the industry. In the absence of orderly marketing network, sufficient regulated markets, lack of adequate cold-chain etc., the wholesale prices of poultry products suffer violent fluctuations and often become un-remunerative, due to cyclic boom-and-bust phenomena. The poultry marketing is largely in the hands of commission agents and private traders.
 - Procurement and distribution in remote places receive low priority. Fragmented and remote rural markets also restrict the reach of commercial poultry products to the far-

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flung rural areas. Strong marketing network covering the entire state is needed to set the industry free from the clutches of middlemen.

• World Trade and Markets

- The international trade in poultry meat and egg accounts for about 12% and 2% of global output of nearly 100 mmt poultry meat and 64 mmt eggs, respectively.
- The traditional channels of international trade in poultry have also been distorted owing to frequent outbreaks of deadly poultry diseases like Avian Influenza etc.
- Limited acceptance of processed poultry products in the domestic markets is yet constraint for the establishment of processing units and further investments in this area.
- Wet-marketing of broilers is still preferred and is widely prevalent in the Gujarat and Country as well in the absence of general awareness about food safety and quality, and statutory provisions to restrict the same. This is the primary reason for almost dismal share (about 0.7%) of the Country in the global poultry trade.

• Institutional and Capital Constraints

- The available minuscule public funded institutional support is far from adequate for the mammoth poultry sector. Support for Poultry Science education and R&D is meagre in the State. Therefore, there is an urgent need to establish Poultry Extension and Research Institute (PERI) in the State. Moreover, there is an urgent need of Central Poultry Disease Diagnostic laboratory, Mobile Poultry Health Monitoring Units and establishment of Regional Poultry Farmer's Training Centres.
- The facilities of microcredit to backyard poultry units are needed to promote poultry production by the masses in the State.

• Human Resource Needs

- Growing poultry sector also requires trained manpower not only to man the commercial establishments but also to support the required R&D in synchronized with ever-evolving scientific needs. It has been estimated that the highly skilled technical manpower requirement of the poultry sector will almost double by 2050, at the present rate of outturn and the present capacity of the educational and training institutions.
- Besides, the sector would also witness growth in skilled and semi-skilled manpower requirement at least @ 5% per year for specific and general operations concerning poultry production and processing. Therefore, developing and sustaining the required capacity building infrastructure to meet the ever-growing manpower demand of the poultry sector will be a challenge before the State.

4.5.4.4 Focus:

Keeping in view the above facts, following key focus areas are identified in order to overcome the issue of poultry production and health sector.

- Establishment of Poultry Extension and Research Institute (PERI) in the State.
- Establishment of Central Poultry Disease Diagnostic Laboratory, Mobile Poultry Health Monitoring Units and Regional Poultry Farmer's Training Centers.
- Strengthening and modernization of R&D infrastructure for promotion of innovations.
- Capacity building for improvement of human resources.

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- Foster linkages and collaborations with the stakeholders in both private and public sectors and also with other agencies.
- Promoting feed and product safety and development of technological interventions for their quality assurance.
- Search for alternate and effective utilization of poultry feed resources precision feeding to minimize the feed cost in the face of stiff competition between the human beings and poultry for the common feed resources.
- Developing cost-effective and efficient processing technologies for production of value-added poultry products with extended shelf-life, and utilization of poultry by-products and wastes.
- Contingency planning for facing the challenges of climate change for sustainable poultry production by evolving technologies for mitigating their adverse effects and associated stresses.
- Promotion of the backyard poultry production in rural area through the supply of improved/hybrid varieties of backyard poultry birds, supplementary feeding and disease control through effective vaccination programme.
- Introduction of improved/hybrid varieties for backyard poultry farming in a rural area will dilute the status of purebred chicken of the state. Hence, conservation and improvement of deshi native chicken breeds are needed.

4.5.4.5 Priorities:

- Strengthening of existing poultry breeding farm and hatcheries and establishment of new breeding farm and hatcheries to meet the requirement of quality chicks in commercial and backyard poultry sector.
- Establishment of new and strengthening of existing poultry feed production units to ensure better quality feed to the stakeholders and strengthening of existing and establishment of new poultry feed testing laboratories.
- Provision of better diagnostic and health inputs to the poultry sector, the establishment of Central and Regional Poultry Disease Diagnostic Laboratories and strengthening of the existing vaccine production unit in the public sector.
- Establishment of Mobile Poultry Health Monitoring Units.
- Identification of link agencies/resource agencies for backward and forward linkages for the real success of poultry sector.
- Establishment of Regional Poultry Farmer's Training Centers.
- Strengthening and restructuring of poultry product market and the establishment of a market network to support the poultry entrepreneurs and Creation and improvement of cold storage facilities for poultry products viz. eggs and meat.

4.5.4.6 Strategic Frame and the Long-term Goals/Targets:

Table-4.5.35 Strategic Frame and Long-Term Goals / Targets

Goal	Approach
Standardization of package of practices for poultry production	Identification of new feed resources, by-products and wastes, their evaluation and utilization through processing, improving gut-health, biotechnological tools, supplements and management of anti-nutritional factors
	Determination and fine-tuning of nutrient requirements of poultry under different systems of rearing and climates
	Surveillance, monitoring and prevention of poultry diseases by developing effective bio-security, bio-safety procedures
Developing self-sustainable production systems and effective management of farm waste and by-products	Development of integrated composite production systems aimed at zero waste production regime
	Processing and recycling techniques employing conventional and biotechnological methods for efficient utilization of all wastes from poultry farming
Improving food safety, value addition and quality assurance	Developing technologies for the production of demand drive convenient value-added poultry products, their shelf life extension and quality assurance
HRD, Capacity building and technology transfer	Organizing need based training programmes, trainers' training programmes, interactive meets, conferences/ symposia, seminars, etc.
	Dissemination of proven technologies through mass media approaches exhibitions etc.

4.5.4.7 Recommended Interventions for the State with Detail Action Plan with Cost

Table-4.5.36 Recommended Interventions Capacity Building for the State in Poultry Sector with Action Plan and Cost

SN	Activity /Projects	1 st year (2017-18)		2 nd year (2018-19)		3 rd year (2019-20)		Total (Rs. in Lakh)		Remarks
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
1	Training proposed for capacity building of field Veterinarians*	20	12.00	20	12.00	20	12.00	60	36.00	10 person/ training of 6 days duration
2	Training proposed for capacity building of para-veterinarians and field workers*	20	15.00	20	15.00	20	15.00	60	45.00	15 person/ training of 6 days duration
3	Training proposed for capacity building of poultry farmers on different technologies	132	72.00	132	72.00	132	72.00	396	216.00	30 person/ training of 3 days duration 4 training/year in each District
4	Demonstration of package of practices (five in each region)	20	20.00	20	20.00	20	20.00	60	60.00	Five demonstrations /region
5	Group formation for specific activities	33	33.00	33	33.00	33	33.00	99	99.00	One group/district
	Total	225	152.00	225	152.00	225	152.00	675	456.00	

*Training proposed for field veterinarians and para-veterinarians are on Regional basis viz; South, North, Saurashtra and Middle Gujarat region (Five training programmes in each zone)

4.5.4.8 Researchable Issues:

- Breeding: Development and improvement of area-specific varieties for backyard/rural poultry sector.
- Feed: Identification of alternative feed resources for the economic production of poultry diet.
- Marketing: Market survey for assessment of supply chain management of various input and output commodities in the poultry sector.
- Housing: Development of strategies for mitigation of the impact of climate change through improved housing systems in the poultry sector.
- Automation: Automation of poultry operations like feeding, watering, egg collection, cleaning, environment control, manure handling etc.
- Diagnostics and health: Development of rapid disease diagnostic tools for control of poultry diseases. Testing of therapeutic agents for control of poultry diseases.
- Poultry Product Processing Technology: Development of egg and chicken-based food products.

Basic Marketing Infrastructures for Poultry Products:

- Strengthening and restructuring/redefining the activities of existing IPDP's to play a vital role in providing the market network to the poultry entrepreneurs and to cope-up with the monopoly of private traders in regulating the prices of poultry products in the market.

District Level Cold Storage Plants (Capacity inT):

Innovative schemes/project-Background/Justification, objectives, budget (year wise), outcome etc.

Table-4.5.37 Strengthening of Infrastructure Facilities Logical Framework Matrix

Sr. No.	Infrastructure	No.	Cost (Rs. in Lakh)
1	Establishment of Poultry Extension and Research Institute (PERI) in the State	1	10000
2	Establishment of Central Poultry Disease Diagnostic Laboratory	1	1000
3	Establishment of Mobile Poultry Health Monitoring Units (regional)	4	200
4	Establishment of Regional Poultry Farmer's Training Centers	4	2000
5	Capacity building for improvement of human resources		456
6	Strengthening of existing poultry breeding farm and hatcheries	4	400
7	Establishment of new breeding farm and hatcheries	4	4000
8	Strengthening of existing poultry feed production units	7	700
9	Strengthening the existing vaccine production unit in the public sector.	1	100
10	Creation of cold storage facilities for poultry products	5	800
11	Strengthening of existing and establishment of new poultry feed testing laboratories.	5	650
		Total	20306

4.5.5 DAIRY SCIENCE:**4.5.5.1 Background:**

The milk production in the country is around 163.7 million tonnes and the per capita availability of milk is 352 grams/ day. The strong growth in Indian dairy sector can be attributed to the presence of the large dairy cooperative network in the country. According to the NDDB's Annual report (2016), there were around 15.835 million milk producer members in the country who have registered with around 1,70,992 Village Dairy Coop Societies in the country. Gujarat is a leading milk-producing state and has contributed significantly to the overall success of the dairy sector of the country. Milk production in the state has increased from 4.4 million tons in the year 1994 to 12.784 million tons in the year 2016-17. The state contributes to around 7.8 % of milk production in the country. The per capita availability of milk in Gujarat is impressive 563 grams /day. The leading milk producing districts of Gujarat state are – Banaskantha (13.55%), Sabarkantha (8.89%), Mehsana (6.39%), Kheda (5.52%), Panchmahals (5.04%), Junagadh (4.98%), Rajkot (4.68%) and Anand (4.53%). It has been estimated at present that about 25 % of milk produced in the country is handled by organized co-operative and private dairy plants, while the rest is utilized locally and converted into traditional dairy products, mostly by the unorganized sectors. It is projected that by the year 2020, the milk production in the country would be more than 180 million tons.

Vision:

Enhance the milk productivity, processing and value addition in milk products for better return to milk producers

Mission:

To enhance the quality and quantity of milk production and milk processing by the implementation of developments in science, technology and management practices.

To provide the leadership in skilled manpower development to handle various dairy processing operations, product development, clean milk production, value addition, safety and marketing of milk and milk products.

4.5.5.2 Important Issues:

1. Quality and safety of milk – needs improvement to stand in the global market
2. Enhancing shelf-life of milk – cold chain, transport and infrastructure needs to strengthen
3. Education of milk producers
4. Development of value-added dairy products having health benefits
5. Energy conservation and enhancing the use of green technology.

4.5.5.3 Priority

1. Education to farmers for promoting clean milk production.
2. Increased status of dairy education for highly qualified manpower.
3. Increase processing capacity under organized sector.
4. Entrepreneurship development through dairying and indigenous dairy products development in rural and urban areas.

Table-4.5.38 District-wise Milk Production in Gujarat

Sr. No.	District	Milk Production (in 000 tonnes) Year 2016-17	% of total
1	Banaskantha	1732.62	13.55%
2	Sabarkantha	1136.49	8.89%
3	Mehsana	817.14	6.39%
4	Kheda	705.67	5.52%

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Sr. No.	District	Milk Production (in 000 tonnes) Year 2016-17	% of total
5	Panchmahal	644.01	5.04%
6	Junagadh	636.21	4.98%
7	Rajkot	598.06	4.68%
8	Anand	579.15	4.53%
9	Kaccha	540.98	4.23%
10	Bhavnagar	500.34	3.91%
11	Vadodara	482.47	3.77%
12	Surat	466.78	3.65%
13	Surendranagar	455.4	3.56%
14	Ahmedabad	435.83	3.41%
15	Jamnagar	423.9	3.32%
16	Gandhinagar	413.59	3.24%
17	Patan	407.42	3.19%
18	Amreli	352.83	2.76%
19	Dahod	298.39	2.33%
20	Navsari	273.81	2.14%
21	Tapi	257.6	2.02%
22	Valsad	179.4	1.40%
23	Porbandar	168.02	1.31%
24	Bharuch	164.75	1.29%
25	Narmada	81.79	0.64%
26	Dang	31.43	0.25%
	Total	12784	100%

4.5.5.4 Recommended Interventions for the State with a Detailed Action plan with Cost:

(A) Intervention for Clean Milk Production:

The clean milk production is one of the basic requirements in order to supply safe milk to the consumers and to meet the quality standards of different dairy products. The following areas are proposed to be considered for clean milk production.

- a. The incentive for clean milk production by subsidy for Milking Machines
- b. The incentive to women managed milk Producers Co-operative Societies.
- c. Training of Clean Milk Production to the Technical staff of Dairy cooperatives and Entrepreneurs
- d. Intensive training of clean milk production to various Milk Producers

The cost estimates for all these interventions are given in below Tables.

(B) Intervention for Producing Skilled Man Power for the Industry:

Qualified manpower is one of the very basic needs to handle milk in various dairy plants.

(C) The intervention of Entrepreneurship Development:

The extension activities in the area of clean milk production, manufacture of traditional Indian dairy products, entrepreneurship development, energy conservation, training etc. need to be organized.

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Table-4.5.39 Districtwise Proposals for Milking Machines

Sr. No.	Districts	Total members in the district Milk coop*	Assuming 5% members having 30 or more milch animals	Physical target for year 2017-18	cost for year 2017-18	Physical target for year 2018-19	cost for year 2018-19	Physical target for year 2019-20	cost for year 2019-20	Total Physical target for 3 years	Total Project cost (Rs. In lakhs)
1	Ahmedabad	88425	4421	1474	147	1474	147	1474	147	4422	442
2	Amreli	38655	1933	644	64	644	64	644	64	1933	193
3	Banaskantha	346936	17347	5782	578	5782	578	5782	578	17347	1735
4	Bharuch	65500	3275	1092	109	1092	109	1092	109	3275	328
5	Bhavnagar	54033	2702	901	90	901	90	901	90	2702	270
6	Botad	12043	602	201	20	201	20	201	20	602	60
7	Gandhinagar	44369	2218	739	74	739	74	739	74	2218	222
8	Junagadh	32189	1609	536	54	536	54	536	54	1609	161
9	Kutch	36057	1803	601	60	601	60	601	60	1803	180
10	Kheda	695000	34750	11583	1158	11583	1158	11583	1158	34750	3475
11	Mehsana	611588	30579	10193	1019	10193	1019	10193	1019	30579	3058
12	Morbi	17490	875	292	29	292	29	292	29	875	87
13	Panchmahal	278000	13900	4633	463	4633	463	4633	463	13900	1390
14	Porbandar	40580	2029	676	68	676	68	676	68	2029	203
15	Rajkot	64000	3200	1067	107	1067	107	1067	107	3200	320
16	Sabarkantha	359392	17970	5990	599	5990	599	5990	599	17970	1797
17	Surat	238443	11922	3974	397	3974	397	3974	397	11922	1192
18	Surendranagar	86729	4336	1445	145	1445	145	1445	145	4336	434
19	Vadodara	226353	11318	3773	377	3773	377	3773	377	11318	1132
20	Valsad	120700	6035	2012	201	2012	201	2012	201	6035	604
	Total	3456482	172824	57608	5761	57608	5761	57608	5761	172825	17282
	Rs in Crores				57.61		57.61		57.61	0	172.82

Note: (1) *According to data available for the year 2016-17.(2) Cost of a double bucket milking machine around Rs.40,000/-, providing a subsidy of 25 %, i.e Rs. 10,000 per unit

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Table-4.5.40 Districtwise Proposals for Supporting Women Dairy Cooperatives

Sr. No.	Districts	Total members in the district Milk coop*	Physical target 20 kits per female Coop Soc.	Physical target for year 2017-18	cost for year 2017-18	Physical target for year 2018-19	cost for year 2018-19	Physical target for year 2019-20	cost for year 2019-20	Total Physical target for 3 years	Total Project cost (Rs. In lakhs)
1	Ahmedabad	144	2880	960	24	960	24	960	24	2880	72
2	Amreli	20	400	133	3	133	3	133	3	400	10
3	Banaskantha	105	2100	700	18	700	18	700	18	2100	53
4	Bharuch	155	3100	1033	26	1033	26	1033	26	3100	78
5	Bhavnagar	525	10500	3500	88	3500	88	3500	88	10500	263
6	Botad	90	1800	600	15	600	15	600	15	1800	45
7	Gandhinagar	32	640	213	5	213	5	213	5	640	16
8	Junagadh	212	4240	1413	35	1413	35	1413	35	4240	106
9	Kutch	121	2420	807	20	807	20	807	20	2420	61
10	Kheda	33	660	220	6	220	6	220	6	660	17
11	Mehsana	190	3800	1267	32	1267	32	1267	32	3800	95
12	Morbi	113	2260	753	19	753	19	753	19	2260	57
13	Panchmahal	429	8580	2860	72	2860	72	2860	72	8580	215
14	Porbandar	163	3260	1087	27	1087	27	1087	27	3260	82
15	Rajkot	455	9100	3033	76	3033	76	3033	76	9100	228
16	Sabarkantha	159	3180	1060	27	1060	27	1060	27	3180	80
17	Surat	189	3780	1260	32	1260	32	1260	32	3780	95
18	Surendranagar	182	3640	1213	30	1213	30	1213	30	3640	91
19	Vadodara	106	2120	707	18	707	18	707	18	2120	53
20	Valsad	922	18440	6147	154	6147	154	6147	154	18440	461
	Total	4345	86900	28967	724	28967	724	28967	724	86900	2173
	Rs in Crores				7.24		7.24		7.24		21.73

Note: (1)*According to data available for the year 2016-17 (2) Cost of Clean Milk Production kit is assumed to be Rs.5000 per beneficiary, 50% subsidy Rs. 2500 should be provided. (3) Distribution 20 kits per Female Village Dairy Cooperatives Society.

Table-4.5.41 Training for Capacity Building of Technical staff of Dairy cooperatives and Entrepreneurs

Sr	District	Training for Technical Staff of Milk Cooperatives (District-wise)							
		2017-18		2018-19		2019-20		Phy in numbers & Fin- Rs. in Lakh	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	40	0.32	40	0.32	40	0.32	120	1.6
2	Amreli	40	0.32	40	0.32	40	0.32	120	1.6
3	Banaskantha	60	0.48	60	0.48	60	0.48	180	2.4
4	Bharuch	40	0.32	40	0.32	40	0.32	120	1.6
5	Bhavnagar	20	0.16	20	0.16	20	0.16	60	0.8
6	Botad	20	0.16	20	0.16	20	0.16	60	0.8
7	Gandhinagar	20	0.16	20	0.16	20	0.16	60	0.8
8	Junagadh	20	0.16	20	0.16	20	0.16	60	0.8
9	Kutch	20	0.16	20	0.16	20	0.16	60	0.8
10	Kheda	20	0.16	20	0.16	20	0.16	60	0.8
11	Mehsana	20	0.16	20	0.16	20	0.16	60	0.8
12	Morbi	20	0.16	20	0.16	20	0.16	60	0.8
13	Panchmahal	20	0.16	20	0.16	20	0.16	60	0.8
14	Porbandar	40	0.32	40	0.32	40	0.32	120	1.6
15	Rajkot	20	0.16	20	0.16	20	0.16	60	0.8
16	Sabarkantha	20	0.16	20	0.16	20	0.16	60	0.8
17	Surat	20	0.16	20	0.16	20	0.16	60	0.8
18	Surendranagar	20	0.16	20	0.16	20	0.16	60	0.8
19	Vadodara	20	0.16	20	0.16	20	0.16	60	0.8
20	Valsad	20	0.16	20	0.16	20	0.16	60	0.8
	Total	520	3.84	520	4.16	520	4.16	1560	20.8
Note: Cost Norms: (Rs.800/Day /Person) i.e Rs. 0.008 lakhs /day/person									

District-wise Training Proposed for Capacity Building of Technical staff of Dairy cooperatives and Entrepreneurs**Cost Norms:** (Rs.800/Day /Person)

The area of training includes

- Use e-course content for teaching
- Hands-on training for the various advanced milk processing operations and equipment
- Adoption of greener technology in the dairy industry
- Use of instrumentation for the measurement of quality of milk and detection of adulterations

Table-4.5.42 Training Proposed for Capacity Building of Milk Producers

Sr No	District	Training for Milk producers (District-wise)							
		2017-18		2018-19		2019-20		Phy in numbers & Fin- Rs. in Lakh	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	90	0.54	90	0.54	90	0.54	270	1.62
2	Amreli	60	0.36	60	0.36	60	0.36	180	1.08
3	Anand	120	0.72	120	0.72	120	0.72	360	2.16
4	Aravalli	30	0.18	30	0.18	30	0.18	90	0.54
5	Banaskantha	120	0.72	120	0.72	120	0.72	360	2.16
6	Bharuch	90	0.54	90	0.54	90	0.54	270	1.62
7	Bhavnagar	60	0.36	60	0.36	60	0.36	180	1.08
8	Botad	30	0.18	30	0.18	30	0.18	90	0.54
9	Chhota Udaipur	30	0.18	30	0.18	30	0.18	90	0.54
10	Dahod	30	0.18	30	0.18	30	0.18	90	0.54
11	Dang	30	0.18	30	0.18	30	0.18	90	0.54
12	Devbhoomi Dwarka	30	0.18	30	0.18	30	0.18	90	0.54
13	Gandhinagar	30	0.18	30	0.18	30	0.18	90	0.54
14	Gir Somnath	30	0.18	30	0.18	30	0.18	90	0.54
15	Jamnagar	60	0.36	60	0.36	60	0.36	180	1.08
16	Junagadh	60	0.36	60	0.36	60	0.36	180	1.08
17	Kutch	60	0.36	60	0.36	60	0.36	180	1.08
18	Kheda	90	0.54	90	0.54	90	0.54	270	1.62
19	Mahisagar	30	0.18	30	0.18	30	0.18	90	0.54
20	Mehsana	90	0.54	90	0.54	90	0.54	270	1.62
21	Morbi	30	0.18	30	0.18	30	0.18	90	0.54
22	Narmada	30	0.18	30	0.18	30	0.18	90	0.54
23	Navsari	60	0.36	60	0.36	60	0.36	180	1.08
24	Panchmahal	60	0.36	60	0.36	60	0.36	180	1.08
25	Patan	60	0.36	60	0.36	60	0.36	180	1.08
26	Porbandar	30	0.18	30	0.18	30	0.18	90	0.54
27	Rajkot	30	0.18	30	0.18	30	0.18	90	0.54
28	Sabarkantha	120	0.72	120	0.72	120	0.72	360	2.16
29	Surat	90	0.54	90	0.54	90	0.54	270	1.62
30	Surendranagar	30	0.18	30	0.18	30	0.18	90	0.54
31	Tapi	30	0.18	30	0.18	30	0.18	90	0.54
32	Vadodara	90	0.54	90	0.54	90	0.54	270	1.62
33	Valsad	90	0.54	90	0.54	90	0.54	270	1.62
	Total	1920	11.52	1920	11.52	1920	11.52	5760	34.56
	Rs. In crore		0.1152		0.1152		0.1152		0.3456

Note: Cost Norms: (Rs.600/Day /Person) i.e Rs. 0.006 lakhs /day/person

The Cost Norms: (Rs.600/Day /Person).

4.5.6 PACK ANIMALS PRODUCTION

4.5.6.1 Background:

Gujarat is endowed with the Kachchhi breed of camel and Kathiawadi and Marwari breed of horse but there is no any recognized breed of donkey. The pack animals' population showed decline trend since last two decades

The pack animals play a pivotal role for socio-economically backward people in India for their livelihood who fetch very limited financial and physical recourses for the upliftment of these species. The animals (camel and donkey) production except for horse in India has been considered as second-line animals after cattle, buffalo and poultry production. The pack animals lost their position from the map of India and led to declining trend and finally classified in the group of threatened breeds of livestock because of less socio-economic importance, high feed cost and rapid stride in atomization.

Vision:

- Conservation and characterization of pack animals in a modern era of mechanized transportation and enhance their value edition

Mission:

- Assessment of nutritional and therapeutic values of camel milk
- Genetic phenotypic characterization of donkey and horse breeds

4.5.6.2 Current Status of livestock population:

Table-4.5.43 Live-stock Census of Gujarat, 2014 (Unit in '000)

Sr. No.	Item	Gujarat	India	Rank	%
1	Horse & Ponies	18	625	9	2.92
2	Mules	0	196	21	0.08
3	Donkey	39	319	3	12.18

(Source: Animal Husbandry, Gujarat state, 2014)

Table-4.5.44 Live-stock Population and Growth Rate over Previous Livestock Census 1951-2012

Sr. No.	Horse and Ponies		Camel		Donkey	
	Numbers	Growth Rate (%)	Numbers	Growth rate (%)	Numbers	Growth Rate (%)
1951	79	-	36	-	99	-
1956	101	+27.85	44	+22.22	122	+23.23
1961	113	+11.88	44	0.00	115	-5.74
1966	70	-38.05	46	+4.55	112	-2.61
1972	63	-10.00	63	+36.96	107	-4.46
1977	76	+20.63	56	-11.11	85	-20.56
1982	28	-63.16	75	+33.93	100	+17.65
1988	16	-42.86	58	-22.67	84	-16.00
1992	13	-18.75	62	+6.90	80	-4.76
1997	15	+15.38	65	+4.84	74	-7.50
2003	18	+20.00	53	-18.46	66	-10.81
2007	14	-22.67	38	-27.78	51	-23.88
2012 (P)	18	28.57	30	-21.05	39	-22.32

4.5.7 FODDER PRODUCTION:**4.5.7.1 Background:**

In Gujarat, total reporting area is 188.10 lakh ha out of this 99.66 lakh ha (52.98 %) is net sown area while 25.52 lakh ha is barren and uncultivable land. The area under non agricultural use is 11.71 lakh ha, 19.60 lakh ha is a cultivable waste. The permanent pasture and other grazing land is 8.51 lakh ha, which is only 4.52 % of the total area. The total human population of Gujarat is reported about 604.40 lakh while the collective population of cattle, buffalo, sheep and goats are 233.92 lakh which turned about 30 % of the human population while their feeding area is only 4.52 %.

At present, the availability of green forage is 608 lakhs metric tonnes and dry fodder is 139 lakhs metric tonnes in Gujarat. Which shows 25 and 44 percent deficit, respectively.

Moreover, decreasing areas under grassland combined with an increasing diversion of crops residues for fuel and industrial uses is creating an acute scarcity of fodder supply not only for Gujarat but for India also.

Major fodder crops of Gujarat State:

Kharif	Rabi	Summer
<ul style="list-style-type: none"> • Sorghum, <i>Bajra</i>, • Maize, • Cowpea, • Hybrid <i>Napier grass</i>, • <i>Guinea grass</i>, • Clusterbean, • Sunflower 	<ul style="list-style-type: none"> • Lucerne, • Oats, • Maize, • Sunflower, • Wild Chicory (<i>Pandadiu</i>) 	<ul style="list-style-type: none"> • Sorghum, • <i>Bajra</i>, • Maize, • Cowpea, • Hybrid <i>Napier grass</i>

Fodder crops are grown in different zone

The state has three major seasons viz. the hot weather (March to Mid June), *Kharif* (Mid June to September) and *Rabi* (October to February). Considering the rainfall patterns, topography, soil characters, climate zones have been identified in Gujarat state below:

Sr. No.	Geographical area	District	Fodder Crops
1	South Gujarat (Heavy Rainfall)	Dang, parts of Surat and Valsad	Sorghum, Lucerne, Maize, Hybrid <i>Napier</i> , para grass, Guinea grass
2	South Gujarat	Valsad, Parts of Surat, Bharuch and Narmada	Sorghum, Lucerne, Maize, Hybrid <i>Napier</i> , para grass, Guinea grass and oat
3	Middle Gujarat	Vadodara, Anand Kheda, Botad Chottaudepur Panchmahal, Mahisagar,	Sorghum, Lucerne, oat, Hybrid <i>Napier</i> , Maize,
4	North Gujarat	Mehsana, Patan, Sabarkantha, Part of Banas Kantha	Sorghum (Dual), Hybrid <i>Napier</i> , Maize, Lucerne, oat and <i>Bajra</i>
5	Bhal area	Khambhat, part of Bharuch, Hansot (Surat), Matar (kheda), Dholka, Dhandhuka, Vallbhipur, Limdi	Sorghum, Maize, Hybrid <i>napier</i> , Lucerne, <i>Bajra</i>

Sr. No.	Geographical area	District	Fodder Crops
6	South Saurashtra	Junagadh, Bhavnagar, Amreli and Rajkot Part	Sorghum (Dual), Maize, Hybrid napier, Lucerne, Bajra
7	North Saurashtra	Jamnagar, Rajkot, parts of surendranagar and Bhavnagar	Sorghum (Dual), Maize, Hybrid Napier, Lucerne, Bajra
8	North West Zone	Kutch, Ahmedabad, Viramgam, Rajkot, Halvad (Surendranagar) and Part of Banaskantha	Sorghum, Lucerne, Bajra, Oat, Hybrid Napier and Maize

Vision:

To minimize the gap between demand and supply of green fodder, only two alternatives are there on account of heavy pressure on land resources. The first one is the possibility of increasing the forage production by bringing more area under fodders, utilizing the grassland, wasteland and forest area. Another is by increasing the production in space and time through providing improved technologies in the form of high yielding varieties of forage crops and improved forage production technologies of different forage crops.

Mission

The prime important to increase the fodder yield of the state is by developing the high yielding and multi-cut type varieties having better quality with the help of multi-disciplinary and problem-oriented programme of forage research along with the latest agronomical practices having low economics could be achieved. It can also possible through covering a barren area of the state with rainfed grasses.

Scope**Forage Issue:**

- * Forage research includes a group of varieties of different crops but to concentrate on all crops is a very tedious job.
- * Mostly forage crops are low priority crops.
- * Seed producing ability of forage crops is also very low.
- * Harvesting of crops at the vegetative stage which does not allow the crop to reach seed production.
- * The cost of seed production is very high.
- * Less allocation of resources for forage production (manpower and fund).
- * Poor extension machinery responsible for the poor popularization of improved varieties.
- * Non synchronization: In many kinds of grass and legumes non synchrony in flowering and seed maturation.
- * Due to indeterminate growth habit in most of the range grasses and legumes as well as cultivated legumes there is no synchrony in between reproductive and vegetative growth leads to lower flowering and seed setting.
- * Non availability of male sterile lines in most of the forage crops, particularly in sorghum non availability of tall type of male sterile line.
- * Seed shattering: Although seed production potential of many grasses and legumes is very high, the harvestable seed yield is very low due to continuous seed shattering.
- * In most of the forage crops there are problems of seed dormancy, parthenocarpy, low viability and low seed setting is occurred.
- * Development of drought tolerant and salinity resistant genotype with high yield production.

Post harvesting:

- * Storage and transportation facility is to be improved including silage facility.
- * Poor prices of fodder. As higher prices of fodder are not bearable by poor cattle holder.
- * Most of the green fodders at variable/ earlier growth stage contain one or more toxic factors. So early cutting is problematic.

4.5.7.3 Priority:

- * Bringing more area under fodder utilizing of grassland, wasteland and forest area.
- * Increasing the production in space and time through providing improved technologies in the form of high yielding varieties in forage crops.
- * By developing improved forage production technologies of different forage crops.
- * By developing male sterile lines in various forage crops.

Table 4.5.45 Statement showing the area of Forage crops in Gujarat (Area 00 hact).

Sr. No.	District	Area
1	Ahmedabad	44
2	Amreli	38
3	Anand	87
4	Aravalli	56
5	Banaskantha	578
6	Bharuch	19
7	Bhavnagar	94
8	Botad	7
9	Chhotaudepur	9
10	Dahod	18
11	Dang	0
12	Devbhumi Dwarka	8
13	Gandhinagar	115
14	Gir Somnath	58
15	Jamnagar	11
16	Junagadh	39
17	Kheda	131
18	Kuchchh	128
19	Mahisagar	63
20	Mehsana	222
21	Morbi	9
22	Narmada	6
23	Navsari	9
24	Panchmahal	16
25	Patan	89
26	Porbandar	52
27	Rajkot	30
28	Sabarkantha	118
29	Surat	32
30	Surendranagar	59
31	Tapi	28
32	Vadodara	131
33	Valsad	19
	Total	2322

As per DAG, Gujarat published report on 30.04.2018

4.5.7.4 Varieties of Forage Crop:

Table-4.5.46 Released Varieties of Forage Crop

Sr. No.	Name of the Crop	Variety	Year of Release	Green Forage Yield (q/ha)	Recommended Area
1.	Lucerne	GAUL-1 (Anand-2)	1975	700-800 in 6-7 cuts	For Gujarat, Rajasthan and Madhya Pradesh
		GAUL-2 (SS-627)	1980	700-800 in 6-7 cuts	For North Gujarat area
		Anand-3	1991	350-400	For cold dry zone of Kinnour, Lahaul & Spiti valley of H.P.
		Anand Lucerne-3 (AL-3)	2006	1103 in a year	For Whole Gujarat
		Anand Lucerne-4 (AL-4)	2013	500-600 q	North west zone
2.	Oats	Kent	1973	500-550	For the whole country
		JO-03-91	2014	500-600	For Whole Gujarat
3.	Sorghum	C-10-2	1945	300-350	For Saurashtra Region of Gujarat State.
		S-1049	1955	275-350	For middle Gujarat
		GFS-3	1984	500-550	For the area of North & Middle Gujarat
		GFS-4	1989	360-400	For North Gujarat, South Gujarat, Saurashtra & Kutchh area.
		GFSH-1	1992	650-700 in two cuts 400-500 in one cut	For Whole Gujarat State except its South part
		GFS-5	1998	400-450	For whole Gujarat State
		CoFS-29 (Endorsed)	2013	400-450	For whole Gujarat state
		GAFS-11	2011	400	Middle Gujarat, Bhal zone and North west zone of Gujarat in rainfed condition
		GAFS-12	2016	300	Middle Gujarat
4.	Bajra	GFB-1	2005	350-400 in a single cut, 600-800 in multicut	Entire summer forage <i>bajra</i> growing areas of Gujarat State i.e. North & Middle Gujarat
		AFB-3	2011	Av. 460	North west zone of India
		GAFB 4	2018		Middle Gujarat
5.	Cowpea	GFC-1	1980	225-250	For whole country
		GFC-2	1980	250	For whole country
		GFC-3	1980	200-250	For whole country
		GFC-4	1980	250-300	For whole country
		EC-4216		280-300	Adapted to the entire country

Sr. No.	Name of the Crop	Variety	Year of Release	Green Forage Yield (q/ha)	Recommended Area
6.	Maize	African tall (composite variety)	1982	400-800	For whole country
7.	Hybrid Napier	APBN-1 (Endorsed)	2001	1800-2000 per year	For Whole Gujarat State
		Co-3 (Endorsed)	2010	1112.5	For Whole Gujarat state
8.	Grasses				
(a)	Marvel	GMG-1	1980	250-350 Annually	Arid & semi-arid Region of Rajasthan and Gujarat
		GAMG-2	2009	130-240	Pasture land of Gujarat
(b)	Anjan	GAAG-1	2011	214	Rainfed condition of Gujarat
(c)	Guinea	JHGG-8-1	2013	1512 q/ha/year	Rainfed condition of Gujarat state

Table-4.5.47 Breeder Seed Production of Forage Crops (2007-08 to 2016-17)

Production Year	Crop / Variety (Quantity in Q.)			
	Lucerne		Oats: Kent	Cowpea: GFC-3
	GAUL-1	AL-3		
2007-08	9.45	0.25	39.10	0.20
2008-09	9.45	0.25	36.70	-
2009-10	17.60	0.25	26.70	-
2010-11	4.25	1.25	18.00	-
2011-12	8.00	3.89	30.00	-
2012-13	4.55	0.57	60.00	-
2013-14	3.00	0.55	75.10	1.00
2014-15	5.00	0.54	75.00	-
2015-16	2.00	0.40	25.00	-
2016-17	4.10	0.85	70.00	-

4.5.7.5 Gap Analysis of Forage crop:

Table-4.5.48 Gap Analysis of Forage Crop

Sr. No.	Crop	Green Forage Yield (q/ha)		Gap (%)
		Average Yield	Potential Yield	
1.	Lucerne (Perennial)	1100	1300	18.2
2.	Hybrid Napier (Perennial)	1700	2000	17.6
3.	Forage Sorghum (Single cut)	400	450	12.5
4.	Forage Bajra (Multicut)	1150	1500	30.4

(Data reported from LSVT trial)

4.5.7.6 Detailed Action Plan with Costs:

Table-4.5.49 Proposed Demonstrations of Forage Crop

Sr No	District	Proposed varietal demonstrations (Phy. Area covered in ha. Fin Rs. In Lacs)							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	0.4	25	0.5	30	0.6	75	1.5
2	Amreli	10	0.2	10	0.2	20	0.4	40	0.80
3	Anand	30	0.6	35	0.7	40	0.8	105	2.10
4	Arvalli	15	0.30	15	0.3	20	0.40	50	1.00
5	Banaskantha	20	0.4	30	0.6	30	0.6	80	1.60
6	Bharuch	30	0.6	35	0.7	30	0.6	95	1.90
7	Bhavnagar	15	0.3	15	0.3	15	0.3	45	0.90
8	Botad	10	0.2	10	0.2	10	0.2	30	0.60
9	Chhotaudepur	10	0.2	15	0.3	15	0.3	40	0.80
10	Dahod	10	0.2	15	0.3	15	0.3	40	0.80
11	Dang	10	0.2	10	0.2	15	0.3	35	0.70
12	Devbhumi Dwarka	5	0.1	5	0.1	5	0.1	15	0.30
13	Gandhinagar	5	0.1	5	0.1	5	0.1	15	0.30
14	Gir Somnath	10	0.2	10	0.2	10	0.2	30	0.60
15	Jamnagar	10	0.2	10	0.2	10	0.2	30	0.60
16	Junagadh	10	0.2	10	0.2	10	0.2	30	0.60
17	Kheda	25	0.5	30	0.6	35	0.7	90	1.80
18	Kuchchh	5	0.1	5	0.1	5	0.1	15	0.30
19	Mahisagar	20	0.4	25	0.5	30	0.6	75	1.50
20	Mehsana	20	0.4	25	0.5	30	0.6	75	1.50
21	Morbi	5	0.1	5	0.1	5	0.1	15	0.30
22	Narmada	20	0.4	25	0.5	30	0.6	75	1.50
23	Navsari	10	0.2	10	0.2	10	0.2	30	0.60
24	Panchmahal	5	0.1	5	0.1	5	0.1	15	0.30
25	Patan	20	0.4	25	0.5	30	0.6	75	1.50
26	Porbandar	5	0.1	5	0.1	5	0.1	15	0.30
27	Rajkot	5	0.1	5	0.1	5	0.1	15	0.30
28	Sabarkantha	20	0.4	25	0.5	30	0.6	75	1.50
29	Surat	5	0.1	5	0.1	5	0.1	15	0.30
30	Surendranagar	5	0.1	5	0.1	5	0.1	15	0.30
31	Tapi	5	0.1	5	0.1	5	0.1	15	0.30
32	Vadodara	20	0.4	25	0.5	30	0.6	75	1.50
33	Valsad	5	0.1	5	0.1	5	0.1	15	0.30
	Total	420	8.4	490	9.8	550	11	1460	29.20

Note : Demonstration cost 2000/- per unit

Table 4.5.50 Training proposed capacity building of farmers under the plan (at district level)

Sr No	District	Physical number of trainees and financial Rs. In lacs							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	2.40	25	3.00	40	4.80	85	10.2
2	Amreli	10	1.20	15	1.80	20	2.40	45	5.4
3	Anand	20	2.40	25	3.00	40	4.80	85	10.2
4	Arvalli	15	1.80	20	2.40	30	3.60	65	7.8
5	Banaskantha	25	3.00	30	3.60	50	6.00	105	12.6
6	Bharuch	20	2.40	25	3.00	40	4.80	85	10.2
7	Bhavnagar	10	1.20	15	1.80	20	2.40	45	5.4
8	Botad	10	1.20	15	1.80	20	2.40	45	5.4
9	Chhotaudepur	15	1.80	20	2.40	30	3.60	65	7.8
10	Dahod	10	1.20	15	1.80	20	2.40	45	5.4
11	Dang	10	1.20	15	1.80	20	2.40	45	5.4
12	Devbhumi Dwarka	20	2.40	25	3.00	60	7.20	105	12.6
13	Gandhinagar	10	1.20	15	1.80	20	2.40	45	5.4
14	Gir Somnath	20	2.40	25	3.00	40	4.80	85	10.2
15	Jamnagar	10	1.20	15	1.80	20	2.40	45	5.4
16	Junagadh	10	1.20	15	1.80	20	2.40	45	5.4
17	Kheda	20	2.40	25	3.00	40	4.80	85	10.2
18	Kuchchh	10	1.20	15	1.80	20	2.40	45	5.4
19	Mahisagar	15	1.80	20	2.40	40	4.80	75	9
20	Mehsana	20	2.40	25	3.00	40	4.80	85	10.2
21	Morbi	10	1.20	15	1.80	20	2.40	45	5.4
22	Narmada	15	1.80	20	2.40	30	3.60	65	7.8
23	Navsari	10	1.20	15	1.80	20	2.40	45	5.4
24	Panchmahal	10	1.20	15	1.80	20	2.40	45	5.4
25	Patan	20	2.40	25	3.00	40	4.80	85	10.2
26	Porbandar	20	2.40	25	3.00	40	4.80	85	10.2
27	Rajkot	10	1.20	15	1.80	20	2.40	45	5.4
28	Sabarkantha	20	2.40	25	3.00	40	4.80	85	10.2
29	Surat	20	2.40	25	3.00	40	4.80	85	10.2
30	Surendranagar	20	2.40	25	3.00	40	4.80	85	10.2
31	Tapi	20	2.40	25	3.00	40	4.80	85	10.2
32	Vadodara	10	1.20	10	1.20	20	2.40	40	4.8
33	Valsad	10	1.20	10	1.20	10	1.20	30	3.6
	Total	495	59.4	650	78	1010	121.20	2155	258.60

Note : 20 farmers per training (20 X 600/- per day = 12000.00 per training)

Table 4.5.51 Training proposed for the capacity building of women under plan
(at district level)

Sr No	District	Physical number of trainees and financial Rs. In lacs							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	2.40	25	3.00	40	4.80	85	10.2
2	Amreli	10	1.20	15	1.80	20	2.40	45	5.4
3	Anand	20	2.40	25	3.00	40	4.80	85	10.2
4	Arvalli	15	1.80	20	2.40	30	3.60	65	7.8
5	Banaskantha	25	3.00	30	3.60	50	6.00	105	12.6
6	Bharuch	20	2.40	25	3.00	40	4.80	85	10.2
7	Bhavnagar	10	1.20	15	1.80	20	2.40	45	5.4
8	Botad	10	1.20	15	1.80	20	2.40	45	5.4
9	Chhotaudepur	15	1.80	20	2.40	30	3.60	65	7.8
10	Dahod	10	1.20	15	1.80	20	2.40	45	5.4
11	Dang	10	1.20	15	1.80	20	2.40	45	5.4
12	Devbhumi Dwarka	20	2.40	25	3.00	60	7.20	105	12.6
13	Gandhinagar	10	1.20	15	1.80	20	2.40	45	5.4
14	Gir Somnath	20	2.40	25	3.00	40	4.80	85	10.2
15	Jamnagar	10	1.20	15	1.80	20	2.40	45	5.4
16	Junagadh	10	1.20	15	1.80	20	2.40	45	5.4
17	Kheda	20	2.40	25	3.00	40	4.80	85	10.2
18	Kuchchh	10	1.20	15	1.80	20	2.40	45	5.4
19	Mahisagar	15	1.80	20	2.40	40	4.80	75	9
20	Mehsana	20	2.40	25	3.00	40	4.80	85	10.2
21	Morbi	10	1.20	15	1.80	20	2.40	45	5.4
22	Narmada	15	1.80	20	2.40	30	3.60	65	7.8
23	Navsari	10	1.20	15	1.80	20	2.40	45	5.4
24	Panchmahal	10	1.20	15	1.80	20	2.40	45	5.4
25	Patan	20	2.40	25	3.00	40	4.80	85	10.2
26	Porbandar	20	2.40	25	3.00	40	4.80	85	10.2
27	Rajkot	10	1.20	15	1.80	20	2.40	45	5.4
28	Sabarkantha	20	2.40	25	3.00	40	4.80	85	10.2
29	Surat	20	2.40	25	3.00	40	4.80	85	10.2
30	Surendranagar	20	2.40	25	3.00	40	4.80	85	10.2
31	Tapi	20	2.40	25	3.00	40	4.80	85	10.2
32	Vadodara	10	1.20	10	1.20	20	2.40	40	4.8
33	Valsad	10	1.20	10	1.20	10	1.20	30	3.6
	Total	495	59.4	650	78	1010	121.20	2155	258.60

Note : 20 farmers per training (20 X 600/- per day = 12000.00 per training)

Table-4.5.52 Projected Seed Cost for Forage Crops (Rs. in Lakh)

Crop	Area ha.	Year			
		2017-18	2018-19	2019-20	Total
Sorghum	500000	11025	11025	11576	33626
<i>Bajra</i>	100000	378	378	397	1153
Maize	100000	2520	2520	2646	7686
Oat	75000	2756	2756	2894	8406
Lucerne	115000	9056	9056	9509	27621
Cowpea	60000	630	630	662	1922
Hybrid Napier	100000	10500	10500	11025	32025
Guinea grass	50000	5250	5250	5513	16013
Total :	1100000	42115	42115	44222	128452

Table-4.5.53 Projected Fertilizer Cost for Forage Crops (Rs. in Lakh)

Crop	Area	Year			
		2017-18	2018-19	2019-20	Total
Sorghum	500000	4137	4137	4344	12618
<i>Bajra</i>	100000	827	827	869	2523
Maize	100000	827	827	869	2523
Oat	75000	720	720	756	2196
Lucerne	115000	619	619	650	1888
Cowpea	60000	323	323	339	985
Hybrid Napier	100000	2208	2208	2319	6735
Guinea grass	50000	859	859	902	2620
Total :	1100000	10520	10520	11048	32088

Fodder production:**Table 4.5.54 Estimated cost for fodder seed production unit for Green fodder (Rs. in lakhs)**

Sr No	District	Year-wise, Phy-No. Fin-Rs. in Lakh							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2	24	2	28	2	28	6	80
2	Amreli	2	24	2	28	2	28	6	80
3	Anand	2	24	2	28	2	28	6	80
4	Arvalli	1	12	1	14	1	14	3	40
5	Banaskantha	3	36	3	42	3	42	9	120
6	Bharuch	1	12	2	28	2	28	5	68
7	Bhavnagar	2	24	2	28	2	28	6	80
8	Botad	1	12	1	14	1	14	3	40
9	Chhotaudepur	1	12	1	14	1	14	3	40
10	Dahod	1	12	2	28	2	28	5	68
11	Dang	1	12	1	14	1	14	3	40
12	Devbhumi Dwarka	1	12	1	14	1	14	3	40
13	Gandhinagar	1	12	1	14	1	14	3	40
14	Gir Somnath	2	24	1	14	1	14	4	52
15	Jamnagar	1	12	1	14	1	14	3	40

Sr No	District	Year-wise, Phy-No. Fin-Rs. in Lakh							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
16	Junagadh	2	24	2	28	2	28	6	80
17	Kheda	2	24	2	28	2	28	6	80
18	Kuchchh	2	24	2	28	2	28	6	80
19	Mahisagar	2	24	1	14	1	14	4	52
20	Mehsana	2	24	2	28	2	28	6	80
21	Morbi	1	12	1	14	1	14	3	40
22	Narmada	1	12	1	14	1	14	3	40
23	Navsari	1	12	1	14	1	14	3	40
24	Panchmahal	2	24	2	28	1	14	5	66
25	Patan	1	12	2	28	2	28	5	68
26	Porbandar	1	12	1	14	1	14	3	40
27	Rajkot	1	12	2	28	2	28	5	68
28	Sabarkantha	1	12	1	14	2	28	4	54
29	Surat	1	12	2	28	2	28	5	68
30	Surendranagar	1	12	2	28	2	28	5	68
31	Tapi	1	12	1	14	1	14	3	40
32	Vadodara	1	12	1	14	1	14	3	40
33	Valsad	1	12	1	14	1	14	3	40
	Total	46	552	50	700	50	700	146	1952

Seed production Farm : Area 50 ha (One Unit)

Cost of One Unit During 2017-18 : 12 Lakh 2018-19 : 14 Lakh 2019-20 : 14 Lakh

Table 4.5.55 Estimated cost for fodder seed production unit for Dry fodder

(Rs. in lakhs)

Sr No	District	Year-wise, Phy-No. Fin-Rs. in Lakh							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1	12	1	12	1	12	3	36
2	Amreli	1	12	1	14	1	14	3	40
3	Anand	1	12	2	28	2	28	5	68
4	Arvalli	1	12	1	14	1	14	3	40
5	Banaskantha	2	24	2	28	2	28	6	80
6	Bharuch	1	12	2	28	2	28	5	68
7	Bhavnagar	2	24	2	28	2	28	6	80
8	Botad	-	-	1	14	1	14	2	28
9	Chhotaudepur	1	12	1	14	1	14	3	40
10	Dahod	1	12	2	28	2	28	5	68
11	Dang	-	-	1	14	1	14	2	28
12	Devbhumi Dwarka	-	-	1	14	1	14	2	28
13	Gandhinagar	1	12	1	14	1	14	3	40
14	Gir Somnath	1	12	1	14	1	14	3	40
15	Jamnagar	1	12	1	14	1	14	3	40
16	Junagadh	1	12	2	28	2	28	5	68
17	Kheda	1	12	2	28	2	28	5	68

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Sr No	District	Year-wise, Phy-No. Fin-Rs. in Lakh							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
18	Kuchchh	1	12	2	28	2	28	5	68
19	Mahisagar	1	12	1	14	1	14	3	40
20	Mehsana	1	12	2	28	2	28	5	68
21	Morbi	1	12	1	14	1	14	3	40
22	Narmada	1	12	1	14	1	14	3	40
23	Navsari	1	12	1	14	1	14	3	40
24	Panchmahal	1	12	2	28	1	14	4	54
25	Patan	1	12	2	28	2	28	5	68
26	Porbandar	1	12	1	14	1	14	3	40
27	Rajkot	1	12	2	28	2	28	5	68
28	Sabarkantha	1	12	1	14	2	28	4	54
29	Surat	1	12	2	28	2	28	5	68
30	Surendranagar	1	12	2	28	2	28	5	68
31	Tapi	1	12	1	14	1	14	3	40
32	Vadodara	1	12	1	14	1	14	3	40
33	Valsad	1	12	1	14	1	14	3	40
	Total	32	384	47	656	47	656	126	1696

Seed production Farm: Area 50 ha (One Unit)

Cost of One Unit During 2017-18: 12 Lakh 2018-19: 14 Lakh 2019-20: 14 Lakh

Table 4.5.56 Fodder Banks for Storage Dry Grasses from Forest (Rs. in lakhs)

Sr No	District	Storage Dry grass Year-wise, Phy-No. Fin-Rs. in Lakh							
		2017-18		2018-19		2019-20		TOTAL	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2	60	2	60	2	60	6	180
2	Amreli	3	90	2	60	2	60	7	210
3	Anand	2	60	2	60	2	60	6	180
4	Arvalli	1	30	1	30	1	30	3	90
5	Banaskantha	3	90	3	90	3	90	9	270
6	Bharuch	1	30	2	60	2	60	5	150
7	Bhavnagar	2	60	2	60	2	60	6	180
8	Botad	-	-	1	30	1	30	2	60
9	Chhotaudepur	1	30	1	30	1	30	3	90
10	Dahod	1	30	2	60	2	60	5	150
11	Dang	-	-	1	30	1	30	2	60
12	Devbhumi Dwarka	1	30	1	30	1	30	3	90
13	Gandhinagar	1	30	1	30	1	30	3	90
14	Gir Somnath	2	60	1	30	1	30	4	120
15	Jamnagar	1	30	1	30	1	30	3	90
16	Junagadh	2	60	2	60	2	60	6	180
17	Kheda	2	60	2	60	2	60	6	180
18	Kuchchh	2	60	2	60	2	60	6	180
19	Mahisagar	2	60	1	30	1	30	4	120
20	Mehsana	2	60	2	60	2	60	6	180
21	Morbi	1	30	1	30	1	30	3	90
22	Narmada	1	30	1	30	1	30	3	90
23	Navsari	2	60	1	30	1	30	4	120
24	Panchmahal	2	60	2	60	1	30	5	150
25	Patan	1	30	1	30	2	60	4	120
26	Porbandar	1	30	1	30	1	30	3	90
27	Rajkot	1	30	1	30	1	30	3	90
28	Sabarkantha	2	60	2	60	2	60	6	180
29	Surat	1	30	1	30	1	30	3	90
30	Surendranagar	1	30	1	30	1	30	3	90
31	Tapi	1	30	1	30	1	30	3	90
32	Vadodara	1	30	1	30	1	30	3	90
33	Valsad	1	30	1	30	1	30	3	90
	Total	47	1410	47	1410	47	1410	141	4230

- Construction of Dutch Barn / Godowns for storage of dry grasses. Each having storage capacity of 10 Lakh kg.
- Cost of one Godown Rs. 30 Lakh

4.5.7.7 Future Area:

Genetic improvement in yield and yield attributes as well as quality characters in Sorghum, Bajra, Maize and Lucerne suited to the specific area of the state should be done. Research on different forage crops on following aspects should be carried out.

Sorghum:

- Multicut sorghum hybrid having brown midrib with high productivity per unit area and time with low HCN content and suitable for irrigated/ rainfed conditions.
- Multicut Sweet sundan grass hybrid with low HCN content suitable for rainfed conditions.

Maize:

- Development of tillering type forage maize variety with high leaf: stem ratio from Maize x *Teosinte* hybridization.

Pearl millet:

- Multicut forage Bajra hybrid/ variety with high leaf: stem ratio.

Lucerne:

- Development of perennial Lucerne varieties resistant to fusarium wilts using conventional and non-conventional methods of breeding.
- 2. Development of new improved varieties of various pasture grasses *viz. Cenchrus, Guinea* through clonal selection is needed.
- 3. To develop salt-resistant varieties of forage crops in sorghum, *Bajra* and barley and its screening in salt-affected areas to increase forage production.
- 4. Baby corn has the good potentiality for fodder production as well as cob for vegetables and other uses. It has also a good market for vegetables in western countries. Baby corn cobs harvested at the emergence of the silking stage has higher nutritive value and fodder used for milking cow and buffaloes resulted in an increase in milk production. So dual purpose varieties of baby corn should be developed.
- 5. To develop varieties of different forage crops to fit as intercrop.
- 6. Integrated pest and disease management strategies should be developed for different pests and disease of various forage crops.

Important Issue:

1. Multicut forage sorghum:
2. *Rabi* forage sorghum:
3. Dual purpose sorghum:

Project Outcome:

- Development of multicut or perennial type varieties of fodder crops
- The increase of availability of continuous green fodder due to technical information provided by the station in this area
- Farmers of state encourage for their livestock holding capacity
- Increase milk production and develop dairy farming
- Reduce the deficit of green fodder and dry fodder
- Increase forage production in unit area and time

4.5.8 ANIMAL HEALTH:

4.5.8.1 Background:

Milk production in Gujarat grew at a higher rate than that of a nation and hence the contribution of state in national production increased from 6.5% to 7.5% during last 15 years. From the perspective of milk demand, the state of Gujarat incurs higher proportion of the total expenditure towards milk and milk products as compared to Indian average and therefore, the per capita consumption of milk in Gujarat is higher than that of the national average. The demand for milk and milk products is expected to grow rapidly with the rise in per capita income both in Gujarat as well as in India. North Gujarat have poor rainfall and is traditionally animal husbandry dependent.

Gujarat is one of the most important state harboring diversity of more than 18 domestic animal breeds with important breeds of Cattle (Gir, Kankrej & Dangri), Buffalo (Mehsani Jafarabadi, Surti and Banni), Sheep (Patanwadi, Marwadi & Duma), Goat (Kachchhi, Surti, Zalawadi, Mehnsani & Gohilwadi), Horses (Kathiawari & Marwari) & Camel (Kachchhi and Bikaneri). During the second half of 20th century, the population of Cattle (+ 49%), Buffalo (+ 249 %), Goat (+ 99%), Sheep (+ 27 %), Pig (+ 450%) and Poultry (+ 1076 %) shown increasing rate while Horses (-82 %) and Donkey (-40%) have declined. In Gujarat, almost 70-80 % bovine population belongs to well define specific breed like Gir, Kankrej, Dangri, Surti, Jafarabadi, Mehnsani, Banni, etc. which is quite opposite to the scenario of the National level (i.e. 70-80 % bovine population is a non-descript type). For the purpose of conserving biodiversity, improving productivity, food security and food safety and preventing zoonotic diseases of animal origin, animal health is of vital importance.

Vision:

- Healthy animals for food safety and food security.
- State free of animal diseases of zoonotic importance.
- Production of clean and organic milk with more milk per animal.
- Improved rural economy through improved productivity and reduced morbidity and mortality

Mission:

- Development of disease forecasting models for the state.
- Molecular diagnosis of diseases at a subclinical stage.
- Controlling morbidity and mortality through preventive measures and treatment.
- Optimising production through strategic deworming.
- Strategic and complete vaccination for disease-free status.

4.5.8.2 Issues and Gap Analysis:

The North Gujarat districts have a total population of 78.56 lakhs animals which is 33 % of the total population of the state. It has two educational institutes besides six polyclinics, 224 veterinary dispensaries and four disease investigation units. The cooperative dairies are also providing health services to members their jurisdiction. However, there is no specialized institute which can take up independent health surveillance and give timely forecasting of diseases in the area in order to minimize morbidity, mortality and loss in production. Similarly, out of total 5514600 in milch animals in north Gujarat, 2131400 are cattle and 3383200 buffaloes which produce 4059.74 ton of milk (2012-13) but there is lack of information on complex problems of compound stomach besides the metabolic disorders of high producing animals. The available scattered data suggest the larger magnitude of problems but without systemic study and impact on the economy. Establishment of such institutes will fully devote to the cause and will contribute to the rural economy.

4.5.8.3 Priorities:

- To control the calf mortality and haemoprotozoan diseases in the area.
- To establish state of the art disease diagnosis cum surveillance center
- To establish a center for excellence for understanding complex disease problems of compound stomach besides the metabolic disorders of high producing dairy animals.
- To develop linkages with the department of animal husbandry, cooperative dairies and animal health experts.
- Providing expert consultancy and health services to farmers and veterinarians.
- Educating youth and women for animal health.

4.5.8.4 Current Status of Livestock Population:**Table-4.5.57 North Gujarat Districtwise Livestock Population**

Figures in thousand

Sr. No.	District	Cattle	Buffalo	Sheep	Goat	Horses & Ponies	Donkeys & Mules
1	Kachchh	389	226	575	485	2	3
2	Banaskantha	660	955	161	309	2	3
3	Sabarkantha	621	775	67	344	0	5
4	Patan	131	364	54	103	1	3
5	Mehsana	216	568	15	88	1	2
6	Gandhinagar	148	364	17	47	0	1
	Total	2165	3252	889	1376	6	17

Source: Dept of A.H. Statistics, 2007

Table-4.5.57 North Gujarat Districtwise Livestock Population conti...

Sr. No.	District	Camel	Pig	Dog	Rabbit	Total Livestock
1	Kachchh	9	1	17	0	1707
2	Banaskantha	5	5	62	2	2165
3	Sabarkantha	3	2	17	1	1834
4	Patan	3	0	5	0	664
5	Mehsana	6	1	0	0	896
6	Gandhinagar	2	0	10	0	590
	Total	28	9	111	3	7856

Table-4.5.58 North Gujarat District-wise Density of Livestock Population

Sr. No.	District	Total Livestock	Total Geographical Area (in Sq. Km.)	Density of Livestock per Sq. Km.
1	Kachchh	1707279	45652	37
2	Banaskantha	2164984	10757	201
3	Sabarkantha	1833638	7390	248
4	Patan	664066	5730	116
5	Mehsana	896064	4384	204
6	Gandhinagar	589965	2163	273
	Total	23793513	196024	121

Source: Dept of A.H. Statistics, 2007

Table-4.5.59 Estimated No. of Productive Animals (in '00 No.)

Year	Cow		Buffalo	Goat
	Indigenous breed	Cross breed		
	In milk	In milk	In milk	In milk
2012-13	15109	6205	33832	15605
Total	21314		33832	15605

Source: Dept of A.H. Statistics, 2007

Table-4.5.60 District-wise Milk Production, 2007 (North Gujarat)

District	Milk ('000 T)	Rank
Banaskantha	1203.58	1
Gandhinagar	423.47	9
Kachchh	383.43	12
Mehsana	774.95	3
Patan	360.33	15
Sabarkantha	913.98	2
Total	4059.74	

Source: Dept of A.H. Statistics, 2007

Table-4.5.61 Inoculation/Vaccination Done 2012-2013

District	R.P.	H.S.	B.Q.	Anthrax	FMD	ARV	ET
Kachchh	0	283945	3569	0	563912	685	241737
Banaskantha	0	1219020	4000	0	4153373	14783	352476
Sabarkantha	0	705878	0	0	3751560	1917	93083
Mahesana	0	803901	0	0	1532564	7807	5990
Patan	0	375687	0	0	406670	1043	33251
Gandhinagar	0	443402	0	4200	448757	926	7980

Source: Dept of A.H. Statistics, 2007

4.5.9 FISHERIES:**4.5.9.1 Background:**

Gujarat is endowed with a wide range of marine and inland aquatic resources. The state has a long coastline extending to 1600 km, a continental shelf area of 0.18 million km², Exclusive Economic Zone (EEZ) of 0.214 million km², rivers and tributaries extending to 3865 km, reservoirs with 0.286 million ha, ponds and tanks of 0.071 million ha and brackish water area of 0.376 million ha. Gujarat occupies 32% of the continental shelf area and 10% of the total EEZ of India. The fishing industry, which has grown substantially in the last four decades with the continuous intensification of fishing effort, contributes significantly to the economic, social and nutritional wellbeing of the people of Gujarat. Gujarat is in the forefront of marine fish production in the country. The marine fish production in Gujarat is more than 7 Lakh M. tones, but freshwater fish production is very low & it remained between 8-10 % of the total fish production of the state. Its poor growth is mainly due to the fact that most of the existing natural water resources are not utilized properly for fish cultivation. On the other hand in the state of West Bengal & Andhra Pradesh, freshwater fish production is in the forefront. Considerable farmed fish production has been found to be in the increasing trend of the country except for Gujarat. Pond-based freshwater aquaculture technology has been perfected in the country, but it has not been reached to the grass root level due to poor extension system. Transfer of technology to the level of the farmer is greatly felt in Gujarat. In freshwater fish farming, higher mortality of fish seed occurs in the nursery and rearing phases of culture because in early stage of the development fish seeds need a very special attention in terms of maintenance of water quality, feeding, protection from harmful aquatic insects etc, therefore, adequate knowledge of fishpond management is must for obtaining better growth and survival of fish seeds. In Gujarat majority of people are not aware of fish farming and its prospects, hence it is necessary to create awareness among the people of Gujarat to adopt fish farming as a profession.

Vision:

Sustainable Inland, brackish water and Marine water fish production and yield through innovative, eco-friendly technological interventions

Mission:

- To protect the marine, inland and brackish water environment for capture and culture fisheries
- Accelerate technology development process to meet ensuing climatic changes as also the needs/expectation of all stakeholders.
- To develop value addition of fish products to meet domestic and export demands

4.5.9.2 Priority:

- Yield stability and narrowing gap in yield level between different districts through proper training of the farmers
- Development of model aquaculture farm for demonstration
- Strengthening of Research centers for diversified fish seed production
- Establishment of fish, shrimp disease diagnosis centers
- Modernization and up gradation of existing training centers
- Development of technology for environmental friendly aquaculture
- Research needs for development of suitable technology for sustainable fish production in view of climate change,
- Review of land leasing policy for shrimp farming in coastal areas.
- Subsidized power supply to fish farmers at par with Agriculture farmers

4.5.9.3 Current Status of Fish Production:

Table-4.5.62 District Wise Inland Fish Production Since 2013-14 to 2016-17

S.N.	District	Production in MT			
		2013-14	2014-15	2015-16	2016-17
1	Valsad	8060	8324	10220	10019
2	Navsari	10583	10512	15469	10019
3	Dang	0	0	0	18866
4	Surat	10174	14901	18197	0
5	Tapi	10004	10478	10245	18902
6	Bharuch	10000	18812	11243	10307
7	Narmada	6822	6202	5848	11728
8	Vadodara	7683	7691	7100	5885
9	Chota Udepur	N.A.	N.A.	503	7261
10	Panch Mahals	3487	3442	2635	497
11	Dahod	763	826	771	2547
12	Anand	6527	6552	6312	681
13	Kheda	3785	4831	4483	6527
14	Mahisagar	N.A.	N.A.	698	4338
15	Ahmedabad	7717	5812	5745	718
16	Gandhinagar	9	0	0	5477
17	Mahesana	497	329	316	0
18	Patan	21	46	44	313
19	Sabarkantha	1436	1519	931	41
20	Aravalli	N.A.	N.A.	520	953
21	Banaskantha	825	998	899	498
22	Surendranagar	3735	2972	2818	898
23	Rajkot	8838	4803	2733	2793
24	Morbi	N.A.	N.A.	2100	2842
25	Bhavnagar	668	909	758	2009
26	Botad	N.A.	N.A.	117	712
27	Kachchh	67	58	59	131
28	Jamnagar	267	343	240	56
29	Devbhumi Drawaka	N.A.	N.A.	119	302
30	Porbandar	236	375	294	135
31	Junagadh	591	580	457	282
32	Gir Somnath	N.A.	N.A.	186	458
33	Amreli	118	167	172	209
		102913	111482	112232	116625
	Reservoir	21362	26264	25980	26672
	B.W. Prod.	9858	27058	31664	36608
	Riverine	30333	21674	20583	20598
	Esturine	15016	9012	8837	8944
	Pond & Tank Prod.	9313	8918	8439	8747
	Mkt. & Other	12249	13712	11841	10256
	Lake	4782	4844	4888	4900
	TOTAL	102913	111482	112232	116725
	GROWTH RATE	8.41	8.33	0.67	4.00

Source: Commissioner of Fisheries, GoG, Gandhinagar

Table-4.5.63 Species Wise Inland Fish Production of Gujarat State from 2013-14 to 2016 – 2017

(Production in MT)

SR. NO.	Name of fish	2013-14	2014-15	2015-16	2016-17
1	2	4	5	6	7
1	Catla	13568	12034	12022	12341
2	Rohu	14303	14503	14401	14423
3	Mrigal	13237	11626	11688	11701
4	Kalbasu	1373	1104	1106	1111
5	Minor carp	152	34	20	20
6	Wallagoatta	2681	1930	1933	1908
7	Scorpion	898	716	649	619
8	Murrel	2768	2121	2123	2137
9	Catfish	4754	4664	4658	4659
10	Bomby duck	588	600	632	649
11	Hilsa	1567	449	449	427
12	Mullet	2635	2824	2790	2791
13	Eel	858	983	994	1018
14	Shrimps	2215	1621	1619	1532
15	Prawns (M)	12606	29806	33265	38183
16	Prawns (J)	405	69	77	74
17	Bekti	124	595	543	169
18	Crabs	442	1068	1051	523
19	Levta	1064	301	186	765
20	Mahaseer	0	0	0	0
21	Misc.	26675	24434	22026	21675
	TOTAL	102913	111482	112232	116725

Source: Commissioner of Fisheries, GoG, Gandhinagar

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Table-4.5.64 Details of Fish Seed Farm of Gujarat State (Year 2013-14 to 2016-17)

S. N.	Name of farm	Village	Taluka	District	Details of pond in Dept. of Fisheries, farm												Year of Const.
					Nursary	Pond	Reairing	Pond	Stoking	Pond	Other	Pond	Hatchery	Total	Water Spread AREA		
					No.	Area	No	Area	No	Area	No	Area	Area	Area of FARM			
1	Godhra	Godhra	Godhra	P.M.	15	0.15	12	0.62	5	1.01	0	0	NO	2.87	1.78	1963-65	
2	Kadana	Kadana	Kadana	Dohad	7	0.14	7	0.84	15	1.22	0	0	NO	2.42	2.20	1986-87	
3	Panchavada	Panchavada	Dohad	Dohad	0	0.00	12	2.31	0	0.00	0	0	NO	5.00	2.31	1988-89	
4	Sanjely	Sanjeli	Zalod	Dohad	10	0.50	3	0.55	0	0.00	0	0	NO	1.18	1.05	1967-68	
5	Prantij	Prantij	Prantij	S.K.	4	0.13	16	1.75	2	0.39	0	0	NO	4.03	2.27	1964-65	
6	Babsar	Babsar	Idar	S.K.	6	0.15	12	1.50	1	0.27	0	0	NO	4.00	1.92	1983-84	
7	Palan	Palan	Valsad	Valsad	0	0.00	6	1.50	2	1.00	0	0	YES	3.27	2.50	1989-90	
8	Fadvel	Fadvel	Chikhali	Navsari	8	2.00	8	2.00	4	1.53	0	0	NO	10.00	5.53	1990-91	
9	Thala	Thala	Chikhali	Navsari	0	0.00	8	0.36	0	0.00	0	0	YES	0.00	0.36	1986-87	
10	Motivada	Motivada	Pardi	Valsad	14	0.63	7	0.14	5	0.27	0	0	NO	6.00	1.04	1986-87	
11	Bhadrania	Bhadrania	Anand	Anand	14	0.30	22	4.50	3	2.20	0	0	YES	15.00	7.00	1984-89	
12	Lingda	Lingda	Umareth	Anand	15	0.45	15	1.50	2	1.00	0	0	YES	7.50	2.95	1975-76	
13	Navli	Navli	Anand	Anand	1	0.05	9	2.25	6	3.00	0	0	NO	0.00	5.30	1988-89	
14	Kosmada	Kosmada	Surat	Surat	34	3.40	8	1.60	4	1.00	0	0	YES	10.00	6.00	1988-89	
15	Pipodara	Pipodara	Choryasi	Surat	3	0.49	11	1.53	2	1.19	0	0	YES	6.40	3.21	1981-82	
16	Ukai	Ukai	Songadha	Surat	6	0.60	40	9.70	2	1.00	0	0	YES	49.30	11.30	1982-83	
17	Valan	Valan	Kamrej	Surat	8	0.80	8	1.68	2	0.90	0	0	NO	0.00	3.38	1989-90	
18	Kakrapar	Kakrapar	Vyara	Surat	0	0.00	0	0.00	0	0.00	0	0	NO	6.40	1.64	1965-66	
19	Umarvada	Umarvada	Ankleswar	Bharuch	6	0.75	2	0.36	1	0.30	0	0	YES	0.00	1.41	1988-89	
20	Akavada	Akavada	Akavada	Bhavnagar	4	0.20	9	0.94	0	0.00	0	0	NO	5.30	1.14	1988-89	
21	Bahdar	Bahdar	Gondal	Rajkot	14	0.50	23	1.34	0	0.00	0	0	NO	6.00	1.84	1983-84	
22	Dantivada	Dantivada	Dhanera	B.k.	14	0.45	7	0.44	2	0.33	0	0	NO	2.50	1.24	1966-67	
23	Dabhoi	Dabhoi	Dabhoi	Vadodara	9	0.70	0	0.00	0	0.00	0	0	NO	1.00	0.70	1964-65	
24	Vaidi	Vaidi	Megharaj	S.k.	12	0.42	18	2.43	2	0.49	0	0	NO	7.75	3.28	1989-90	
25	Kuski	Kuski	Bhiloda	S.k.	16	0.40	13	1.60	1	0.80	0	0	NO	10.00	2.80	1989-90	
GRAND TOTAL					220	13.21	276	41.44	61	17.90	0	0		165.92	74.15		

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Table-4.5.65 Districtwise and Species-wise Marine Fish Production for the Year-2016-17 (Prod. in MT.& Price Rs. in Lakh)

S N	Name of fish	District name's							
		Valsad	Navsari	Surat	Bharuch	Anand	Morbi	Kutchh	Jamnagar
1	White Pomfret	1071	1298	0	0	0	0	1309	433
2	Black Pomfret	0	0	0	0	0	0	74	0
3	Bombay Duck	36894	5497	1633	577	24	25	6546	0
4	Thread fin	90	0	0	0	0	0	541	321
5	Jew fish	0	0	0	0	0	6	687	376
6	Hilsa	899	251	81	17	0	0	241	0
7	Other clupeids	37	617	0	380	34	2	2663	174
8	Coilia	5919	1051	32	6	0	9	3766	0
9	Shark	30	287	48	0	0	0	1487	107
10	Mullet	1112	630	285	455	34	21	711	472
11	Catfish	777	541	110	166	20	18	1834	442
12	Eel	0	0	0	0	0	0	162	142
13	Leadher Jacket	0	0	0	0	0	0	236	43
14	Seerfish	0	190	0	0	0	0	378	212
15	Indian Salmon	304	0	0	0	0	14	387	0
16	Ribbonfish	282	667	0	0	0	0	2183	0
17	Silver Bar	0	0	0	0	0	7	1304	374
18	Perch	0	0	0	0	0	13	639	253
19	Small Sciendes	0	2564	0	158	0	27	6495	0
20	Shrimp	17252	4396	29	688	0	18	8269	67
21	Prawns (M)	2233	656	210	26	55	2	1181	82
22	Prawns (J)	0	183	0	0	0	0	579	52
23	Lobster	131	66	0	0	0	0	285	6
24	Crab	752	667	257	203	13	52	362	182
25	Levta	952	513	410	370	18	0	0	0
26	Squid/Cuttles	0	11	0	0	0	0	321	0
27	Tuna	0	0	0	0	0	0	22	0
28	Carangies/Mecrel	0	0	0	0	0	0	75	0

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

S N	Name of fish	District name's							
		Valsad	Navsari	Surat	Bharuch	Anand	Morbi	Kutchh	Jamnagar
29	Ranifish	0	696	0	0	0	0	0	0
30	Sole	0	10	0	0	0	0	589	0
31	Miscellaneous	24916	7097	544	568	100	30	26914	564
Total		93651	27887	3638	3616	298	245	70240	4303

Source: Commissioner of Fisheries, GoG, Gandhinagar

Table-4.5.65 Districtwise and Species-wise Marine Fish Production for the Year-2016-17 Conti... (Prod. in MT.& Price Rs. in Lakh

S N	Name of fish	District name's								Avg.Price	Value (Rs.In Lakh)
		Devbhumi drawaka	Porbandar	Juna Gadh	Geer som Nath	Amreli	Bhav Nagar	Total			
1	White Pomfret	787	153	195	1630	204	0	7080	374.42	26507.40	
2	Black Pomfret	780	287	152	2412	25	0	3729	280.58	10462.86	
3	Bombay Duck	1305	0	0	6502	23377	491	82871	42.08	34871.67	
4	Thread fin	2100	29	3	25	132	10	3251	234.60	7627.67	
5	Jew fish	2493	28	3	2564	890	2	7051	455.02	32082.18	
6	Hilsa	32	14	13	218	0	29	1795	203.40	3650.39	
7	Other clupeids	1260	584	700	4040	202	7	10701	56.78	6076.42	
8	Coilia	75	0	5	1954	5346	0	18163	37.77	6859.57	
9	Shark	1154	146	898	4244	579	410	9389	50.00	4694.82	
10	Mullet	925	4	0	30	0	164	4843	71.92	3483.10	
11	Catfish	3863	4373	3220	5131	1197	413	22104	42.08	9301.01	
12	Eel	1016	483	118	763	278	0	2962	104.58	3097.60	
13	Leadher Jacket	853	269	67	3156	10	0	4634	58.45	2708.59	
14	Seerfish	4927	297	698	1407	0	6	8114	157.35	12768.03	
15	Indian Salmon	136	6	0	866	0	0	1712	216.51	3707.61	
16	Ribbonfish	4459	12783	3804	38093	1105	0	63376	90.70	57479.01	
17	Silver Bar	918	138	676	1553	39	0	5009	38.90	1948.23	
18	Perch	4938	1517	1754	5078	562	0	14754	67.89	10017.22	

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

S N	Name of fish	District name's							Total	Avg.Price	Value (Rs.In Lakh)
		Devbhumi drawaka	Porbandar	Juna Gadh	Geer som Nath	Amreli	Bhav Nagar				
19	Small Sciendes	10624	13985	13415	97099	2049	3	146419	63.56	93068.18	
20	Shrimp	3097	1650	615	4954	1502	284	42821	69.46	29743.68	
21	Prawns (M)	1229	192	42	1870	33	781	8592	136.96	11767.30	
22	Prawns (J)	550	150	1	14	8	13	1550	290.20	4498.67	
23	Lobster	173	86	12	152	0	0	911	693.34	6313.06	
24	Crab	251	157	1168	486	58	8	4617	46.40	2142.58	
25	Levta	0	0	0	0	0	10	2272	69.46	1578.19	
26	Squid/Cuttles	4366	19114	3034	9252	0	0	36099	121.29	43784.39	
27	Tuna	922	50	32	1701	162	0	2890	68.05	1966.44	
28	Carangies/Mecrel	407	2895	2179	3125	0	0	8682	50.15	4353.94	
29	Ranifish	53	11852	3155	1145	0	0	16900	49.15	8306.92	
30	Sole	696	354	893	568	227	0	3338	40.99	1368.08	
31	Miscellaneous	10896	20770	3517	43444	12450	394	152204	24.94	37966.42	
Total		65288	92366	40366	243478	50433	3025	698832	69.29	484201.19	

Source: Commissioner of Fisheries, GoG, Gandhinagar

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Table-4.5.66 Species wise Marine Fish Production (in MT) Since 2013-14 to 2016-17

SR.NO.	NAME OF FISH	Year			
		2013-14	2014-15	2015-16	2016-17
1	White Pomfret	7633	6589	6993	7080
2	Black Pomfret	2414	3511	3676	3729
3	Bombay Duck	79630	83219	82680	82871
4	Thread fin	2894	3261	3197	3251
5	Jew fish	5432	6668	7019	7051
6	Hilsa	1397	1821	1794	1795
7	Other clupeids	9060	10654	10684	10701
8	Coilia	11695	18603	17991	18163
9	Shark	9864	9921	9320	9389
10	Mullet	5138	5127	4760	4843
11	catfish	27704	22286	21912	22104
12	Eel	3098	2795	2928	2962
13	Leadher Jacket	5208	4135	4678	4634
14	Seerfish	8309	8931	8050	8114
15	Indian Salmon	726	1441	1693	1712
16	Ribbonfish	65972	63110	63170	63376
17	Silver Bar	5921	5057	5003	5009
18	Perch	16841	14116	14684	14754
19	Small Sciendes	177326	148074	146549	146419
20	Shrimp	40484	41378	42479	42821
21	Prawns (M)	7863	7670	8400	8592
22	Prawns (J)	1081	1405	1511	1550
23	Lobster	686	858	904	911
24	Crab	8615	4686	4541	4617
25	Levta	3673	2349	2267	2272
26	Squid/Cuttles	26095	35466	35958	36099
27	Tuna	3942	2600	2896	2890
28	Carangies/Mecrel	10438	8405	8654	8682
29	Ranifish	17490	16992	16940	16900
30	Sole	10889	3681	3310	3338
31	Miscellaneous	118063	153639	152685	152204
Total		695580	698450	697328	698832

Source: Commissioner of Fisheries, GoG, Gandhinagar

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Table-4.5.67 Item-Wise/ Species wise Foreign Export of Fish and Fish Products from Gujarat (2013-14 To 2015-16)

Qty. in T and Value in Rs.Crore

Major Item	Q	Year				India Export		Gujarat's Share In India's Export
	V	2013-14	2014-15	2015-16	2015-16%	2015-16	%	
Frozen Shrimp	Q	7409	7684	7497	3.59	373866	39.53	2.01
	V	299.65	335.72	313.39	8.79	20045.50	65.89	1.56
Frozen Fish	Q	157690	148202	117420	56.28	228749	24.18	51.33
	V	2169.80	1866.45	1840.26	51.59	3462.25	11.38	53.15
Frozen Cuttle Fish	Q	19138	24244	21838	10.47	65596	6.93	33.29
	V	366.68	492.32	506.06	14.19	1636.11	5.38	30.93
Frozen Squid	Q	18570	17900	21449	10.28	81769	8.64	26.23
	V	278.22	278.52	377.31	10.58	1615.21	5.31	23.36
Dried Items	Q	2275	1297	2785	1.33	43320	4.58	6.43
	V	153.07	95.19	24.98	0.70	725.58	2.39	3.44
Live Items	Q	0	0	0	0.00	5493	0.58	0.00
	V	0	0	0	0.00	308.81	1.02	0.00
Chilled Items	Q	137	158	164	0.08	33150	3.50	0.49
	V	3.96	5.14	6.09	0.17	809.50	2.66	0.75
Other Items	Q	46701	45949	37471	17.96	113949	12.05	32.88
	V	387.19	571.89	499.15	13.99	1817.87	5.98	27.46
Grand Total	Q	251920	245434	208624	100.00	945892	100.00	22.06
	V	3658.57	3645.23	3567.24	100.00	30420.83	100.00	11.73

Source: The Marine Products Export Development Authority, Kochi, India

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Table-4.5.68 Inter-State Export of Fish & Fish Products from GUJARAT Year 2015-2016 [Quantity in M.T and Value in Lakh Rs.]

Sr.No	District	Fresh Fish				Dry Fish		Fish Meal		Fish Pulvers		Fish & Maws		Total	
		Marine		Inland		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
		Qty	Value	Qty	Value										
1	Valsad	0.00	0.00	1400.00	6965.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1400.00	6965.00
2	Navsari	0.00	0.00	510.00	2550.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	510.00	2550.00
3	The Dangs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Surat	0.00	0.00	2545.00	7635.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2545.00	7635.00
5	Tapi	0.00	0.00	772.74	691.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	772.74	691.40
6	Bharuch	0.00	0.00	14.60	255.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.60	255.89
7	Narmada	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Vadodara	0.00	0.00	114.48	108.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	114.48	108.64
9	Chota Udepur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Panch Mahals	0.00	0.00	192.25	191.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	192.25	191.78
11	Dohad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Anand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Kheda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	Mahisagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	Ahmedabad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	Gandhinagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	Mahesana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	Patan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Sabarkantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	Aravalli	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	Banaskantha	0.00	0.00	0.30	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.45

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Sr.No	District	Fresh Fish				Dry Fish		Fish Meal		Fish Pulvers		Fish & Maws		Total	
		Marine		Inland		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
		Qty	Value	Qty	Value										
22	Surendranagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	Rajkot	0.00	0.00	16.24	24.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.24	24.79
24	Morbi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	Bhavnagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Botad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	Kachchh	0.00	0.00	0.00	0.00	113.60	73.85	0.00	0.00	0.00	0.00	0.00	0.00	113.60	73.85
28	Jamnagar	503.28	377.30	0.00	0.00	118.44	98.24	0.00	0.00	0.00	0.00	0.00	0.00	621.72	475.54
29	Devbhumi Drawaka	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	Porbandar	5929.00	8501.80	0.00	0.00	2843.00	3353.00	11042.00	3987.80	0.00	0.00	0.00	0.00	19814.00	15842.60
31	Junagadh	0.00	0.00	0.00	0.00	27.00	4.70	0.00	0.00	0.00	0.00	0.00	0.00	27.00	4.70
32	Gir Somnath	12480.00	972.17	0.00	0.00	9949.00	438.79	7700.00	212.27	0.00	0.00	5.00	81.50	30134.00	1704.73
33	Amreli	0.00	0.00	0.00	0.00	60.00	11.06	0.00	0.00	0.00	0.00	0.00	0.00	60.00	11.06
Total		18912.28	9851.27	5565.61	18422.95	13111.04	3979.64	18742.00	4200.07	0.00	0.00	5.00	81.50	56335.93	36535.43

Source: Commissioner of Fisheries, GoG, Gandhinagar

4.5.9.4 Sustainability Issues and Gap Analysis:

Table-4.5.69 Sustainability Issues and Gap Analysis of Productivity

Sr. No	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
Fisheries						
1	Quality seed	Inadequate quality seed availability, poor breed,	Ensure quality seed availability, educate farmers on seed production. Strengthening of seed production units.	Extension activities, new seed production units (hatchery unit) will be established.	5 % growth in area under quality seed per annum.	Increase in productivity and profitability.
2	Shortage of critical fish farming inputs and disease diagnosis facilities	Lack of facilities like rearing spaces, feed and disease diagnosis. High mortality of spawn, fry and fingerling of fish	Provide rearing spaces or optional arrangements for fish seed rearing in natural water resources i.e. pen culture, cage culture etc., in village ponds and reservoirs. Strengthening of disease diagnosis facility at the district level. Creating awareness.	Training, demonstrations (cage and pen culture) in farmers' participatory approach. Develop disease diagnosis aqua lab	5% reduction in mortality rate per year. 5% increase fingerlings and yearlings production per annum.	Increase in fish seed production, fish productivity and profitability. Reduced fish mortalities.
3	Poor adoption of modern techniques of fish farming	Inefficient dissemination of technologies, fewer extension activities.	Educating farmers on modern techniques of fish farming. Strengthening training facilities.	Training and demonstrations in farmers' participatory approach.	5% growth in area under modern techniques of fish farming per annum.	Increase in productivity and profitability.

Table-4.5.70 Activity Output Matrix of Allied Sectors for Narrowing the Gaps for Realizing the Vision.

Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target
Setting up of fish brood banks and seed production units	Poor quality of fish brooder, poor technical knowledge of fish farmers, poor management of fish farms, scarcity of fish fingerling and yearling,	<ul style="list-style-type: none"> • Fishery Department will organize training/demonstrations for fisheries development during the plan period Dist. Fishery Officer (ADF) will work to develop an advanced stock of 10 lacs fingerlings/yearlings 100 mm size during the plan period. ADF will get FRP Carp hatcheries established during the plan period for fish seed production. 	Fisheries Dept./ KVK/ SAUs. Government Fishery Department; in the existing farms and leasing out to entrepreneurs)
Fish feed production units	Shortage of fish food in the market, high feed cost The annual requirement of supplementary feed for aquaculture in ponds and seed rearing is about 2-3 Lakh T. The main ingredients are mostly rice bran, groundnut or mustard oilcake. However ready formulated fish feeds are available from private manufactures from other States.	<ul style="list-style-type: none"> • Fisheries Department develops and leasing out to entrepreneurs. • Animal and fish feed manufacturers could be invited to establish fish feed plants in 3 - 4 places in the State. • Cluster base (10-20 ha) fish feed unit should be developed/On-farm preparation of fish feed @ 100 kg/day – unit cost Rs 8 Lakh 	Fisheries Dept./ KVK/ NGOs/PPP
Post-harvest infrastructure (Fishmarket, Chilled room, insulated box etc.)	Unhygienic fish quality due to poor handling and unorganized marketing Consumer preference fresh fish hence, the emphasis would need to be laid on the speedy transfer of fish from production to consumption centers, without adding much to the costs.	<ul style="list-style-type: none"> • Fisheries Department will develop fish markets/child room etc., in the state and lease out to entrepreneurs. • Provide insulated box, insulated van, cycle-box, hand carts etc., on the subsidized rate to the fishermen and women. 	Fisheries Dept. /MNP/ Municipalities

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Activity/Crop/ Commodity	Issues	Mode of Action	Collaborator/ Target
Aquaculture Laboratory		Fisheries Department/SAUs will develop an advanced laboratory for soil-water testing and fish diseases	Fisheries Dept./ KVK/ SAUs
Capacity building	Training of officers of the State Fisheries Department and farmers	The regular training programme will be conducted for the stakeholders	Fisheries Dept./ KVK/ SAUs
Ornamental fish culture	Special thrust on ornamental fish culture in the small-scale sector	Emphasis should be given to intensification of breeding and culture of ornamental fishes.	Fisheries Dept./ KVK/ SAUs
Insurance cover	Natural calamities affect the culture ponds i.e. flood, drought, etc. Insurance schemes in aquaculture sector in mission mode	Proper insurance coverage should be made available for culture fisheries.	Fisheries Dept./ Insurance company /PPP
Assisting fishermen in more efficient fishing	Per unit catch is decreased, fishing/trawling period (days) extended, most of the fishing grounds exploited	Boosting fishing operation in the deep sea (untouched fish potential area)	Fisheries Dept./ CIFT/ MPEDA
Enforcement of fisheries act/rules	Overexploitation of fishing grounds	Due care for endangered species for sustainable fisheries to improve the living condition of marine fishermen with special emphasis on health, hygiene and sanitation	Fisheries Dept./ Boat Associations

4.5.9.5 Innovative Schemes:

4.5.9.5.1 Strengthening of existing training centers

Strengthening of existing training centers (six) functioning under the State Fisheries Department, Government of Gujarat needs immediate attention to renovate and make it modernized to cater the training on various aspects of fisheries and aquaculture development regularly for the benefits of fish farmers, rural youth and students. The trainers of these training centers will regularly update their knowledge from the trainer's training centers as proposed above. The proposed financial requirement is Rs. 780.00 lakhs.

Table-4.5.71 Financial need for strengthening of six Regional Fisheries Training Centers of Fisheries Department

Sr. No.	Dist/Area	Total Financial Requirement	Three year Cost (Rs in Lakhs)		
			I	II	III
1	Kadana	130.00	30	50	50
2	Umbergaon	130.00	30	50	50
3	Khedbramha	130.00	30	50	50
4	Chhota Udaipur	130.00	30	50	50
5	Porbandar	130.00	30	50	50
6	Madhuban	130.00	30	50	50
Total		780.00	180	300	300

Table-4.5.72 Budget (Year wise) requirement for Regional Fisheries Training Centers of Fisheries Department, GoG

Sr. No	Item	Cost (year wise) Rs. in Lakhs			
		I	II	III	Total
1.	Pay and allowance	5	10	10	25
2.	Recurring	5	10	10	25
3.	Non-Recurring	10	10	10	30
4	Renovation	10	20	20	50
	Total	30	50	50	130

4.5.9.5.2 Training proposed for capacity building of fish farmers (District wise) on different technologies

Table-4.5.73 Training proposed for capacity building of fish farmers (District wise) on different technologies

(Rs.600/day /farmer)
(Phy-No.of trainees, Fin-Rs.in lakh)

District	Year wise no. of farmers to be trained						Total	
	I		II		III			
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	200	1.20	200	1.20	200	1.20	600	3.60
Amreli	50	0.30	50	0.30	50	0.30	150	0.90
Anand	100	0.60	100	0.60	100	0.60	300	1.80
Banaskantha	50	0.30	50	0.30	50	0.30	150	0.90
Bhavnagar	100	0.60	100	0.60	100	0.60	300	1.80

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District	Year wise no. of farmers to be trained						Total	
	I		II		III			
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Bharuch	100	0.60	100	0.60	100	0.60	150	0.90
Dahod	50	0.30	50	0.30	50	0.30	150	0.90
Gandhinagar	25	0.15	25	0.15	25	0.15	75	0.45
Jamnagar	100	0.60	100	0.60	100	0.60	300	1.80
Junagadh	50	0.30	50	0.30	50	0.30	150	0.90
Kachchh	50	0.30	50	0.30	50	0.30	150	0.90
Kheda	100	0.60	100	0.60	100	0.60	300	1.80
Mahesana	50	0.30	50	0.30	50	0.30	150	0.90
Narmada	50	0.30	50	0.30	50	0.30	150	0.90
Navsari	100	0.60	100	0.60	100	0.60	300	1.80
Panchmahal	50	0.30	50	0.30	50	0.30	150	0.90
Patan	50	0.30	50	0.30	50	0.30	150	0.90
Porbandar	100	0.60	100	0.60	100	0.60	300	1.80
Rajkot	150	0.90	150	0.90	150	0.90	450	2.70
S.nagar	50	0.30	50	0.30	50	0.30	150	0.90
Sabarkantha	50	0.30	50	0.30	50	0.30	150	0.90
Surat	150	0.90	150	0.90	150	0.90	450	2.70
Tapi	25	0.15	25	0.15	25	0.15	75	0.45
The dangs	25	0.15	25	0.15	25	0.15	75	0.45
Vadodara	150	0.90	150	0.90	150	0.90	450	2.70
Valsad	100	0.60	100	0.60	100	0.60	300	1.80
TOTAL	2075	12.45	2075	12.45	2075	12.45	6075	37.35

As the State of Gujarat is endowed with vast inland and marine water resources amenable for the development of fisheries sector of the State. In order to have the holistic development of fisheries following key areas have been proposed to enhance the overall productivity of the fish and fishery produce.

Inland fisheries developmental programmes

4.5.9.5.3 Introduction of Portable FRP Carp Hatcheries for fish seed production.

Fish seed production is the major constraint of the Gujarat state. Fish farmers of the district depend on another state because the state fisheries department hatcheries fulfill only 40 percent requirement of the district. The pedestal of inland fish production on the availability of quality and quantity of fish seed, therefore decentralization of fish seed production is required.

First time ever in Gujarat, Inland Fisheries Training cum Demonstration Centre, Anand Agricultural University has brought FRP Carp Hatchery from Central Institute of Freshwater Aquaculture (CIFA), ICAR, Bhubaneswar for demonstrating the new technology of fish seed production amongst fish farmers of middle Gujarat. The concept of portable FRP carp hatchery is to accomplish the fish seed production at farmer's pond during the breeding season. After breeding season this FRP carp hatchery used for ornamental fish breeding and rearing also. Fish farmers will produce own fish seed by using this FRP carp hatchery at the pond. The unit cost of FRP carp hatchery is nearly Rs 1.50 lakh. This FRP hatchery can be offered to freshwater fish farmers, aquaculture SHGs, progressive fish farmers, and active co-operative

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societies who are engaged in fish seed production. It should cover all the inland districts of Gujarat state.

Table-4.5.74 Year wise FRP carp hatchery demonstration (Rs. in lakh)

Description	Year wise hatchery demonstration							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Portable FRP carp hatchery	45	67.5	45	67.5	45	67.5	135	202.5

Table-4.5.75 District-wise no. of units along with financial requirements for a proposal for Portable FRP Carp Hatcheries for fish seed production in various districts of the state

(Fin: Rs in lakh, Phy: nos, Unit - Rs 1.50 lakh/unit/demonstration)

District	District wise no. of FRP carp hatchery demonstration							
	I		II		III		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	5	7.50	5	7.50	5	7.50	15	22.50
Amreli	1	1.50	1	1.50	1	1.50	3	4.50
Anand	3	4.50	3	4.50	3	4.50	9	13.50
Banaskantha	1	1.50	1	1.50	1	1.50	3	4.50
Bhavnagar	1	1.50	1	1.50	1	1.50	3	4.50
Bhuruch	2	3.00	2	3.00	2	3.00	6	9.00
Dohad	1	1.50	1	1.50	1	1.50	3	4.50
Gandhinagar	0	0.00	0	0.00	0	0.00	0	0.00
Jamnagar	1	1.50	1	1.50	1	1.50	3	4.50
Junagadh	1	1.50	1	1.50	1	1.50	3	4.50
Kachchh	0	0.00	0	0.00	0	0.00	0	0.00
Kheda	2	3.00	2	3.00	2	3.00	6	9.00
Mahesana	1	1.50	1	1.50	1	1.50	3	4.50
Narmada	1	1.50	1	1.50	1	1.50	3	4.50
Navsari	3	4.50	3	4.50	3	4.50	9	13.50
Panchmahals	1	1.50	1	1.50	1	1.50	3	4.50
Patan	1	1.50	1	1.50	1	1.50	3	4.50
Porbandar	1	1.50	1	1.50	1	1.50	3	4.50
Rajkot	3	4.50	3	4.50	3	4.50	9	13.50
S.nagar	2	3.00	2	3.00	2	3.00	6	9.00
Sabarkantha	1	1.50	1	1.50	1	1.50	3	4.50
Surat	5	7.50	5	7.50	5	7.50	15	22.50
Tapi	1	1.50	1	1.50	1	1.50	3	4.50
The dangs	0	0.00	0	0.00	0	0.00	0	0.00
Vadodara	4	6.00	4	6.00	4	6.00	12	18.00
Valsad	3	4.50	3	4.50	3	4.50	9	13.50
TOTAL	45	67.5	45	67.5	45	67.5	135	202.5

4.5.9.5.4 Introduction of Freshwater Prawn in Village ponds

The village ponds are utilized for fish culture in the middle and south Gujarat Districts. These ponds are given to the fishermen on lease basis by the State Fisheries Department under FFDA scheme. At present fishermen stock only indigenous fishes fry/fingerlings to these ponds and its productivity is very low (1000 kg/ha) as compared to national average productivity (2800 kg/ha). Further, they are not aware of the freshwater prawn culture; therefore, there is a dire need for demonstration units of freshwater prawn juvenile more than 40-60 mm size (scampy) for its better survival rate and high production in village ponds. These are to be distributed in districts of the State.

Demonstration unit –

- Prawn larvae (40-60 mm) – 20,000 nos /ha - @ Rs 2 per larvae; Rs 0.40 Lacs

Demonstration criteria –

- Village pond depth should be between 1.5 to 3 m with a perennial water source
- The pond must be free from catfishes or harvest all the catfishes, if not they pray on scampy juvenile
- Provide 20-30 % hiding space for prawn shelter in the village pond

Output –

- Estimated scampy production – 500 MT @ Rs 3 lakh per MT
- **Budget requirement: Rs. 222.00 lakh**

Table -4.5.76 District-wise no. of units along with financial requirements for demonstration of Freshwater Prawn in Village ponds in various districts of the state

(Fin: Rs in lakh, Phy: nos of demonstration)

Sr No	District	Year & District wise no. of demonstration							
		I		II		III		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	4.00	10	4.00	10	4.00	30	12.00
2	Jamnagar	5	2.00	5	2.00	5	2.00	15	06.00
3	Junagadh	10	4.00	10	4.00	10	4.00	30	12.00
4	Kachchh	10	4.00	10	4.00	10	4.00	30	12.00
5	Kheda	5	2.00	5	2.00	5	2.00	15	06.00
6	Mahesana	10	4.00	10	4.00	10	4.00	30	12.00
7	Narmada	10	4.00	10	4.00	10	4.00	30	12.00
8	Navsari	5	2.00	5	2.00	5	2.00	15	06.00
9	Panchmahals	10	4.00	10	4.00	10	4.00	30	12.00
10	Patan	10	4.00	10	4.00	10	4.00	30	12.00
11	Porbandar	5	2.00	5	2.00	5	2.00	15	06.00
12	Rajkot	10	4.00	10	4.00	10	4.00	30	12.00
13	S.nagar	5	2.00	5	2.00	5	2.00	15	06.00
14	Sabarkantha	10	4.00	10	4.00	10	4.00	30	12.00
15	Surat	10	4.00	10	4.00	10	4.00	30	12.00
16	Tapi	10	4.00	10	4.00	10	4.00	30	12.00
17	Dang	5	2.00	5	2.00	5	2.00	15	06.00
18	Vadodara	5	2.00	5	2.00	5	2.00	15	06.00

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Sr No	District	Year & District wise no. of demonstration							
		I		II		III		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
19	Valsad	10	4.00	10	4.00	10	4.00	30	12.00
20	Gandhinagar	10	4.00	10	4.00	10	4.00	30	12.00
21	Jamnagar	10	4.00	10	4.00	10	4.00	30	12.00
22	Junagadh	10	4.00	10	4.00	10	4.00	30	12.00
23	Kachchh	5	2.00	5	2.00	5	2.00	15	06.00
24	Kheda	0	0.00	0	0.00	0	0.00	0	0.00
25	Mahesana	10	4.00	10	4.00	10	4.00	30	12.00
26	Narmada	10	4.00	10	4.00	10	4.00	30	12.00
27	Navsari	5	2.00	5	2.00	5	2.00	15	06.00
28	Panchmahals	5	2.00	5	2.00	5	2.00	15	06.00
29	Patan	5	2.00	5	2.00	5	2.00	15	06.00
30	Porbandar	5	2.00	5	2.00	5	2.00	15	06.00
31	Rajkot	5	2.00	5	2.00	5	2.00	15	06.00
32	S.nagar	5	2.00	5	2.00	5	2.00	15	06.00
33	Sabarkantha	5	2.00	5	2.00	5	2.00	15	06.00
	TOTAL	185	74.00	185	74.00	185	74	555	222.00

4.5.9.5.5 Village pond for fisheries development

The total area of the ponds and tanks is 0.071 million ha. Suitable areas for pond culture in the state are available in Valsad, Surat and Bharuch district in south Gujarat and Kheda and Anand districts in central Gujarat. Fish farmers of Surat and Valsad are practicing fish culture in a scientific manner adopting proper seed stocking, manuring and feeding practices. Average production in Valsad and Surat districts reaches 2,000 kg per ha per year. In Saurashtra area production is less than 500 kg per ha per year. The lower productivity in Saurashtra is primarily due to unfavorable temperature and water conditions. The problem of high temperatures during summers can be avoided by developing ponds of depth 1.5 – 2 m instead of the usual 1 m depth ponds. To utilize village pond for fish culture and provide employment through fish farming to generate employment at village level by the help of Self Help Groups(SHG) and utilization of village pond to cope up the nutritional deficiency by utilizing fish as a feed.

Demonstration unit – Rs 0.40 lakh/demo

Village pond for fish culture - inlet-outlet, excavation of the pond, development of fish seed rearing space, erection of 'pen' for fish seed rearing etc

Output of-Develop group approach/SHGs for employment generation and restrict migration in an urban area. Cope up the nutritional deficiency by utilizing fish as a food. For the 12th plan, it is proposed to cover 26 districts. For this proposed fund is Rs. 318.00 lakhs.

ANIMAL HUSBANDRY, ANIMAL HEALTH, DAIRYING, POULTRY AND FISHERY SECTORS

Financial Requirement

Table -4.5.77 District-wise no. of units along with financial requirements for Village pond development for fisheries in various districts of the state

(Fin: Rs in lakh, Phy: nos of demonstration)

Sr No	District	Year wise no. of demonstration village pond development for fisheries							
		I		II		III		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	4.00	10	4.00	20	8.00	4	16.00
2	Amreli	5	2.00	5	2.00	15	6.00	25	10.00
3	Anand	10	4.00	10	4.00	20	8.00	40	16.00
4	Banaskantha	10	4.00	10	4.00	15	6.00	35	14.00
5	Bhavnagar	5	2.00	5	2.00	10	4.00	20	8.00
6	Bharuch	10	4.00	10	4.00	20	8.00	40	16.00
7	Dahod	10	4.00	10	4.00	15	6.00	35	14.00
8	Gandhinagar	5	2.00	5	2.00	5	2.00	15	6.00
9	Jamnagar	10	4.00	10	4.00	15	6.00	35	14.00
10	Junagadh	10	4.00	10	4.00	15	6.00	35	14.00
11	Kachchh	5	2.00	5	2.00	10	4.00	25	8.00
12	Kheda	10	4.00	10	4.00	20	8.00	40	16.00
13	Mahesana	5	2.00	5	2.00	10	4.00	20	8.00
14	Narmada	10	4.00	10	4.00	20	8.00	40	16.00
15	Navsari	10	4.00	10	4.00	20	8.00	40	16.00
16	Panchmahals	10	4.00	10	4.00	15	6.00	35	14.00
17	Patan	5	2.00	5	2.00	10	4.00	20	8.00
18	Porbandar	5	2.00	5	2.00	5	2.00	15	6.00
19	Rajkot	10	4.00	10	4.00	20	8.00	40	16.00
20	S.nagar	10	4.00	10	4.00	10	4.00	30	12.00
21	Sabarkantha	10	4.00	10	4.00	10	4.00	30	12.00
22	Surat	10	4.00	10	4.00	20	8.00	40	16.00
23	Tapi	5	2.00	5	2.00	5	2.00	15	6.00
24	The Dangs	0	0.00	5	2.00	10	4.00	15	6.00
25	Vadodara	10	4.00	10	4.00	20	8.00	40	16.00
26	Valsad	10	4.00	10	4.00	15	6.00	35	14.00
	TOTAL	210	84	215	86	370	148	764	318

4.5.9.5.6 Pilot project for Cage/Pen Culture in Reservoirs lakes and canals. – Fish yearling production

Fish seed is the basic requirement for increasing fish production through fish culture practices. The purpose is to utilize the reservoir lakes and canal water resources for fish production. Fish seed can be reared in the periphery of the reservoirs creating pens and cages. Under the project, the major reservoirs of various districts would be covered. The fund required for 12th plan is Rs.620.00 lakhs.

Demonstration unit – 0.40 lakh

- Rs 15,000 for fingerling to yearling 250/Sq.m. for cage/pen
- Rs 25,000 or 50 % subsidy whichever is less for construction of cage/pen

Financial Requirement

Table -4.5.78 District-wise no. of units along with financial requirements for Cage/Pen Culture in Reservoirs lakes and canals in various districts of the State

Sr	District	Year wise no. of demonstration							
		I		II		III		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	4.00	90	36.00	55	22.00	155	62.00
2	Bharuch	10	4.00	90	36.00	55	22.00	155	62.00
3	Kheda	10	4.00	90	36.00	55	22.00	155	62.00
4	Narmada	10	4.00	90	36.00	55	22.00	155	62.00
5	Panchmahal	10	4.00	90	36.00	55	22.00	155	62.00
6	Rajkot	10	4.00	90	36.00	55	22.00	155	62.00
7	Sabarkantha	10	4.00	90	36.00	55	22.00	155	62.00
8	Surat	10	4.00	90	36.00	55	22.00	155	62.00
9	Surendranagar	10	4.00	90	36.00	55	22.00	155	62.00
10	Vadodara	10	4.00	90	36.00	55	22.00	155	62.00
Total		100	40.00	900	360.00	550	220.00	1550	620.00

Marine fisheries sustainable production programmes

4.5.9.5.7 Financial Assistance to Fishing Boat Owner for replacement of the cod end in a trawl net

Fish Production from nearshore waters (0-50 meter) has reached its optimum yield levels and has been stagnant for some years. To sustain this production and to ensure that the major fisheries do not suffer any irreparable damage, improved management features, based on community participatory approach have to be put in place earliest. In Gujarat, most of the fishermen use the net below mesh size of 12-14 mm to exploit nonpenaeid shrimp on large scale. Due to this, it drags out most of the small fishes. Such small catches have no use and destroy the marine resources. If cod ends of 40 mm mesh size are fitted to trawler boats, it would help to preserve small fishes. It is proposed to cover all 8000 trawler boats (3 cod ends are required for 1 trawler boat) in the state, which would cost Rs.801.60 lakhs.

Demonstration unit – Rs 0.12 Lacs

- Replacement of small size mesh cod end with big size 40 mm mesh size cod end

The output of- Preventing small size fishes and decrease the over-exploitation.

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Financial Requirement: Rs. 801.6 lakh

Table –4.5.79 Fishing port-wise no. of units along with financial requirements for replacement of the cod end of trawl net in various districts of the State

(Fin: Rs in lakh, Phy: nos of demonstration)

Sr. No.	Name of fishing port	I		II		III		Total	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
1	Mangrol	100	12.00	100	12.00	100	12.00	300	36
2	Jafarabad	50	6.00	50	6.00	50	6.00	150	18
3	Jakhau	50	6.00	50	6.00	50	6.00	150	18
4	Okha	100	12.00	100	12.00	100	12.00	300	36
5	Porbandar	300	36.00	700	84.00	800	96.00	1800	216
6	Valsad	60	7.20	60	7.20	60	7.20	180	21.6
7	Veraval	400	48.00	1400	168.00	2000	240.00	3800	456
Total		1060	127.2	2460	295.2	3160	379.2	6680	801.6

4.5.9.5.8 Biometric cards to fishermen/crew and tandels

For the purpose of national security, the bio-metric card is one of the reliable identification methods for border patrolling. It helps in identifying the genuine fishermen at any point in time at any place. About 5 lakhs fishermen live in 884 fishing villages and towns in the state. In the interest of National security and for identification of fishermen, it is proposed to provide latest technology biometric identity cards to 1 lakh fishermen.

With the help of the biometric card, Govt Department and other authorities can identify the Nationality and personal identification of the fishermen. This can be extremely useful whenever the fishermen are captured by Pakistan Marine Security Agency (PMSA). It will be useful during their release too.

The Approximate cost of 1 bio-metric card is Rs. 480/- and for **0.64 lakh bio-metric card the total cost would be Rs. 307.20 lakhs.**

Table–4.5.80 Fishing port-wise no. of units along with financial requirements for Biometric cards to fishermen/crew and tandels

(Fin: Rs in lakh, Phy: nos of demonstration)

Sr. No.	Name of fishing port	I		II		III		Total	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
1	Mangrol	3000	14.40	3000	14.40	5000	24.00	11000	52.8
2	Jafarabad	1000	4.80	1500	7.20	1500	7.20	4000	19.2
3	Jakhau	1000	4.80	1500	7.20	1500	7.20	4000	19.2
4	Okha	3000	14.40	3000	14.40	3000	14.40	9000	43.2
5	Porbandar	5000	24.00	5000	24.00	5000	24.00	15000	72
6	Valsad	1000	4.80	1000	4.80	1000	4.80	3000	14.4
7	Veraval	6000	28.80	6000	28.80	6000	28.80	18000	86.4
Total		20000	96	21000	100.8	23000	110.4	64000	307.2

Strengthening of infrastructure facilities in marine fisheries**4.5.9.5.9 Modernisation and developments of existing fish markets**

Presently the fish are sold in open basket. Due to sunlight, dust and passing of time, the quality of the fish gets deteriorated. Hence, the fish sellers may not get a good price. Moreover, the sale of fish in open condition may cause environmental pollution. Many times, the non-fish eating people are taking objections to open sale of fish. It is proposed to establish modern fish markets in major cities/towns of the State of Gujarat to sell the fish in hygienic condition. The area of the project will be Ahmedabad, Vadodara, Surat, Rajkot and Veraval.

Fishermen/Fisherwomen and laborers, transporters, ice manufactures, etc. will be the beneficiaries.

The project will be implemented through local Municipal Corporation/panchayats under State Scheme with 100 % subsidy ratio. The requirements of funds for the renovation and upgradation of 6 fish markets Rs. 3300 lakhs.

Table - 4.5.81 Financial Requirement for modernization and developments of existing Fish markets

Sr. No.	Dist/Area	Total Financial Requirement	Three year Cost (Rs in Lakhs)		
			I	II	III
1	Ahmedabad	550.00	25	275	250
2	Vadodara	550.00	25	275	250
3	Veraval	550.00	25	275	250
4	Porbandar	550.00	25	275	250
5	Okha	550.00	25	275	250
6	Jafarabad	550.00	25	275	250
Total		3300.00	150	1650	1500

Research and development**4.5.9.5.10 Research on Genetic up-gradation of indigenous fish species**

Research work on genetic up gradation can be done in above-suggested model farm complex. There is no much work have been done on genetic screening, there is no reported work on genetic screening on indigenous species having aquaculture potential hence it is imperative to undertake genetic screening and up gradation of indigenous species of Gujarat. Therefore, it is envisaged to have a special focus on genetic upgradation fish/shrimp species.

Table 4.5.82 Financial Requirement for genetic up-gradation of indigenous fish species

Sr. No.	Name of Dist./Area	Total Financial Requirement	Three year Cost (Rs in Lakhs)		
			I	II	III
1	Veraval	130.00	10.00	60.00	60.00
2	Anand	130.00	10.00	60.00	60.00
3	Navsari	130.00	10.00	60.00	60.00
4	Sabarkantha	130.00	10.00	60.00	60.00
Total		520.00	40	240.00	240.00

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Budget requirements for each center

Sr. No	Item	Cost (year wise) Rs. in Lakhs			
		I	II	III	Total
1	Recurring	1	5	5	11
2	Non-Recurring	1	25	25	51
3	Construction	8	30	30	68
	Total	10	60	60	130

4 Establishment of the marine fish hatchery at Okha

Gujarat has the largest coastline amongst all the maritime state of India many commercial finfish species are available on the coast. There is a good scope for mariculture, however, there is no single hatchery of marine fishes, There is already fisheries research station is available at port Okha. Okha coast is rich in aquatic flora and fauna, therefore, it is proposed to establish marine fish hatchery at Okha for the seed production of Mullet, Seabass, Silver pampano, Pearl spot, Milkfish etc. Proposed fund for the project is Rs. 46.00 lakhs.

Table- 4.5.83 Financial Requirement and budget

Sr. No.	Name of Dist./Area	Financial Requirement	Three year Cost (Rs in Lakhs)			
			I	II	III	Total
1	Okha	Recurring	3.00	10.00	10.00	23.00
2	JAU research station	Non-Recurring	3.00	10.00	10.00	23.00
Total			6.00	20.00	20.00	46.00

4.5 Strengthening of aquaculture research centers

Existing Fisheries Research Centers of SAUs having cater to the need of infrastructural modifications likes wet lab at pond site, fish/shrimp feed storage unit, store room, lab room at the site, staff room, DG room, Pump shed, repairing or modification of inlet and outlet, nursery tanks and sheds etc. The approximate cost of four demonstration units - Rs 360.00 lakhs.

Table- 4.5.84 Financial Requirement for Strengthening of aquaculture research centers

Sr. No.	Name of Dist./Area	Total Financial Requirement	Three year Cost (Rs in Lakhs)		
			I	II	III
1	Coastal Soil Salinity Research Station, NAU, Danti (Navsari)	90.00	5.00	50.00	35.00
2	Inland Fisheries Demonstration cum Training Centre AAU, Anand	90.00	5.00	50.00	35.00
3	Inland Fisheries Research Station, JAU Junagadh	90.00	5.00	50.00	35.00
4	Fisheries Research and Training Centre, JAU, Mahuva(Dist.: Amreli)	90.00	5.00	50.00	35.00
Total		360.00	20.00	200.00	140.00

Budget requirements for each center

Sr. No	Item	Cost (year wise) Rs. in Lakhs			
		I	II	III	Total
1	Recurring	1	15	15	31
2	Non-Recurring	1	5	5	11
3	Construction	3	30	15	48
	Total	5	50	35	90

4.5.9.5.13 Demonstration for seaweed cultivation (*Kappaphycus*) to fish farmers and SHGs (District wise)

Seaweed cultivation for fishermen community and SHGs are beneficial activities for revenue generation. Through raft cultivation and long line cultivation methods, seaweed can be cultivated at sandy sea coast- especially at intertidal zone. Depending upon the species, the cultivation period may vary from 45 days to 120 days. Cultivation technology is simple; needs no any extra care.

Material required for demonstration of seaweed cultivation

Seaweed material, Bamboos, Polypropylene ropes, iron anchors, nut and bolts for fabrication of rafts.

Table - 4.5.85 Material required for demonstration of seaweed cultivation

(Phy-No.of Demonstration, Fin-Rs.in lakh)

District	Year wise no. of farmers to be demons.							
	I		II		III		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Amreli	2	0.40	2	0.40	2	0.40	6	1.20
Jamnagar	2	0.40	2	0.40	2	0.40	6	1.20
Junagadh	2	0.40	2	0.40	2	0.40	6	1.20
Kachchh	2	0.40	2	0.40	2	0.40	6	1.20
Porbandar	2	0.40	2	0.40	2	0.40	6	1.20
TOTAL	10	2.00	10	2.00	10	2.00	30	6.00

Cost- (Rs...20000/demonstration)**4.5.9.5.14 Demonstration of seaweed liquid fertilizer to farmers**

Seaweed liquid fertilizer made up of *Sargassum* and *Ascophyllum* species are beneficial for an agricultural crop. The SLF is used in foliar spray. Hormones like auxin and cytokines present in the seaweed induce the flowering in the crop.

The fertilizer is made by the simple boiling method.

Material requirements: Seaweed (*Sargassum/Ascophyllum*), Wet grinder, autoclave etc.

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Table - 4.5.86 Demonstration of seaweed liquid fertilizer to farmers

(Phy-No. of Demonstration, Fin-Rs.inlakh)

District	Year wise no. of farmers to be demons.							
	I		II		III		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	10	0.50	10	0.50	10	0.50	30	1.50
Amreli	10	0.50	10	0.50	10	0.50	30	1.50
Anand	10	0.50	10	0.50	10	0.50	30	1.50
Bhavnagar	10	0.50	10	0.50	10	0.50	30	1.50
Jamnagar	10	0.50	10	0.50	10	0.50	30	1.50
Junagadh	10	0.50	10	0.50	10	0.50	30	1.50
Kachchh	10	0.50	10	0.50	10	0.50	30	1.50
Porbandar	10	0.50	10	0.50	10	0.50	30	1.50
Rajkot	10	0.50	10	0.50	10	0.50	30	1.50
TOTAL	90	4.50	90	4.50	90	4.50	270	13.50

Cost- (Rs...5,000/demonstration)

4.6 OTHER SECTORS:

4.6.1 Integrated Pest and Disease Management (IPDM):

4.6.1.1 Background:

Integrated pest and disease management (IPDM) is designed to manage the insects and diseases effectively with low cost and maintaining a natural balance.

- While new planting materials are one component, IPDM technology is equally effective when it is applied to existing plant system.
- IPDM is designed to maximize the benefits to the farmers by improving the health of the crops.
- The application of IPDM to the crop enables farmers to choose management strategies suited to their situations and needs.
- The use of an integrated management system reduces the levels of pests and diseases in the crop, reduces the inappropriate use of chemicals, provides alternatives for pest and disease management and improves the yield and quality of the crop, thereby increases the farmers' income.

Vision:

- Effectively and economically manage the pests and diseases by maintaining natural balance.

Mission:

- To utilize science-based pest management programs those are economically and environmentally sustainable and socially acceptable.

4.6.1.2 Crop/Area Issues:

- Resurgence of pest
- Resistance against pesticides
- Pest outbreak
- Pesticide residue in food commodity
- Environmental pollution and health hazards.

Crop Specific Issues:

Crop	Issues
Cotton	<ul style="list-style-type: none">• Pink bollworm and sucking pest complex• Root rot, wilt, angular leaf spot, alternaria leaf spot, anthracnose and physiological wilt
Paddy	<ul style="list-style-type: none">• Stem borer, plant hoppers and leaf roller• Bacterial leaf blight, blast, sheath blight, khaira disease, false smut and iron deficiency
Mango	<ul style="list-style-type: none">• Mango hopper and fruit fly• Powdery mildew, anthracnose, dieback, mango malformation

COTTON:

For Insect Pests:

- ✓ One need based (5 aphids, leafhopper and whitefly/leaf) application of *Beauveria bassiana* (2 x 10⁸ cfu) @ 4 g/l water followed by need based application of thiamethoxam 25 WG @ 0.01% (0.4 g/l water) (50 g a.i. /ha).
- ✓ Need based (5 thrips/leaf) application of acephate 75 SP @ 0.075% (1 g/l water) (375 g a.i. /ha).
- ✓ Installation of sex pheromone traps (40 traps/ha) for the pink bollworms, *P. gossypiella* in cotton.

- ✓ Application of 20 EC @ 0.04% (2 ml/ l) or betacyfluthrin 2.5 SC @ 0.025% (1 ml/ l) or spinosad 48 SC @ 0.0015% (0.3 ml/ 1) or triazophos 40 EC @ 0.04% (1 ml/ 1).
- ✓ Application of Imidacloprid 17.8 SL @ 0.09% (0.5 ml/l) and diafenthiuron 50 WP @ 0.05% (1 g/ l) for sucking pests.
- ✓ Application of chlorpyriphos 20 EC @ 0.04% (2 ml/ l) or betacyfluthrin 2.5 SC @ 0.025% (1 ml/ l) or spinosad 48 SC @ 0.0015% (0.3 ml/ 1) or triazophos 40 EC @ 0.04% (1 ml/ 1).

For Diseases:

- ✓ **Wilt root rot:** Seed treatment with *Trichoderma* sp. @ 10 g/kg seed.
- ✓ **Angular leaf spot:** Spraying of streptomycin sulphate (streptocycline) @ 0.01% + copper oxychloride 0.2%.
- ✓ **Alternaria leaf spot:** Spraying of mancozeb 0.2% or mancozeb 0.3% + carbendazim 0.2%.
- ✓ **Anthraxnose:** Spraying of carbendazim 0.05%.
- ✓ **Physiological wilt:** Application of 280 kg N/ha in four equal splits i.e. 70 kg N as basal application at the time of sowing and at 30, 60 and 90 days after sowing. In addition, foliar spray each of 50 g urea, FeSO₄, ZnSO₄ and MgSO₄ in 10 litre of water.

PADDY:

For Insect Pests:

- ✓ Application of carbofuran 3 G or cartap hydrochloride 4 G @ 1 kg/100 m² area after 5 days of raising the nursery and 5 days before uprooting the seedlings.
- ✓ Installation of pheromone traps @ 30/ ha one month after transplanting for the control of stem borer.
- ✓ Spot application of cartap hydrochloride 4 G 20 kg or carbofuran 3 G 25 kg/ha for the control of stem borer and plant hoppers.
- ✓ Spraying of *Bacillus thuringiensis* @ 1 kg/ ha at the initiation of leaf folder damage.

For Diseases:

- ✓ **Bacterial Leaf Blight:** Soaking of seeds at the time of raising the nursery with streptomycin sulphate 0.05% and Spraying of streptomycin sulphate (streptocycline) @ 0.01% + copper oxychloride 0.2%.
- ✓ **Blast:** Spraying of propiconazole 0.025% or carbendazim 0.05%.
- ✓ **Sheath Blight:** Spraying of carbendazim 0.05%.
- ✓ **Khaira Disease:** Spraying of ZnSo₄ 0.4 % + calcium carbonate (CaCO₃) 0.2% (Quick lime).
- ✓ **Iron Deficiency:** Ferrous sulphate (FeSO₄) 0.4% + Quick lime 0.2%.
- ✓ **False Smut:** Spraying of propiconazole 0.075% or at the time of initiation of flowering mancozeb 0.2%.

MANGO:

For Insect Pests:

- ✓ Off seasonal spraying of the carbaryl 50 WP @ 0.2% for the control of mango hopper.
- ✓ Spraying of imidacloprid 17.8 SL @ 0.009 % (5 ml/ 10 litre of water) or acetamiprid 20 SP @ 0.01% (5 g /10 litre of water) or thiamethoxam 25 WG @ 0.0125% (5 g /10 litre of water) at 5 nymphs/ inflorescence for the control of mango hopper.
- ✓ Installation of the methyl ugenol traps @ 10 traps/ha for the control of fruit fly.
- ✓ Planting of the black tulsii in the mango orchards and installation of methyl ugenol impregnated block 10 traps/ha Application of dichlorvos 76 EC @ 0.05% periodically on tulsii for the control of adult fruit fly.
- ✓ Spot application of poison bait (10 litre of water + 450 g jeggery + 5 ml of dichlorvos 76 EC)

For Diseases:

- ✓ **Powdery mildew:** Spraying of wettable sulphur 0.2% or dinocap 0.1% or tridemorph 0.1%
- ✓ **Anthracoise:** Spraying of hexaconazole 0.01% or carbendazim 0.1% or copper oxy-chloride 0.3%.
- ✓ **Die-back:** Spraying of carbendazim 0.05% or Copper oxy-chloride 0.3%.
- ✓ **Mango malformation:** Spraying of NAA 200ppm or use the bordeaux paste 1%.
- ✓ **Shooty mould:** Spraying of monocrotophos @0.05% or methyl-o-demeton @ 0.025%.

Outcomes of IPDM:

- Improves crop health
- Reduces pest and disease pressure
- Develops disease-suppressive conditions
- Increases the income and economic status of farmers
- Reduces the toxic effects of chemicals on environment
- Resurgence of pest can be overcome
- Resistance against pesticides can be avoided
- Pest outbreak can be minimized
- Pesticide residue in food commodity can be reduced
- Environmental pollution and health hazards can be minimized

4.6.1.3 Present Scenario of Chemical Pesticides in Gujarat:**Table – 4.6.1 Present Scenario of Chemical Pesticides in Gujarat (2017-18 to 2019-20) (Kg)**

Sr. No.	District	Present	Projected Use		
		2016-17	2017-18	2018-19	2019-20
1	Ahmedabad	70053	71454	73597	76541
2	Amreli	90611	113103	113103	113103
3	Banaskantha	313253	343535	360236	369636
4	Bharuch	27300	27846	28955	29897
5	Dahod	39101	44966	49463	54408
6	Dangs	6600	8600	10600	12600
7	Junagadh	223561	218445	213435	208330
8	Narmada	47431	44584	42353	37233
9	Navsari	17500	17500	17500	17500
10	Panchmahal	50335	55412	60954	60954
11	Porbandar	133730	136404	139133	141915
12	Sabarkantha	94500	97200	99900	104500
13	Surat	249286	274214	299143	299143
14	Tapi	110796	121875	132955	132955
15	Vadodara	226480	250070	277900	277900
16	Valsad	6600	8600	10600	12600
Total		1707137	1833808	1929827	1949215

Source: Deputy Director of Agriculture (DDA) Extension (All districts)

Note: The data on Present Scenario of Chemical Pesticides in Gujarat other than above mentioned districts are not available in the department of Agriculture, Gujarat state. Hence, the data are not mentioned for the remaining districts

4.6.1.4 IPDM Demonstrations in Gujarat:

Table- 4.6.2 Crop-wise IPDM Demonstrations in 2017-18 to 2019-20

(Phy-No.; Fin – Rs. in Lakh)

Crop	Year-wise IPDM Demonstrations							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Cotton	6450	322.5	6450	322.5	6450	322.5	19350	967.5
Paddy	2300	115	2300	115	2300	115	6900	345.0
Mango	397.0	19.85	397.0	19.85	397.0	19.85	1191	59.55
Total	9147	457.35	9147	457.35	9147	457.35	27441	1372.05

Cost Norms: Rs. 5000/- per demonstration

District-wise IPDM Demonstrations in Gujarat for Different Crops:

Table- 4.6.3 IPDM Demonstrations in 2017-18 to 2019-20 (Cotton)

(Phy-No.; Fin – Rs. in Lakh)

Sr. No	District	Year-wise IPDM Demonstrations							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1.	Ahmedabad	100	5.0	100	5.0	100	5.0	300	15.0
2.	Amreli	630	31.5	630	31.5	630	31.5	1890	94.5
3.	Anand	80	4.0	80	4.0	80	4.0	240	12.0
4.	Bharuch	200	10.0	200	10.0	200	10.0	600	30.0
5.	Bhavnagar	1000	50.0	1000	50.0	1000	50.0	3000	150.0
6.	Dahod	100	5.0	100	5.0	100	5.0	300	15.0
7.	Gandhinagar	40	2.0	40	2.0	40	2.0	120	6.0
8.	Junagadh	300	15.0	300	15.0	300	15.0	900	45.0
9.	Kheda	100	5.0	100	5.0	100	5.0	300	15.0
10.	Kuchchh	200	10.0	200	10.0	200	10.0	600	30.0
11.	Mehsana	150	7.50	150	7.50	150	7.50	450	22.5
12.	Narmada	300	15.0	300	15.0	300	15.0	900	45.0
13.	Patan	40	2.0	40	2.0	40	2.0	120	6.0
14.	Porbandar	50	2.50	50	2.50	50	2.50	150	7.50
15.	Sabarkantha	330	16.50	330	16.50	330	16.50	990	57.0
16.	Surat	50	2.50	50	2.50	50	2.50	150	7.5
17.	Tapi	30	1.50	30	1.50	30	1.50	90	4.5
18.	Vadodara	1000	50.0	1000	50.0	1000	50.0	3000	150.0
19.	Botad	100	5.0	100	5.0	100	5.0	300	15.0
20.	Morbi	100	5.0	100	5.0	100	5.0	300	15.0
21.	Rakot	300	15.0	300	15.0	300	15.0	900	45.0
22.	Jamnagar	100	5.0	100	5.0	100	5.0	300	15.0
23.	Surrendranagar	400	20.0	400	20.0	400	20.0	1200	60.0
24.	Aravali	100	5.0	100	5.0	100	5.0	300	15.0
25.	Mahesana	200	10.0	200	10.0	200	10.0	600	30.0
26.	Patan	100	5.0	100	5.0	100	5.0	300	15.0
27.	Mahisagar	200	10.0	200	10.0	200	10.0	600	30.0
28.	Panchmhal	50	2.5	50	2.5	50	2.5	150	7.5
29.	Chhota Udaipur	50	2.5	50	2.5	50	2.5	150	7.5
30.	Gir Somanath	50	2.5	50	2.5	50	2.5	150	7.5
31.	Dangs	0	0	0	0	0	0	0	0

Sr. No	District	Year-wise IPDM Demonstrations							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
32.	Navsari	0	0	0	0	0	0	0	0
33.	Valsad	0	0	0	0	0	0	0	0
	Total	6450	322.5	6450	322.5	6450	322.5	19350	967.5

Cost Norms: Rs. 5000/- per demonstration

Table-4.6.4 District-wise IPDM Demonstrations in 2017-18 to 2019-20 (Paddy)

(Phy-No.; Fin – Rs. in Lakh)

Sr. No	District	Year-wise IPDM Demonstrations							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1.	Ahmedabad	100	5.0	100	5.0	100	5.0	300.0	15.0
2.	Amreli	0	0	0	0	0	0	0	0
3.	Anand	400	20.0	400	20.0	400	20.0	1200.0	60.0
4.	Bharuch	200	10.0	200	10.0	200	10.0	600.0	30.
5.	Bhavnagar	0	0	0	0	0	0	0	0
6.	Dahod	50.0	2.5	50.0	2.5	50.0	2.5	150.0	7.5
7.	Gandhinagar	0	0	0	0	0	0	0	0
8.	Junagadh	0	0	0	0	0	0	0	0
9.	Kheda	150	7.5	150	7.5	150	7.5	450.0	22.5
10.	Kuchchh	0	0	0	0	0	0	0	0
11.	Mehsana	0	0	0	0	0	0	0	0
12.	Narmada	200	10.0	200	10.0	200	10.0	600	30.0
13.	Patan	0	0	0	0	0	0	0	0
14.	Porbandar	0	0	0	0	0	0	0	0
15.	Sabarkantha	0	0	0	0	0	0	0	0
16.	Surat	100	5.0	100	5.0	100	5.0	300	15.0
17.	Tapi	100	5.0	100	5.0	100	5.0	300	15.0
18.	Vadodara	500	25.0	500	25.0	500	25.0	1500	75.0
19.	Botad	0	0	0	0	0	0	0	0
20.	Morbi	0	0	0	0	0	0	0	0
21.	Rakot	0	0	0	0	0	0	0	0
22.	Jamnagar	0	0	0	0	0	0	0	0
23.	Surrendranagar	0	0	0	0	0	0	0	0
24.	Aravali	0	0	0	0	0	0	0	0
25.	Mahesana	0	0	0	0	0	0	0	0
26.	Patan	0	0	0	0	0	0	0	0
27.	Mahisagar	0	0	0	0	0	0	0	0
28.	Panchmhal	200	20.0	200	20.0	200	20.0	600	60.0
29.	Chhota Udaipur	0	0	0	0	0	0	0	0
30.	Gir Somanath	0	0	0	0	0	0	0	0
31.	Dangs	100	5.0	100	5.0	100	5.0	300	15.0
32.	Navsari	100	5.0	100	5.0	100	5.0	300	15.0
33.	Valsad	100	5.0	100	5.0	100	5.0	300	15.0
	Total	2300	115	2300	115	2300	115	6900	375.0

Cost Norms: Rs. 5000/- per demonstration

Table-4.6.5 District-wise IPDM Demonstrations in 2017-18 to 2019-20 (Mango)

(Phy-No.; Fin – Rs. in Lakh)

Sr. No	District	Year-wise IPDM Demonstrations							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1.	Ahmedabad	2	0.1	2	0.1	2	0.1	6	0.3
2.	Amreli	20	1.0	20	1.0	20	1.0	60	3.0
3.	Anand	10	0.5	10	0.5	10	0.5	30	1.5
4.	Bharuch	5	0.25	5	.025	5	.025	15	0.75
5.	Bhavnagar	15	0.75	15	0.75	15	0.75	45	2.25
6.	Dahod	5	0.25	5	0.25	5	0.25	15	0.75
7.	Gandhinagar	5	0.25	5	0.25	5	0.25	15	0.75
8.	Junagadh	50	2.50	50	2.50	50	2.50	150	7.50
9.	Kheda	5	0.25	5	0.25	5	0.25	15	0.75
10.	Kuchchh	20	1.0	20	1.0	20	1.0	60	3.00
11.	Mehsana	5	0.25	5	0.25	5	0.25	15	0.75
12.	Narmada	10	0.5	10	0.5	10	0.5	30	1.5
13.	Patan	5	0.25	5	0.25	5	0.25	15	0.75
14.	Porbandar	0	0	0	0	0	0	0	0
15.	Sabarkantha	10	0.5	10	0.5	10	0.5	30	1.5
16.	Surat	20	1.0	20	1.0	20	1.0	60	3.0
17.	Tapi	10	0.5	10	0.5	10	0.5	30	1.5
18.	Vadodara	20	1.0	20	1.0	20	1.0	60	3.0
19.	Botad	2	0.1	2	0.1	2	0.1	6	0.30
20.	Morbi	5	0.25	5	0.25	5	0.25	15	0.75
21.	Rakot	2	0.10	2	0.10	2	0.10	6	0.3
22.	Jamnagar	5	0.25	5	0.25	5	0.25	15	0.75
23.	Surrendranagar	0	0	0	0	0	0	0	0
24.	Aravali	0	0	0	0	0	0	0	0
25.	Mahesana	2	0.1	2	0.1	2	0.1	6	0.3
26.	Patan	2	0.1	2	0.1	2	0.1	6	0.3
27.	Mahisagar	5	0.25	5	0.25	5	0.25	15	0.75
28.	Panchmhal	5	0.25	5	0.25	5	0.25	15	0.75
29.	Chhota Udaipur	2	0.1	2	0.1	2	0.1	6	0.3
30.	Gir Somanath	30	1.5	30	1.5	30	1.5	90	4.5
31.	Dangs	10	0.5	10	0.5	10	0.5	30	1.5
32.	Navsari	50	2.5	50	2.5	50	2.5	150	7.5
33.	Valsad	60	3.0	60	3.0	60	3.0	180	9.0
	Total	397.0	19.85	397.0	19.85	397.0	19.85	1191	59.55

Cost norms Rs. 5000/- per demonstration

4.6.2 SOIL HEALTH:

4.6.2.1 Background:

To sustain the growth rate and productivity in agriculture, it is of prime importance to maintain and improve the soil health. The end of the 12 FYP state's target is to cover rest of the 46 lacs farmers under SHC programme with all available nutrients in their soil. Based on soil analysis data it is seen that all districts are low to medium in soil organic matter content, also many districts are low to medium in micronutrients and sulphur content. So the farmers of the districts shall be encouraged to use manures, micronutrients and sulphur fertilizers.

Also, 8 coastal districts have salinity problems and the coastal and inland salinity areas in the state is more than 58 lacs hectares need to be amended with gypsum to improve soil health.

At present there are 21 soil testing laboratories operating under DAG and their modernization and renovation work is going at present. Also out of 21 STLs only 11 STLs have the facilities of AAS to analyze micro nutrients. So other 10 AAS required to be purchased. 12 districts have no facility of STL, so 12 new STL to be established.

At present s Soil Health Card programme running in the state. Huge amount of soil samples will be analyzed in stipulated time. So for rapid and accurate analysis of soil samples there is need to create facility of Inductively Coupled Plasma (ICP) instrument in zone wise 1 laboratory in state and 4 laboratories of SAU'S.

Table 4.6.6 Details of Soil Testing Laboratories of Gujarat State with Full Address, Phone Number & Group

<i>Name of District</i>	<i>Sr. No</i>	<i>LOCATION OF SOIL TESTING LABORATORIES.</i>	<i>PHONE NO.</i>	<i>GROUP</i>
Jamnagar	1	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Jamnagar Dist: Jamnagar, Bedival sura road,	0288, 2754072	DAG
	2	APMC, At:- JAM JODHPUR, Ta:- JAM JODHPUR, Dist:-Jamnagar	02898-220256	APMC
	3	APMC At:- JAM KHAMBHALIYA, Dist:- Jamnagar	02833-232725	APMC
	4	APMC ,At:-JAMNAGAR (HAPA), , Dist:-Jamnagar	0288-2570722-133	APMC
	6	D K V Arts & Science College, Dist: Jamnagar	---	SCI
Rajkot	7	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Rajkot Dist: Rajkot, Rid club compound	0281, 2440740	DAG
	8	APMC At:-GONDAL Dist Rajkot	02825-220471/091	APMC

	9	APMC At:-JASDAN, Dist Rajkot	---	APMC
	10	APMC At:-MORBI,Dist Rajkot	02822-230240/2210	APMC
	11	APMC At:-UPLETA, Dist Rajkot	02766-222296	APMC
	12	APMC At:-WANKANER, Dist Rajkot	02828-227513	APMC
	13	H & H B Kotak Institute of Science, Dr Yagnik Road,Rajkot Dist Rajkot	---	SCI
	14	Virani Science College, Kalavad Road,Rajkot Dist Rajkot	---	SCI
	15	Matrushree Virbaima Mahila Science & Home Science College, Kalavad Road,Rajkot Dist Rajkot	---	SCI
Junagadh	16	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Junagadh Dist: junagadh, mini krishi bhavan,Nilam bag	0285, 2630538	DAG
	17	APMC, At:-JUNAGADH, Dist: Junagadh,	---	APMC
	18	APMC , At:-KODINAR, Dist: Junagadh	02795-221516	APMC
	19	APMC, At:-MANAVADAR, Dist: Junagadh	02748-222038	APMC
	20	APMC, At:-VISAVADAR, Dist. Junagadh	---	APMC
	21	APMC, At:-UNA, Dist: Junagadh	02875-221612	APMC
	22	Bileshvar khedut sugar co-oper At:- kodinar, dlst:- junagadh	02795-221601-04	SUCO-OP
	23	Bahauddin Science College,Junagadh	---	SCI
Porbandar	24	M D Science College,Porbandar	---	SCI
Surendranagar	25	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Surendrnagar Dist: Surendrnagar, kherali road, Ph-	02752, 221691	DAG
	26	APMC, At:HALWAD, Dist: Surendranagar, Ph:-	02758-256957	APMC

	27	APMC ,At:WADHWAN, Dist: Surendranagar, Ph:-	02752-243830/462	APMC
Bhavanagar	28	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Bhavnagar Dist: Bhavnagar, Shamal das collage compound	0278, 2433877	DAG
	29	APMC, At:-BOTAD, Dist:- Bhavnagar,Near bus stand	02849-255002	APMC
	30	APMC, At:-MAHUVA, Dist:- Bhavnagar, Bus Stand road	02844-222596	APMC
Amreli	31	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Amreli Dist: Amreli, Chakkargadh road,	02792, 220439	DAG
	32	APMC At:- AMRELI, DIST. Amreli	02792-223941	APMC
	33	APMC At:- BABARA , DIST. Amreli	02791-233564	APMC
	34	APMC At:- RAJULA ,DIST. Amreli	02794-222198	APMC
	35	APMC At:- SAVARKUNDLA,DIST. Amreli	02845-242120	APMC
	36	Kamani Science College & Prataprai Arts College,Amreli	---	SCI
Kutch	37	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Kutch Dist: Kutch	02832, 221053	DAG
	38	APMC, At:-ANJAR, Dist:- Kutch-Bhuj	02836-242577/4058	APMC
	39	APMC, At:- RAPAR, Dist:- Kutch-Bhuj	02830-220985	APMC
	40	Kutch University,Bhuj	---	SCI
	41	Tolani Arts & Science College, Nr Railway Station,Adipur Dist Bhuj	---	SCI
Mahesana	42	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Pilavi Ta:- vijapur, Dist: Mahesana, T.C.D. farm compound	02763, 289166	DAG

	43	APMC, At:-VIJAPUR, Dist:- Mahesana	02763-220001	APMC
	44	P S Science & H D Patel Arts College, Kadi Dist: Mahesana	---	SCI
	45	Munshi Arts and Sci College, Nagalpur, Dist: Mahesana	---	SCI
	46	U P Arts Science & Commerce College, Vijapur Dist: Mahesana	---	SCI
	47	M N Science College, Visnagar Dist. Mehsana	---	SCI
Patan	48	APMC, At:- PATAN, Dist:- Patan	02679-224239	APMC
	49	APMC, At:-SIDHAPUR, Ta:- SIDHAPUR, Dist:-Patan	02767-220082/902	APMC
	50	Sheth M N Science College, Patan	---	SCI
Banaskantha	51	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Deesa, Ta:-Deesa Dist: Banaskantha	02744 -221478	DAG
	52	APMC, At:- DEESA, Ta:- Deesa Dist:-Banaskantha	02744-220072	APMC
	53	APMC, At:- DHANERA, Ta:- Dhanera, Dist:-Banaskantha	02730-293229	APMC
	54	APMC, At:- THARAD, Ta:- Thara, Dist: Banaskantha	9825057032	APMC
	55	APMC, At:- PALANPUR, Ta:- Palanpur, Dist: Banaskantha	02742-255071	APMC
	56	APMC, At:- THARA, Ta:- Thara, Dist: Banaskantha	02749-222019	APMC
	57	R R Mehta College of Science & C L Parikh college of Commerce, Palanpur	---	SCI
Sabarkantha	58	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Khedbhrahma, Ta:- Khedbhrahma, Dist: Sabarkantha, Idar- Ambaji road, Near Farmer Treining Centre	02775-220183	DAG
	59	APMC, At:- Bayad, Ta:-Bayad, Dist:-Sabarkantha	---	APMC

	60	APMC, At:- BHILODA, Dist:- Sabarkantha	02771-232099	APMC
	61	APMC, At:- MALPUR, Ta:- Malpur, Dist:-Sabarkantha	---	APMC
	62	APMC, At:- TALOD, Ta:- Talod, Dist:-Sabarkantha	02770-220508/404	APMC
	63	APMC, At:- KHEDBRHAHMA, Ta:-Khedbhrahma, Dist:- Sabarkantha	02775-220054	APMC
	64	APMC, At:- DHANSURA, Ta:-Dhansura, Dist:- Sabarkantha	02774-222006	APMC
	65	APMC, At:-HIMATNAGAR, Ta:-Himatnagar, Dist:- Sabarkantha	02772-245078	APMC
Gandhinagar	66	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Gandhinagar Dist: Gandhinagar , Sector-15, Near I.T.I,	079, 23222567	DAG
	67	APMC, At:-Randheja, Ta:-& Dist:-Gandhinagar	---	APMC
	68	Gujrat Land Development Corporation,At:- GANDHINAGAR	---	GLDC
	69	Gujrat State Seed Corporation, At:- GANDHINAGAR	079-23256677,23256684	GSSC
	70	Govt SCI College,Gandhinagar	---	SCI
	71	APMC At:-KALOL, Ta:-Kalol, Dist:- GANDHINAGAR	02764-220422	APMC
Ahmedabad	72	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Ahmedabad Dist: Ahmedabad, Sabaramati, Near visata petrol pump	----	DAG
	73	APMC, At:-Jetalpur,Dist:- Ahmedabad	079-25323834	APMC
	74	APMC, At:-DHOLKA, Ta:- Dholka, Dist:-Ahmedabad	9825066532	APMC
	75	M.G.Science institute,Ahmedabad	---	SCI
	76	Gujarat Arts & Science College, Elligebridge	---	SCI

	77	Bhavans college Dist: Ahmedabad	---	SCI
	78	k.ka.shastri Sci College,Khokhara,Maninagar	---	SCI
	79	C.U.Shah Sci College,Elisbridge,Ahmedabad	---	SCI
	80	Jarodwala Maninagar science college, Ahmedabad	---	SCI
Panchmahal	81	APMC, At:-GODHARA, Dist:- Panchmahal	02672-224197/3213	APMC
	82	Sheth P T Patel Arts & Science College,Godhara	---	SCI
	83	P N Pandya Arts, M P Pandya Science, Smt B P Pandya Commerce college,Lunavada	---	SCI
Dahod	84	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Dahod Dist: Dahod, chakaliya road	02673, 242539	DAG
	85	APMC, At:- JHALOD, Ta:- Jhalod, Dist:-Dahod	02979-224239	APMC
	86	APMC, At:- DAHOD, Dist:- Dahod	02673-240014	APMC
	87	Navjivan Science College, Zalod Road,Dahod	---	SCI
Vadodara	88	Assistance Director of agriculture Soil Testing Laboratory(Static) (Department of Agril), At:- Chhotaudepur, Ta:- Chhotaudepur Dist: Vadodara	--	DAG
	89	Assistance Director of agriculture Soil Testing Laboratory(mobile) (Department of Agril), At:- Chhotaudepur, Ta:- Chhotaudepur Dist: Vadodara	--	DAG
	90	APMC, At:- BODELI, Ta:- BODELI, Dist:- Vadodara	02665-220415	APMC
	91	APMC, At:- KARJAN, Ta:- BODELI, Dist:- Vadodara	02666-232042	APMC
	92	APMC, At:- PAVI JETPUR, Ta:-BODELI, Dist:-Vadodara	02664-242135	APMC

	93	APMC, At:- SAVALI, Ta:- BODELI, Dist:- Vadodara	---	APMC
	94	APMC, At:- VADODARA, Ta:- BODELI, Dist:- Vadodara	0265-2423831	APMC
	95	VADODARA Dist Sugar Co-Operative Sugarcane groars union ltd,At:- Gandhar, Ta:- Karajan,Dist:-Vadodara,	02666-221253, 221131,33	SUCO-OP
	96	C N P F Arts & D N Science College, Dabhoi	---	SCI
Anand	97	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Borasad, Ta:- Borasad, Dist: Anand, Bedival ,opp love-kush apartment, Tarapur chokadi	----	DAG
	98	APMC, At:- PETLAD, Ta:- Petlad, Dist:- Anand	02697-251962	APMC
	99	J B Rudelwala Science College Borsad Dist: Anand	---	SCI
	100	M B Patel Science college, Anand Dist: Anand	---	SCI
	101	P. P. Arts and B C J science College Khambhat Dist: Anand	---	SCI
Kheda	102	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Thasara, Ta:-Thasara Dist: Kheda,T.C.D. farm	02699, 222006	DAG
	103	APMC, At:- KATHALAL, Ta:- Kathalal, Dist:- Kheda(Nadiad)	---	APMC
	104	APMC At:- KAPADWANJ, Ta:- Kapadwanj, Dist:- Kheda(Nadiad)	02691-252204/531	APMC
	105	Bhavans College, Umreth Road,Dakor Dist: Kheda	---	SCI
Narmada	106	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Rajpipala Dist: Narmada, Vadiya palace compound,	02640, 220326	DAG
	107	APMC, At:- RAJPIPALA, Ta:- Rajpipala, Dist:- Narmada	02640-220057	APMC

	108	Narmada Sugar Co-Op At:- Dhari kheda, post:-Timbi, Via:- pratapnagar SOP Ta:- Nandod, Dist:-Narmada,	02640- 249711,12, 249762.	SUCO-OP
	109	M R Science College,Rajpipala Dist: Narmada	---	SCI
	110	APMC, At:- DEDIYAPADA, Ta:-Dediyapada, Dist:- Narmada	---	APMC
Bharuch	111	APMC, At:- AMOD, Ta:- Amod, Dist:-Bharuch	0268-2561760	APMC
	112	APMC, At:- VALIYA, Ta:- Valiya, Dist:-Bharuch	02643-270634	APMC
	113	APMC , At:-ZAGHADIA Ta:- Zaghadiya, Dist:-Bharuch	02645-220010	APMC
	114	APMC, At:- ANKLESHWARTa:- Annkleshwar, Dist:-Bharuch	02646-247117	APMC
	115	Khedut Sugar Co-operative. At:Pandvai Via Kosamba(RS) Ta:- Hansot, Di:-Bharuch	02629-231772,75	SUCO-OP
	116	Ganesh sugar Co-operative, At:- VatariaTa:-Valiya, Di:- Bharuch	02643-270611,270103	SUCO-OP
surat	117	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Bardoli Dist: Surat, T.C.D. farm,	02622, 220292	DAG
	118	APMC, At :- SURAT, Ta:- Surat,Dist:-Surat	9824119366	APMC
	119	Kamrej Sugar Co-operative, At:- Navi Pardi, Ta:-Kamrej, Di:-Surat	02621-034500,234600	SUCO-OP
	120	Sri Sayan Vibhag Sugar Co-operative, At:-Sayan Ta:- Olapad,Dist:- Surat	02621-242149,242178	SUCO-OP
	121	Madhi Sugar Co-operative, At:-Madhi, Ta:- Bardoli, DiSt:- Surat	02622-241048, 241013	SUCO-OP
	122	Chalthan Sugar Co-operative, At&Po:Chalthan, Ta:Palsana, Dist:-Surat	02622-281050,281112	SUCO-OP
	123	Khedut Sugar Co-operative. Po:Sardar Baug At:-Baben-Bardoli, Ta:-Bardoli, Dist:-surat	02622-220172-73,220706	SUCO-OP

	124	Mahuva Pradesh Sugar Co-operative, At:- Bamniya, Ta: Mahuva, Dist:- Surat	02625-256835, 256838	SUCO-OP
Tapi	125	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Vyarr Dist: Surat	02626, 221019	DAG
	126	Koper Sugar Co-operative, At:- Dadariya(virpor) Ta:-Valod, Di:-Tapi	02625-244135,244094	SUCO-OP
	127	Ukai pradesh Sugar Co-Operative, At:- Khulashpura. Ta:-vyara Dist:-Tapi	02626-220319,220219, 222412	SUCO-OP
Valsad	128	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:-Pardi Dist: Valsad ,Station road,Kotlav	----	DAG
	129	APMC, At:-VALSAD, Ta& Dist:-Valsad	---	APMC
	130	Valasad Sugar Co-operative, At:-Parnera-Pardi,po:-Valsad sugar factory, Natinal higway no-8 Dist:- Valsad	02632-226944-46	SUCO-OP
	131	APMC, At:- KAPRADA, Ta:- Kaprada, Dist:-Valsad	---	APMC
	132	B K M Science College, Tithal Road,VALSAD	---	SCI
Navsari	133	Assistance Director of agriculture Soil Testing Laboratory (Department of Agril), At:- Vasda Dist: Navasari	02630, 223200	DAG
	134	sahakari Sugar Co-operative, At:- Gandevi By: Bilimora, Dist:- Navasari	02634-262347, 262348	SUCO-OP
	135	Maroli vubhag Sugar Co-operative, At-Kolsana Kalyannagar, Ta: Jalalpor, Dist:-Navsari	02637-272057, 272047	SUCO-OP
	136	B.P.Bariya college Navasari	---	SCI
	137	V S patel Arts & Science College, Bilimora	---	SCI

* where at present soil analysis work for SHC program is going on

4.6.2.2 Soil Health Card and Subsidies for Soil Health Inputs under SAP:

1. Soil Health Card:

By the end of the 12 FYP state's target is to cover rest of the 46 Lakh farmers under SHC Program with all available nutrients in their soil. The approximate cost of soil sample collection, analysis and report generation would be Rs. 200/card.

Objectives

- All the 46.00 lacs farmers to be covered under SHC Program phase wise.

Table-4.6.7 Approximate Cost for Soil Health Card Program (Rs. in Lakh)

Year wise target of No. of Soil Health Cards to be prepared	Year wise Samples to be analysed			Total
	2017-18	2018-19	2019-20	
	-	23.00	23.00	46.00
cost	-	4600.00	4600.00	9200.00

Cost Norms: 200/ Sample

2. Subsidies for Soil Health Inputs under SAP:

Based on soil analysis data it is seen that all districts are low to medium in soil organic matter content, also many districts are low to medium in micronutrients and sulphur content. So the farmers of the districts shall be encouraged to use manures, micronutrients and sulphur fertilizers.

Also, 8 coastal districts have salinity problems and the coastal and inland salinity areas in the state is more than 58 lacs hectares need to be amended with gypsum to improve soil health.

Objectives

- Increase the use of inputs like manures, micronutrients, fertilizers and gypsum to improve and maintenance the soil health.

Table-4.6.8 Low and Medium Status of OC, Fe, Zn and Sulphur in Different Districts of Gujarat

OC (%)		Fe		Zn		Sulphur	
Low	Medium	Low	Medium	Low	Medium	Low	Medium
Jamnagar	Amreli	Gandhinagar	Ahmedabad	Porbandar	Juanagadh	Amreli	Bhavnagar
Surendranagar	Junagadh	Mehsana	Anand	Rajkot	Ahmedabad	Kheda	Jamnagar
Vadodara	Porbandar		Vadodara	Surendranagar	Kheda	Dahod	Juanagadh
Ahmedabad	Bhavnagar		Bharuch	Banaskantha	Dahod	Mehsana	Porbandar
Bharuch	Dang		Narmada		Panchmahal	Sabarkantha	Surendranagar
Narmada	Surat		Patan		Vadodara	Banaskantha	Anand
Valsad	Panchmahal		Kutchh		Bharuch		Ahmedabad
Sabarkantha	Dahod		Sabarkantha		Dang		Tapi
Gandhinagar	Anand		Banaskantha		Narmada		Valsad
Patan	Kheda				Surat		Bharuch
Kutchh	Tapi				Kutchh		Dang
Banaskantha	Mehsana				Mehsana		Narmada
	Rajkot				Sabarkantha		Surat
							Gandhinagar
							Patan
							Kutchh

(Source: AICRP on Micro nutrients, AAU, Anand)

Table-4.6.9 Rate of Application of Recommended Inputs for Soil Health

	Manures*	FeSO₄**	ZnSO₄**	Sulphur**	Gypsum**
Low	10t/ha	50 kg/ha	25 kg/ha	20 kg/ha	1 t/ha
Medium	5t/ha	15 kg/ha	8 kg/ha	20 kg/ha	1 t/ha

*Application every year ** Application once in three year

Table-4.6.10 Approximate Cost of Subsidies for Soil Amendments like Micro-nutrients, Manures and Gypsum for Soil Health

Sr. No.	No. of Districts of the state	Year			Total
		2017-18	2018-19	2019-20	
1.	25	-	625.00	625.00	1250.00
	Total	-	625.00	625.00	1250.00

*Rs. 10 lac/district/year

Overall budget required under SAP for soil health:

Table-4.6.11 Budgetary Requirements for Soil Health under SAP

Sr. No.	Particulars	Year			Total
		2017-18	2018-19	2019-20	
1.	Cost of soil health card	-	4600.00	4600.00	9200.00
2.	Subsidy for soil amendments *	-	625.00	625.00	1250.00
	Grand Total	-	5225.00	5225.00	10450.00

*Like micronutrients, manures and gypsum

4.6.3 Organic Farming:

4.6.3.1 Background

Gujarat is bestowed with lot of potential to produce all varieties of organic products due to its diverse agro-climatic regions. In several parts of the state, the inherited tradition of organic farming is an added advantage. This holds promise to fetch the premium price to the organic producers by tapping steadily growing domestic and international market of organic produce. Therefore, it is very essential to know the present status, potential and other relevant issues of organic farming under agro-climatic conditions of Gujarat. Considering these points, a plan is being prepared for development of organic farming in the state.

Vision:

Integrate compatible techniques of organic systems which can address current crises and assure sustainable agriculture

Mission:

To develop the state as a major hub in organic production for domestic and export market.

4.6.3.2 Strategy:

Strategy to develop organic farming in the state covering major component of organic farming is given as under:

1) Encourage farmers to adopt organic farming

1. Identify the potential/niche area and developed farmers who can adopt the organic farming in the first phase.
2. Extend the technical know-how and benefits of organic farming through training, farmers, meeting, *meals*, exhibition *etc.*
3. Encourage the formation of organic farmers' groups, clubs, SHG's and cooperatives especially women organic farmer groups for the purpose of cultivation, input production, seed/ seedlings/ planting materials production, certification, marketing *etc.*
4. Prepare handouts, video films, posters, folders, leaflets and other awareness materials on organic farming.
5. Encourage setting up of organic kitchen gardens, organic orchards in urban and rural households.

2) Ensure organic seed availability

1. Establish organic seed production pockets exclusively for organic farming.
2. Initiate programmes for the production of seeds, seedlings and planting materials
3. Create appropriate seed storage facilities/protection measures using traditional methods.

3) Strengthen organic farming research and education

1. Establishment of Organic Farming Research Centre (OFRC) in state agricultural universities of the state.
2. Establishment of model multi-disciplinary testing laboratories at each state agricultural university which can cater testing of soil, water, organic manure, food quality including microbiological, heavy metal, pesticide residues, biochemical and GMO testing.
3. The SAUs shall develop model demonstration farms of organic farming for students, farmers and peoples' representatives.
4. Impart practical training.
5. Diploma, certification and ITI courses on organic farming.

4) Ensure availability of quality organic inputs

1. Encourage, with adequate support, the availability of biomass in the organic farm itself, through programmes such as crop rotation, tree crops, cover crops, leguminous crops, green manure and green leaf manure and livestock.

2. Encourage the residue recycling and production of various types of compost and botanical pesticides in the farm itself.
 3. Encourage production and use of quality bio-fertilizers and bio-pesticides.
- 5) Establishment of storage facilities**
1. Establish separate storage facilities for organic farm produce to ensure its organic integrity and help farmers in certification processes.
- 6) Promote organic produce processing and value addition**
1. Encourage farm processing by farmers' groups, SHGs and Farmer Producer Companies for value addition.
 2. Encourage organic food-based industries in the state.
- 7) Marketing and certification of organic produce**
1. Encourage organic producer by fixing minimum support price for certified organic produce.
 2. Set up separate markets/facilities for certified organic produce through the existing channels of marketing of agriculture products at APMC, co-operative societies etc. and also facilitate the establishment of organic farm produce outlets in all the districts, with the help of Governmental and Non-governmental organizations.
 3. Encourage the farmers or organic producers for group certification through providing technical and financial support from Government during conversion period and introduce an insurance scheme for the organic producer.
- 8) Area and crop identification**
1. Default organic farming area
 2. Low input area
 3. Problematic soil area
 4. High input area
 5. Niche area
 6. The State is endowed with varied types of climatic conditions ranging from arid - semi-arid to mild humid. The rainfall and temperature vary considerably from region to region besides the soil and land topography including the vegetation. Considering the varied agro-climatic conditions, the state has been divided into 8 agro-climatic zones which provide the opportunity to cultivate a variety of crops. Detail of agro-climatic zone wise soil type, rainfall and possible crops for organic farming is as under.

Table -4.6.12 Suitable crops for organic farming

Agro climatic zone	Type of soil	Rainfall (mm)	Suitable crops for organic farming
South Gujarat (Heavy Rainfall Area)	Deep black with few patches of coastal alluvial, laterite and medium black	>1500	Sorghum, nagli, ragi, cashew nut, custard apple, vegetables, turmeric, ginger
South Gujarat	Deep black clayey	1000-1500	Sorghum, mango, custard apple, banana vegetables, pulses
Middle Gujarat	Deep black, medium black to loamy sand	800-1000	Sorghum, papaya, custard apple, vegetables, pulses, soybean, cotton, maize
North Gujarat	Sandy loam to sandy	625-875	Pearl millet, cotton, groundnut, mustard, pulses, vegetables, chillies, coriander, cumin, papaya, pomegranate
Bhal and Coastal Area	Medium black, poorly drained and saline	625-1000	Cotton, cumin, pulses, durum wheat

South Saurashtra	Shallow medium black calcareous	625-750	Cotton, groundnut, pulses, pearl millet, mango, custard apple, chillies, coriander, cumin, garlic, onion
North Saurashtra	Shallow medium black	400-700	Cotton, groundnut, sesame, pearl millet, pomegranate, papaya, chillies, garlic, coriander, cumin
North West Zone	Sandy and saline	250-500	Pearl millet, pomegranate, cumin, mustard, fennel, pulses

4.6.3.3 Recommended Interventions for the State with detail Action Plan with Cost:

Table-4.6.13 Additional area to be brought under organic farming in next three years

District	Year-wise area to be brought under organic farming (ha)			
	2017-18	2018-19	2019-20	Total
Ahmedabad	120	130	150	400
Amreli	100	100	100	300
Anand	25	40	60	125
Arvalli	100	100	100	300
Banaskantha	50	50	50	150
Bharuch	298	372	428	2157
Bhavnagar	50	50	100	200
Botad	50	50	50	150
Chhota Udepur	50	60	70	180
Dahod	50	60	70	180
Dang	25	25	25	125
Devbhumi Dwarka	50	50	100	200
Gandhinagar	10	10	10	30
Gir Somnath	50	50	100	200
Jamnagar	50	100	150	300
Junagadh	50	100	150	300
Kachchha	50	50	50	150
Kheda	50	70	90	210
Mahisagar	50	70	90	210
Mehsana	30	30	30	90
Morbi	50	50	100	200
Narmada	120	200	290	1550
Navsari	25	25	25	125
Panchmahal	100	150	150	400
Patan	50	50	50	150
Porbandar	50	50	50	150
Rajkot	50	100	150	300
Sabarkantha	30	30	30	90
Surat	445	500	545	1490
Surendranagar	100	100	150	350
Tapi	125	125	125	625
Vadodara	100	120	140	360

District	Year-wise area to be brought under organic farming (ha)			
	2017-18	2018-19	2019-20	Total
Valsad	405	405	405	2025
Total	2958	3472	4183	13772

Table-4.6.14 Group formation /Commodity interest groups formation for specific activities

District	Group Formation Projection Plan							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	5	1.00	5	1.00	5	1.00	15	3.00
Amreli	3	0.60	3	0.60	3	0.60	9	1.80
Anand	3	0.60	3	0.60	3	0.60	9	1.80
Arvalli	3	0.60	3	0.60	3	0.60	9	1.80
Banaskantha	2	0.40	2	0.40	2	0.40	6	1.20
Bharuch	2	0.40	2	0.40	2	0.40	10	2.00
Bhavnagar	2	0.40	2	0.40	2	0.40	6	1.20
Botad	1	0.20	1	0.20	1	0.20	3	0.60
Chhota Udepur	1	0.20	1	0.20	1	0.20	3	0.60
Dahod	1	0.20	1	0.20	1	0.20	3	0.60
Dang	5	1.00	5	1.00	5	1.00	25	5.00
Devbhumi Dwarka	2	0.40	2	0.40	3	0.60	7	1.40
Gandhinagar	1	0.20	1	0.20	1	0.20	3	0.60
Gir Somnath	2	0.40	3	0.60	3	0.60	8	1.60
Jamnagar	3	0.60	4	0.80	5	1.00	12	2.40
Junagadh	2	0.40	3	0.60	4	0.80	9	1.80
Kachchha	3	0.60	3	0.60	3	0.60	9	1.80
Kheda	2	0.40	2	0.40	2	0.40	6	1.20
Mahisagar	1	0.20	1	0.20	1	0.20	3	0.60
Mehsana	2	0.40	2	0.40	2	0.40	6	1.20
Morbi	2	0.40	2	0.40	3	0.60	7	1.40
Narmada	2	0.40	2	0.40	3	0.60	7	1.40
Navsari	2	0.40	2	0.40	2	0.40	10	2.00
Panchmahal	5	1.00	5	1.00	5	1.00	25	5.00
Patan	2	0.40	2	0.40	2	0.40	10	2.00
Porbandar	2	0.40	2	0.40	3	0.60	7	1.40
Rajkot	3	0.60	4	0.80	5	1.00	12	2.40
Sabarkantha	2	0.40	2	0.40	3	0.60	7	1.40
Surat	2	0.40	2	0.40	2	0.40	10	2.00
Surendranagar	3	0.60	4	0.80	4	0.80	11	2.20
Tapi	2	0.40	2	0.40	2	0.40	10	2.00

District	Group Formation Projection Plan							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Vadodara	7	1.40	7	1.40	7	1.40	21	4.20
Valsad	2	0.40	2	0.40	2	0.40	10	2.00
Total	82	16.40	87	17.40	95	19.00	264	52.80

(Phy- No., Fin – Rs in Lakh; Cost Norms: @ 0.2 Lakh per group)

Table-4.6.15 Training proposal for capacity building of farmers at district level on different technologies.

District	Year wise no. of farmers to be trained and expenditure to be incurred							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	1000	6.00	1000	6.00	1000	6.00	3000	18.00
Amreli	900	5.40	900	5.40	1050	6.30	2850	17.10
Anand	300	3.00	300	3.00	300	3.00	1500	9.00
Arvalli	900	5.40	900	5.40	1050	6.30	2850	17.10
Banaskantha	600	3.60	600	3.60	900	5.40	2100	12.60
Bharuch	1200	7.20	1200	7.20	1200	7.20	3600	21.60
Bhavnagar	600	3.60	600	3.60	900	5.40	2100	12.60
Botad	450	2.70	450	2.70	600	3.60	1500	9.00
Chhota Udepur	200	1.20	200	1.20	200	1.20	600	3.60
Dahod	200	1.20	200	1.20	200	1.20	600	3.60
Dang	200	1.20	200	1.20	200	1.20	600	3.60
Devbhumi Dwarka	300	1.80	450	2.70	600	3.60	1350	8.10
Gandhinagar	200	1.20	200	1.20	200	1.20	600	3.60
Gir Somnath	600	3.60	600	3.60	900	5.40	2100	12.60
Jamnagar	1200	7.20	1200	7.20	1200	7.20	3600	21.60
Junagadh	1200	7.20	1200	7.20	1200	7.20	3600	21.60
Katchchha	1200	7.20	1200	7.20	1200	7.20	3600	21.60
Kheda	300	1.80	300	1.80	300	1.80	900	5.40
Mahisagar	300	1.80	300	1.80	300	1.80	900	5.40
Mehsana	600	3.60	600	3.60	900	5.40	2100	12.60
Morbi	600	3.60	600	3.60	900	5.40	2100	12.60
Narmada	1500	9.00	1500	9.00	1500	9.00	4500	27.00
Navsari	200	1.20	200	1.20	200	1.20	600	3.60
Panchmahal	600	3.60	600	3.60	900	5.40	2100	12.60
Patan	900	5.40	900	5.40	1050	6.30	2850	17.10
Porbandar	600	3.60	600	3.60	900	5.40	2100	12.60
Rajkot	1200	7.20	1200	7.20	1200	7.20	3600	21.60

District	Year wise no. of farmers to be trained and expenditure to be incurred							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Sabarkantha	200	1.20	200	1.20	200	1.20	600	3.60
Surat	1000	6.00	1000	6.00	1000	6.00	3000	18.00
Surendranagar	1200	7.20	1200	7.20	1200	7.20	3600	21.60
Tapi	500	3.00	500	3.00	500	3.00	1500	9.00
Vadodara	800	4.80	800	4.80	800	4.80	2400	14.30
Valsad	200	1.20	200	1.20	200	1.20	600	3.60
Total	21950	132.90	22100	133.80	24950	150.90	69000	417.60

Rs. 600/Farmer/Training, Phy- No., Fin- Rs. in Lakh

Table 4.6.16 Training proposal for the capacity building of extension workers at district level on different technologies

District	Year wise no. of extension worker to be trained and							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	30	0.27	35	0.32	40	0.36	105	0.95
Amreli	25	0.23	30	0.27	35	0.32	90	0.82
Anand	20	0.18	25	0.23	30	0.27	75	0.68
Arvalli	20	0.18	25	0.23	30	0.27	75	0.68
Banaskantha	25	0.23	30	0.27	35	0.32	90	0.82
Bharuch	25	0.23	30	0.27	35	0.32	90	0.82
Bhavnagar	25	0.23	30	0.27	35	0.32	90	0.82
Botad	20	0.18	25	0.23	30	0.27	75	0.68
Chhota Udepur	20	0.18	25	0.23	30	0.27	75	0.68
Dahod	20	0.18	25	0.23	30	0.27	75	0.68
Dang	25	0.23	30	0.27	35	0.32	90	0.82
Devbhumi Dwarka	20	0.18	25	0.23	30	0.27	75	0.68
Gandhinagar	20	0.18	25	0.23	30	0.27	75	0.68
Gir Somnath	25	0.23	30	0.27	35	0.32	90	0.82
Jamnagar	25	0.23	30	0.27	35	0.32	90	0.82
Junagadh	30	0.27	35	0.32	40	0.36	105	0.95
Katchchha	25	0.23	30	0.27	35	0.32	90	0.82
Kheda	20	0.18	25	0.23	30	0.27	75	0.68
Mahisagar	25	0.23	30	0.27	35	0.32	90	0.82
Mehsana	25	0.23	30	0.27	35	0.32	90	0.82
Morbi	25	0.23	30	0.27	35	0.32	90	0.82
Narmada	30	0.27	35	0.32	40	0.36	105	0.95
Navsari	25	0.23	30	0.27	35	0.32	90	0.82
Panchmahal	20	0.18	25	0.23	30	0.27	75	0.68
Patan	20	0.18	25	0.23	30	0.27	75	0.68
Porbandar	25	0.23	30	0.27	35	0.32	90	0.82
Rajkot	30	0.27	35	0.32	40	0.36	105	0.95

District	Year wise no. of extension worker to be trained and							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Sabarkantha	30	0.27	35	0.32	40	0.36	105	0.95
Surat	30	0.27	35	0.32	40	0.36	105	0.95
Surendranagar	25	0.23	30	0.27	35	0.32	90	0.82
Tapi	30	0.27	35	0.32	40	0.36	105	0.95
Vadodara	25	0.23	30	0.27	35	0.32	90	0.82
Valsad	25	0.23	30	0.27	35	0.32	90	0.82
Total	810	7.37	975	8.86	1140	10.34	2925	26.57

Rs. 900/day/Extension worker, Phy- No., Fin- Rs. in Lakh

Table - 4.6.17 Proposal for demonstration of package, manure preparation, botanical pesticide preparation etc.

District	Year wise no. of demonstration to be conducting and							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	40	2.40	40	2.40	40	2.40	120	7.20
Amreli	50	3.00	50	3.00	50	3.00	150	9.00
Anand	20	1.20	20	1.20	20	1.20	60	3.60
Arvalli	50	3.00	50	3.00	50	3.00	150	9.00
Banaskantha	25	1.50	25	1.50	25	1.50	75	4.50
Bharuch	50	3.00	50	3.00	50	3.00	150	9.00
Bhavnagar	25	1.50	25	1.50	25	1.50	75	4.50
Botad	25	1.50	25	1.50	25	1.50	75	4.50
Chhota Udepur	10	0.60	10	0.60	10	0.60	30	2.40
Dahod	10	0.60	10	0.60	10	0.60	30	2.40
Dang	50	3.00	50	3.00	50	3.00	150	9.00
Devbhumi Dwarka	25	1.50	25	1.50	25	1.50	75	4.50
Gandhinagar	25	1.50	25	1.50	25	1.50	75	4.50
Gir Somnath	25	1.50	25	1.50	25	1.50	75	4.50
Jamnagar	50	3.00	50	3.00	50	3.00	150	9.00
Junagadh	50	3.00	50	3.00	50	3.00	150	9.00
Kachchha	50	3.00	50	3.00	50	3.00	150	9.00
Kheda	20	1.20	20	1.20	20	1.20	60	3.60
Mahisagar	20	1.20	20	1.20	20	1.20	60	3.60
Mehsana	25	1.50	25	1.50	25	1.50	75	4.50
Morbi	25	1.50	25	1.50	25	1.50	75	4.50
Narmada	50	3.00	50	3.00	50	3.00	150	9.00
Navsari	50	3.00	50	3.00	50	3.00	150	9.00
Panchmahal	50	3.00	50	3.00	50	3.00	150	9.00
Patan	25	1.50	25	1.50	25	1.50	75	4.50
Porbandar	25	1.50	25	1.50	25	1.50	75	4.50
Rajkot	50	3.00	50	3.00	50	3.00	150	9.00
Sabarkantha	25	1.50	25	1.50	25	1.50	75	4.50
Surat	50	3.00	50	3.00	50	3.00	150	9.00
Surendranagar	50	3.00	50	3.00	50	3.00	150	9.00

District	Year wise no. of demonstration to be conducting and							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Tapi	50	3.00	50	3.00	50	3.00	150	9.00
Vadodara	50	3.00	50	3.00	50	3.00	50	3.00
Valsad	50	3.00	50	3.00	50	3.00	150	9.00
Total	1195	71.70	1195	71.70	1195	71.70	3585	215.10

Rs. 6000/Demonstration, Phy- No., Fin- Rs. in Lakh

Table-4.6.18 Proposal for Organic Seed Production and Storage

District	Year-wise number of storage structures to be constructed							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	2	40.00	2	40.00	2	40.00	6	120.00
Amreli	2	40.00	2	40.00	2	40.00	6	120.00
Anand	1	20.00	1	20.00	1	20.00	3	60.00
Arvalli	2	40.00	2	40.00	2	40.00	6	120.00
Banaskantha	2	40.00	2	40.00	2	40.00	6	120.00
Bharuch	2	40.00	2	40.00	2	40.00	6	120.00
Bhavnagar	1	20.00	1	20.00	1	20.00	3	60.00
Botad	1	20.00	1	20.00	1	20.00	3	60.00
Chhota Udepur	1	20.00	1	20.00	1	20.00	3	60.00
Dahod	1	20.00	1	20.00	1	20.00	3	60.00
Dang	1	20.00	1	20.00	1	20.00	3	60.00
Devbhumi Dwarka	1	20.00	1	20.00	1	20.00	3	60.00
Gandhinagar	1	20.00	1	20.00	1	20.00	3	60.00
Gir Somnath	1	20.00	1	20.00	1	20.00	3	60.00
Jamnagar	2	40.00	2	40.00	2	40.00	6	120.00
Junagadh	2	40.00	2	40.00	2	40.00	6	120.00
Kachchha	2	40.00	2	40.00	2	40.00	6	120.00
Kheda	2	40.00	2	40.00	2	40.00	6	120.00
Mahisagar	1	20.00	1	20.00	1	20.00	3	60.00
Mehsana	2	40.00	2	40.00	2	40.00	6	120.00
Morbi	1	20.00	1	20.00	1	20.00	3	60.00
Narmada	2	40.00	2	40.00	2	40.00	6	120.00
Navsari	2	40.00	2	40.00	2	40.00	6	120.00
Panchmahal	2	40.00	2	40.00	2	40.00	6	120.00
Patan	2	40.00	2	40.00	2	40.00	6	120.00
Porbandar	1	20.00	1	20.00	1	20.00	3	60.00
Rajkot	2	40.00	2	40.00	2	40.00	6	120.00
Sabarkantha	2	40.00	2	40.00	2	40.00	6	120.00
Surat	2	40.00	2	40.00	2	40.00	6	120.00

District	Year-wise number of storage structures to be constructed							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Surendranagar	2	40.00	2	40.00	2	40.00	6	120.00
Tapi	2	40.00	2	40.00	2	40.00	6	120.00
Vadodara	2	40.00	2	40.00	2	40.00	6	120.00
Valsad	2	40.00	2	40.00	2	40.00	6	120.00
Total	54	1080.00	54	1080.00	54	1080.00	162	3240.00

Cost Norms: @ Rs. 20 lakh/Storage

Table-4.6.19 Proposal for Strengthening of Research on Organic and Testing Facilities

Component	Year wise fund required				
	District	2017-18	2018-19	2019-20	Total
Establishment of Organic Farming Research Centre	Banaskantha	500.00	500.00	1000.00	2000.00
	Mehsana	500.00	500.00	1000.00	2000.00
	Kheda	200.00	100.00	100.00	300.00
	Panchmahal	300.00	300.00	300.00	900.00
	Dahod	100.00	100.00	100.00	300.00
	Navsari	300.00	300.00	100.00	700.00
	Junagadh	500.00	500.00	1000.00	2000.00
	Rajkot	500.00	500.00	1000.00	2000.00
Establishment of Testing Laboratory	Mehsana	200.00	100.00	100.00	400.00
	Sabarkantha	25.00	20.00	20.00	65.00
	Ahmedabad	200.00	200.00	100.00	500.00
	Anand	100.00	100.00	100.00	300.00
	Vadodara	100.00	100.00	100.00	300.00
	Navsari	25.00	20.00	20.00	65.00
	Junagadh	200.00	300.00	100.00	600.00
	Rajkot	100.00	100.00	100.00	300.00
Research activities/farm development/demonstration	Mehsana	20.00	20.00	20.00	60.00
	Kutchchha	20.00	20.00	20.00	60.00
	Banaskantha	20.00	20.00	20.00	60.00
	Bharuch	20.00	20.00	20.00	60.00
	Navsari	20.00	20.00	20.00	60.00
	Dangs	20.00	20.00	20.00	60.00
	Tapi	20.00	20.00	20.00	60.00
	Junagadh	20.00	30.00	30.00	80.00
	Rajkot	20.00	30.00	30.00	80.00
	Jamnagar	20.00	30.00	30.00	80.00
Total		4050.00	3970.00	5470.00	13490.00

Table-4.6.20 Proposal for Vermi-compost Units Establishment

District	Year-wise number of vermicompost units to be constructed							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	15	7.50	15	7.50	15	7.50	30	22.50
Amreli	20	10.00	20	10.00	30	15.00	70	35.00
Anand	8	4.00	8.0	4.00	8	4.00	24	12.00
Arvalli	20	10.00	20	10.00	30	15.00	70	35.00
Banaskantha	20	10.00	20	10.00	30	15.00	70	35.00
Bharuch	12	6.00	12	6.00	12	6.00	36	18.00
Bhavnagar	10	5.00	10	5.00	20	10.00	40	20.00
Botad	10	5.00	10	5.00	20	10.00	40	20.00
Chhota Udepur	4	2.00	4	2.00	4	2.00	12	6.00
Dahod	4	2.00	4	2.00	4	2.00	12	6.00
Dang	12	6.00	12	6.00	12	6.00	36	18.00
Devbhumi Dwarka	10	5.00	10	5.00	20	10.00	40	20.00
Gandhinagar	10	5.00	10	5.00	20	10.00	40	20.00
Gir Somnath	10	5.00	10	5.00	20	10.00	40	20.00
Jamnagar	30	15.00	40	20.00	50	25.00	120	60.00
Junagadh	30	15.00	40	20.00	50	25.00	120	60.00
Kachchha	30	15.00	40	20.00	50	25.00	120	60.00
Kheda	4	2.00	4.0	2.00	4	2.00	12	6.00
Mahisagar	4	2.00	4.0	2.00	4	2.00	12	6.00
Mehsana	20	10.00	20	10.00	30	15.00	70	35.00
Morbi	15	7.50	15	7.50	20	10.00	50	25.00
Narmada	12	6.00	12	6.00	12	6.00	36	18.00
Navsari	12	6.00	12	6.00	12	6.00	36	18.00
Panchmahal	12	6.00	12	6.00	12	6.00	36	18.00
Patan	10	5.00	10	5.00	20	10.00	40	20.00
Porbandar	10	5.00	10	5.00	20	10.00	40	20.00
Rajkot	30	15.00	40	20.00	50	25.00	120	60.00
Sabarkantha	10	5.00	10	5.00	20	10.00	40	20.00
Surat	12	6.00	12	6.00	12	6.00	36	18.00
Surendranagar	30	15.00	40	20.00	50	25.00	120	60.00
Tapi	12	6.00	12	6.00	12	6.00	36	18.00
Vadodara	8	4.00	8	4.00	8	4.00	24	12.00
Valsad	12	6.00	12	6.00	12	6.00	36	18.00
Total	468	234.00	518	259.00	693	346.50	1679	839.50

Cost: Rs. 0.50 lakh/Unit

Table-4.6.21 Establishment of NADEP Compost Unit

District	Year-wise number of compost units to be constructed							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	30	3.60	40	4.80	50	6.00	120	14.40
Amreli	30	3.60	40	4.80	50	6.00	120	14.40
Anand	20	2.40	20	2.40	20	2.40	60	7.20
Arvalli	20	2.40	20	2.40	30	3.60	70	8.40
Banaskantha	20	2.40	20	2.40	30	3.60	70	8.40
Bharuch	30	3.60	35	4.20	40	4.80	105	12.60
Bhavnagar	20	2.40	20	2.40	30	3.60	70	8.40
Botad	20	2.40	20	2.40	30	3.60	70	8.40
Chhota Udepur	15	1.80	15	1.80	15	1.80	45	5.40
Dahod	15	1.80	15	1.80	15	1.80	45	5.40
Dang	30	3.60	35	4.20	40	4.80	105	12.60
Devbhumi Dwarka	20	2.40	20	2.40	30	3.60	70	8.40
Gandhinagar	20	2.40	20	2.40	30	3.60	70	8.40
Gir Somnath	20	2.40	20	2.40	30	3.60	70	8.40
Jamnagar	40	4.80	50	6.00	60	7.20	150	18.00
Junagadh	40	4.80	50	6.00	60	7.20	150	18.00
Kachchha	30	3.60	35	4.20	40	4.80	105	12.60
Kheda	15	1.80	15	1.80	15	1.80	45	5.40
Mahisagar	15	1.80	15	1.80	15	1.80	45	5.40
Mehsana	20	2.40	20	2.40	30	3.60	70	8.40
Morbi	30	3.60	40	4.80	50	6.00	120	14.40
Narmada	30	3.60	35	4.20	40	4.80	105	12.60
Navsari	30	3.60	35	4.20	40	4.80	105	12.60
Panchmahal	30	3.60	40	4.80	50	6.00	120	14.40
Patan	20	2.40	20	2.40	30	3.60	70	8.40
Porbandar	30	3.60	40	4.80	50	6.00	120	14.40
Rajkot	40	4.80	50	6.00	60	7.20	150	18.00
Sabarkantha	20	2.40	20	2.40	30	3.60	70	8.40
Surat	30	3.60	35	4.20	40	4.80	105	12.60
Surendranagar	40	4.80	50	6.00	60	7.20	150	18.00
Tapi	30	3.60	35	4.20	40	4.80	105	12.60
Vadodara	20	2.40	20	2.40	20	2.40	60	7.20
Valsad	30	3.60	35	4.20	40	4.80	105	12.60
Total	850	102.00	980	117.60	1210	145.20	3040	364.80

Cost Norms: @ Rs. 0.12 lakh/Unit

Table-4.6.22 Proposal for Infrastructure Development for Storage of Organic Produce

District	Year-wise number of storage structure be constructed							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	1	20.00	1	20.00	1	20.00	3	60.00
Amreli	1	20.00	1	20.00	1	20.00	3	60.00
Anand	1	20.00	1	20.00	1	20.00	3	60.00
Arvalli	1	20.00	1	20.00	1	20.00	3	60.00
Banaskantha	1	20.00	1	20.00	1	20.00	3	60.00
Bharuch	1	20.00	1	20.00	1	20.00	3	60.00
Bhavnagar	1	20.00	1	20.00	1	20.00	3	60.00
Botad	1	20.00	1	20.00	1	20.00	3	60.00
Chhota Udepur	1	20.00	1	20.00	1	20.00	3	60.00
Dahod	1	20.00	1	20.00	1	20.00	3	60.00
Dang	1	20.00	1	20.00	1	20.00	3	60.00
Devbhumi Dwarka	1	20.00	1	20.00	1	20.00	3	60.00
Gandhinagar	1	20.00	1	20.00	1	20.00	3	60.00
Gir Somnath	1	20.00	1	20.00	1	20.00	3	60.00
Jamnagar	1	20.00	1	20.00	2	40.00	4	80.00
Junagadh	1	20.00	1	20.00	2	40.00	4	80.00
Kachchha	1	20.00	1	20.00	2	40.00	4	80.00
Kheda	1	20.00	1	20.00	1	20.00	3	60.00
Mahisagar	1	20.00	1	20.00	1	20.00	3	60.00
Mehsana	1	20.00	1	20.00	1	20.00	3	60.00
Morbi	1	20.00	1	20.00	1	20.00	3	60.00
Narmada	1	20.00	1	20.00	1	20.00	3	60.00
Navsari	1	20.00	1	20.00	1	20.00	3	60.00
Panchmahal	1	20.00	1	20.00	2	40.00	4	80.00
Patan	1	20.00	1	20.00	1	20.00	3	60.00
Porbandar	1	20.00	1	20.00	1	20.00	3	60.00
Rajkot	1	20.00	1	20.00	2	40.00	4	80.00
Sabarkantha	1	20.00	1	20.00	1	20.00	3	60.00
Surat	1	20.00	1	20.00	2	40.00	4	80.00
Surendranagar	1	20.00	1	20.00	2	40.00	4	80.00
Tapi	1	20.00	1	20.00	2	40.00	4	80.00
Vadodara	1	20.00	1	20.00	1	20.00	3	60.00
Valsad	1	20.00	1	20.00	1	20.00	3	60.00
Total	33	660.00	33	660.00	41	820.00	107	2140.00

Cost Norms: @ Rs 20 lakh/unit

Table - 4.6.23 Proposal for Providing Processing Tools and Facilities

District	Year-wise number of storage structure be constructed							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	1	20.00	1	20.00	1	20.00	3	60.00
Amreli	1	20.00	1	20.00	1	20.00	3	60.00
Anand	1	20.00	1	20.00	1	20.00	3	60.00
Arvalli	1	20.00	1	20.00	1	20.00	3	60.00
Banaskantha	1	20.00	1	20.00	1	20.00	3	60.00
Bharuch	1	20.00	1	20.00	1	20.00	3	60.00
Bhavnagar	1	20.00	1	20.00	1	20.00	3	60.00
Botad	1	20.00	1	20.00	1	20.00	3	60.00
Chhota Udepur	1	20.00	1	20.00	1	20.00	3	60.00
Dahod	1	20.00	1	20.00	1	20.00	3	60.00
Dang	1	20.00	1	20.00	1	20.00	3	60.00
Devbhumi Dwarka	1	20.00	1	20.00	1	20.00	3	60.00
Gandhinagar	1	20.00	1	20.00	1	20.00	3	60.00
Gir Somnath	1	20.00	1	20.00	1	20.00	3	60.00
Jamnagar	1	20.00	1	20.00	2	40.00	4	80.00
Junagadh	1	20.00	1	20.00	2	40.00	4	80.00
Kachchha	1	20.00	1	20.00	2	40.00	4	80.00
Kheda	1	20.00	1	20.00	1	20.00	3	60.00
Mahisagar	1	20.00	1	20.00	1	20.00	3	60.00
Mehsana	1	20.00	1	20.00	1	20.00	3	60.00
Morbi	1	20.00	1	20.00	1	20.00	3	60.00
Narmada	1	20.00	1	20.00	1	20.00	3	60.00
Navsari	1	20.00	1	20.00	1	20.00	3	60.00
Panchmahal	1	20.00	1	20.00	2	40.00	4	80.00
Patan	1	20.00	1	20.00	1	20.00	3	60.00
Porbandar	1	20.00	1	20.00	1	20.00	3	60.00
Rajkot	1	20.00	1	20.00	2	40.00	4	80.00
Sabarkantha	1	20.00	1	20.00	1	20.00	3	60.00
Surat	1	20.00	1	20.00	2	40.00	4	80.00
Surendranagar	1	20.00	1	20.00	2	40.00	4	80.00
Tapi	1	20.00	1	20.00	2	40.00	4	80.00
Vadodara	1	20.00	1	20.00	1	20.00	3	60.00
Valsad	1	20.00	1	20.00	1	20.00	3	60.00
Total	33	660.00	33	660.00	41	820.00	107	2140.00

Cost: Rs. 5 lakh/Unit

Table-4.6.24 Proposal for Marketing, Supply Chain, Certification etc under Organic Farming (Rs. in Lakh)

District	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Ahmedabad	5	25.00	5	25.00	5	25.00	15	75.00
Amreli	2	10.00	3	15.00	4	20.00	9	45.00
Anand	1	5.00	1	5.00	1	5.00	3	15.00
Bhavnagar	2	10.00	3	15.00	4	20.00	9	45.00
Dahod	2	10.00	2	10.00	2	10.00	6	30.00
Jamnagar	3	15.00	5	25.00	5	25.00	13	65.00
Junagadh	5	25.00	5	25.00	5	25.00	15	75.00
Kheda	2	10.00	2	10.00	2	10.00	6	30.00
Navsari	1	5.00	1	5.00	1	5.00	3	15.00
Panchmahal	2	10.00	3	15.00	4	20.00	9	45.00
Rajkot	5	25.00	7	35.00	8	40.00	20	100.00
Sabarkantha	2	10.00	3	15.00	4	20.00	9	45.00
Surat	5	25.00	5	25.00	5	25.00	15	75.00
Surendranagar	5	25.00	5	25.00	5	25.00	15	75.00
Vadodara	3	15.00	3	15.00	3	15.00	9	45.00
Valsad	2	10.00	2	10.00	3	15.00	7	35.00
Total	47	235.00	55	275.00	61	305.00	163	815.00

Table-4.6.25 Component-wise Financial Requirements (Rs. in Lakh)

Sr. No.	Component	2017-18	2018-19	2019-20	Total
1	Group formation for organic	16.40	17.40	19.00	52.80
2	Training proposal for capacity	132.90	133.80	150.90	417.60
3	Training proposal for capacity	7.37	8.86	10.34	26.57
4	Demonstration of organic	71.70	71.70	71.70	215.10
5	Organic seed production and	1080.00	1080.00	1080.00	3240.00
6	Strengthening of research on	4050.00	3970.00	5470.00	13490.00
7	Vermicompost unit	234.00	259.00	346.50	839.50
8	NADEP compost unit	102.00	117.60	145.20	364.80
9	Storage of organic produce	660.00	660.00	820.00	2140.00
10	Processing tools for organic	215.00	265.00	365.00	845.00
11	Marketing of organic produce	235.00	275.00	305.00	815.00
	Total	6804.37	6858.36	8783.64	22446.40

4.6.4 FARM MECHANIZATION:

4.6.4.1 Background:

Farm mechanization has been helpful in improving the productivity of different crops, time-saving, reducing drudgery, timely farm operations, resource conservation and protection from natural calamities. The timely sowing of wheat due to seed cum fertilizer drills has improved the productivity of wheat, which is a remarkable achievement in wheat production. Placement of fertilizers under drill sowing results in higher nutrient use and irrigation efficiency under bed planting and laser leveling. Use of crop harvesting machines ensures early completion of harvesting and threshing works which avoids the untimely rainfall and storms hazards, particularly in wheat. Seed grader, laser leveler, bed planter machine etc. need large scale adoption.

At present, there are limited tractor and farm implements in the state. There is need to create more awareness among farmers for proper use of farm machinery for higher efficiency, saving human and energy resources etc. To encourage farmers on quality seed production and ensured availability near to them special projects are being submitted under this plan. Other extension activities like training are also proposed to educate farmers for their capacity building in producing quality seeds.

For effective management of other crucial inputs like fertilizer and agrochemicals for increased yields and productivity while maintaining natural resource's health, Programs for educating farmers, planning for soil testing, IPM and 1NM demonstrations and farmers field schools are proposed in the plan.

Vision:

Mechanization of all agricultural activities and reducing human drudgery in agriculture

Mission:

Ensuring the agricultural mechanization of state to achieve the goals and objectives relating to agricultural productivity, reduce production cost, quality of produce and the welfare of agricultural workers.

4.6.4.2 Issues:

- ❖ Precision and speed in operation.
- ❖ Conservation of inputs - seeds, fertilizer, water and energy.
- ❖ Minimum damage to crop and quality in produce.

4.6.4.3 Requirement of Farm Mechanization in the State:

Table-4.6.26 Proposed Tractors for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	242	1454	242	1484	242	1513	727	4451
2	Amreli	83	206	83	210	83	214	248	630
3	Anand	88	525	88	535	88	546	264	1607
4	Banaskantha	263	1548	263	1580	263	1611	788	4739
5	Bharuch	64	384	64	392	64	399	191	1175
6	Bhavnagar	148	740	148	755	148	771	445	2266
7	Dahod	104	626	104	638	104	651	312	1916
8	Dang	27	162	27	165	27	168	82	494
9	Gandhinagar	64	380	64	388	64	395	191	1163
10	Junagadh	169	841	202	1010	242	1212	613	3063
11	Rajkot	96	576	96	576	96	576	288	1727
12	Jamnagar	94	566	94	577	94	589	282	1731
13	Morbi	78	465	78	474	78	484	233	1422
14	Kachchh	215	1293	215	1319	215	1345	645	3957
15	Kheda	94	566	94	577	94	589	282	1731
16	Mehsana	121	727	121	741	121	756	364	2225
17	Narmada	37	222	37	226	37	231	112	680
18	Navsari	43	263	43	268	43	274	130	804
19	Panchmahal	101	606	101	618	101	630	303	1854
20	Porbandar	10	51	10	52	10	53	30	155
21	Patan	121	727	121	741	121	756	364	2225
22	Sabarkantha	181	1083	181	1104	181	1126	542	3313
23	Surat	78	465	78	474	78	484	233	1422
24	Surendranagar	33	169	33	172	33	175	100	515
25	Tapi	2	12	0	0	0	0	2	12
26	Vadodara	134	808	134	824	134	840	403	2472

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
27	Valsad	42	255	42	260	42	265	127	779
28	Chhota Udaipur	33	169	33	172	33	175	100	515
29	Mahisagar	37	222	37	226	37	231	112	680
30	Aravalli	30	157	31	162	33	175	95	493
31	Botad	43	263	43	268	43	274	130	804
32	Devbhoomi Dhwarka	27	162	27	165	27	168	82	494
33	Gir Somnath	35	214	37	226	37	231	110	672
	Total	2940	16903	2974	17376	3017	17906	8931	52186

Table-4.6.27 Proposed Mini Tractors for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	121	303	121	309	121	315	364	927
2	Amreli	189	596	189	596	189	596	567	1788
3	Anand	40	111	40	113	40	115	121	339
4	Banaskantha	131	328	131	335	131	341	394	1005
5	Bharuch	31	79	31	81	31	82	94	241
6	Bhavnagar	185	556	185	567	185	578	554	1700
7	Dahod	53	131	53	134	53	136	158	402
8	Dang	13	33	13	34	13	35	39	103
9	Gandhinagar	42	84	42	86	42	88	127	258
10	Jamnagar	8	17	8	17	8	17	24	52
11	Junagadh	169	505	202	606	242	727	613	1838
12	Kachchh	108	270	108	275	108	280	324	824
13	Kheda	48	121	48	123	48	126	145	371
14	Mehsana	64	160	64	164	64	167	191	490

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
15	Narmada	17	42	17	43	17	43	52	129
16	Navsari	21	54	21	55	21	56	64	164
17	Panchmahal	51	126	51	129	51	131	152	387
18	Porbandar	10	30	10	31	10	31	30	93
19	Patan	57	141	57	144	57	147	170	433
20	Rajkot	32	74	32	75	32	77	97	225
21	Morbi	10	30	10	31	10	31	30	93
22	Saberkantha	94	234	94	238	94	243	282	716
23	Surat	38	97	38	99	38	101	115	297
24	Surendranagar	16	47	16	48	16	49	48	145
25	Tapi	1	3	0	0	0	0	1	3
26	Vadodara	68	169	68	172	68	175	203	515
27	Valsad	21	54	21	55	21	56	64	164
28	Chhota Udaipur	64	160	64	164	64	167	191	490
29	Mahisagar	53	131	53	134	53	136	158	402
30	Aravalli	53	131	53	134	53	136	158	402
31	Botad	68	169	68	172	68	175	203	515
32	Devbhoomi Dhwarka	42	84	42	86	42	88	127	258
33	Gir Somnath	57	141	57	144	57	147	170	433
	Total	1975	5212	2007	5395	2047	5594	6029	16201

Table-4.6.28 Proposed Power Weeder for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	121	73	121	74	121	76	364	223
2	Amreli	571	342	571	349	571	356	1712	1048

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
3	Anand	51	30	51	31	51	32	152	93
4	Banaskantha	131	79	131	80	131	82	394	241
5	Bharuch	32	19	32	20	32	20	97	59
6	Bhavnagar	111	39	111	40	111	40	333	119
7	Dahod	53	32	53	32	53	33	158	96
8	Dang	14	8	14	9	14	9	42	26
9	Gandhinagar	61	36	61	37	61	38	182	111
10	Jamnagar	101	35	101	36	101	37	303	108
11	Junagadh	20	7	24	8	29	10	74	26
12	Kachchh	111	67	111	68	111	69	333	204
13	Kheda	53	32	53	32	53	33	158	96
14	Mehsana	65	39	65	40	65	40	194	119
15	Narmada	18	11	18	11	18	11	55	33
16	Navsari	21	13	21	13	21	13	64	39
17	Panchmahal	52	31	52	32	52	32	155	95
18	Porbandar	30	11	30	11	30	11	91	32
19	Patan	57	34	57	35	57	35	170	104
20	Rajkot	96	34	96	34	96	35	288	103
21	Morbi	57	34	57	35	57	35	170	104
22	Saberkantha	101	61	101	62	101	63	303	185
23	Surat	40	24	40	25	40	25	121	74
24	Surendranagar	202	72	202	73	202	75	606	219
25	Tapi	2	1	0	0	0	0	2	1
26	Vadodara	81	48	81	49	81	50	242	148
27	Valsad	21	13	21	13	21	13	64	39
28	Chhota Udaipur	40	24	40	25	40	25	121	74
29	Mahisagar	96	34	96	34	96	35	288	103
30	Aravalli	53	32	53	32	53	33	158	96

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
31	Botad	65	39	65	40	65	40	194	119
32	Devbhoomi Dhwarka	53	32	53	32	53	33	158	96
33	Gir Somnath	40	24	40	25	40	25	121	74
	Total	2618	1408	2620	1436	2625	1466	7863	4310

Table-4.6.29 Proposed Rotavator for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	118	76	118	77	118	79	355	231
2	Amreli	81	41	81	42	81	43	242	127
3	Anand	40	25	40	25	40	26	121	77
4	Banaskantha	263	164	263	168	263	171	788	502
5	Bharuch	31	20	31	20	31	20	94	61
6	Bhavnagar	148	77	148	79	148	80	445	235
7	Dahod	27	17	27	17	27	17	82	52
8	Dang	13	8	13	8	13	9	39	25
9	Gandhinagar	64	39	64	40	64	41	191	121
10	Jamnagar	8	3	8	3	8	3	24	9
11	Junagadh	485	242	582	291	698	349	1764	883
12	Kachchh	215	134	215	137	215	140	645	412
13	Kheda	48	30	48	31	48	31	145	93
14	Mehsana	84	53	84	54	84	55	251	161
15	Narmada	17	11	17	11	17	11	52	33
16	Navsari	21	13	21	14	21	14	64	41
17	Panchmahal	51	31	51	32	51	32	152	96
18	Porbandar	10	5	10	5	10	5	30	15
19	Patan	121	76	121	77	121	79	364	231

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
20	Rajkot	56	43	56	44	56	45	167	133
21	Morbi	8	3	8	3	8	3	24	9
22	Sabarkantha	94	59	94	60	94	61	282	179
23	Surat	38	24	38	24	38	25	115	74
24	Surendranagar	30	19	30	19	30	19	91	58
25	Vadodara	68	42	68	42	68	43	203	128
26	Valsad	21	13	21	14	21	14	64	41
27	Tapi	19	11	20	12	21	14	61	37
28	Chhota Udaipur	17	10	18	11	18	11	54	32
29	Mahisagar	38	24	38	24	38	25	115	74
30	Aravalli	51	31	51	32	51	32	152	96
31	Botad	48	30	48	31	48	31	145	93
32	Devbhoomi Dhawarka	20	13	21	14	21	14	63	41
33	Gir Somnath	28	21	28	21	28	21	85	64
	Total	2384	1412	2484	1486	2601	1568	7468	4465

Table-4.6.30 Proposed Diesel Engine with Pump for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	364	115	364	118	364	121	1091	354
2	Amreli	76	281	76	287	76	293	227	861
3	Anand	131	42	131	42	131	43	394	128
4	Banaskantha	404	129	404	131	404	134	1212	393
5	Bharuch	96	31	96	31	96	32	288	94
6	Bhavnagar	111	24	111	24	111	25	333	72
7	Dahod	152	48	152	49	152	50	455	148
8	Dang	39	12	39	12	39	13	118	38

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
9	Gandhinagar	101	32	101	33	101	33	303	98
10	Jamnagar	101	22	101	22	101	23	303	66
11	Junagadh	364	93	436	111	524	134	1324	338
12	Kachchh	323	103	323	105	323	107	970	315
13	Kheda	146	46	146	47	146	48	439	142
14	Mehsana	182	58	182	59	182	60	545	176
15	Narmada	53	16	53	18	53	18	158	52
16	Navsari	64	21	64	21	64	21	191	62
17	Panchmahal	154	48	154	49	154	50	461	148
18	Porbandar	152	40	152	41	152	42	455	124
19	Patan	162	52	162	53	162	54	485	158
20	Rajkot	111	24	111	24	111	25	333	72
21	Saberkantha	263	83	263	85	263	87	788	255
22	Surat	111	35	111	36	111	37	333	108
23	Surendranagar	202	43	202	43	202	44	606	131
24	Tapi	4	2	4	2	6	3	14	7
25	Vadodara	212	68	212	69	212	70	636	207
26	Valsad	65	21	65	21	65	22	194	63
27	Morbi	53	16	53	18	53	18	158	52
28	Chhota Udaipur	64	21	64	21	64	21	191	62
29	Mahisagar	40	13	41	13	42	15	124	42
30	Aravalli	56	19	58	20	60	21	173	59
31	Botad	67	22	69	23	69	23	204	67
32	Devbhoomi Dhawarka	91	21	91	21	93	23	275	64
33	Gir Somnath	182	67	182	67	187	69	550	203
	Total	4691	1668	4769	1715	4869	1776	14330	5158

Table-4.6.31 Proposed Threshers for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	61	152	61	155	61	158	182	464
2	Amreli	313	626	313	638	313	651	939	1916
3	Anand	23	59	23	61	23	62	70	181
4	Banaskantha	61	152	61	155	61	158	182	464
5	Bharuch	17	42	17	43	17	43	52	129
6	Bhavnagar	6	11	6	11	6	11	18	33
7	Dahod	27	68	27	69	27	70	82	206
8	Dang	7	17	7	17	7	17	21	52
9	Gandhinagar	2	4	2	4	2	4	6	12
10	Jamnagar	4	8	5	7	6	11	15	26
11	Junagadh	7	17	8	20	12	22	27	60
12	Kachchh	54	134	54	137	54	140	161	412
13	Kheda	24	61	24	62	24	63	73	185
14	Mehsana	33	84	33	86	33	88	100	258
15	Narmada	10	25	10	26	10	26	30	78
16	Navsari	11	27	11	27	11	28	33	83
17	Panchmahal	20	51	20	52	20	53	61	155
18	Porbandar	40	81	45	86	51	101	136	268
19	Patan	28	71	28	72	28	74	85	216
20	Raikot	13	27	14	28	14	28	41	84
21	Saberkantha	47	118	47	120	47	122	142	361
22	Surat	20	51	20	52	20	53	61	155
23	Surendranagar	17	33	17	33	17	33	52	100
24	Tapi	1	2	0	0	0	0	1	2
25	Vadodara	33	84	33	86	33	88	100	258
26	Valsad	11	27	11	27	11	28	33	83
27	Morbi	13	27	14	28	14	28	41	84
28	Chhota Udaipur	35	86	35	86	36	88	107	260
29	Mahisagar	33	84	33	86	33	88	100	258
30	Aravalli	47	118	47	120	47	122	142	361
31	Botad	6	11	6	11	6	11	18	33
32	Devbhoomi Dhwarka	4	8	5	7	6	11	15	26
33	Gir Somnath	7	17	8	20	12	22	27	60
	Total	1039	2383	1049	2432	1066	2503	3154	7317

Table-4.6.32 Proposed Laser Leveler for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	30	10	30	10	31	30	92
2	Amreli	160	513	164	515	167	517	490	1545
3	Anand	11	33	11	33	11	34	33	101
4	Banaskantha	20	63	20	65	20	66	61	193
5	Bharuch	8	23	8	24	8	24	24	72
6	Bhavnagar	6	11	6	12	6	12	18	35
7	Dahod	13	39	13	40	13	41	39	121
8	Dang	3	9	3	10	3	10	9	29
9	Gandhinagar	1	3	1	3	1	3	3	9
10	Jamnagar	3	5	3	5	3	5	9	15
11	Junagadh	18	36	22	43	26	53	67	132
12	Kachchh	9	27	9	27	9	28	27	83
13	Kheda	12	36	12	37	12	37	36	111
14	Mehsana	15	47	15	48	15	49	45	145
15	Narmada	4	12	4	13	4	13	12	38
16	Navsari	5	16	5	16	5	16	15	48
17	Panchmahal	4	12	4	13	4	13	12	38
18	Porbandar	30	63	30	65	30	66	91	193
19	Patan	13	41	13	41	13	42	39	125
20	Rajkot	3	5	3	5	3	5	9	15
21	Sabarkantha	22	68	22	69	22	71	67	207
22	Surat	10	30	10	30	10	31	30	92
23	Surendranagar	13	41	13	42	13	43	39	127
24	Tapi	1	3	1	3	1	3	3	9
25	Vadodara	15	47	15	48	15	49	45	145
26	Valsad	5	16	5	16	5	16	15	48
27	Morbi	3	5	3	5	3	5	9	15

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
28	Chhota Udaipur	15	47	15	48	15	49	45	145
29	Mahisagar	5	16	5	16	5	16	15	48
30	Aravalli	4	12	4	13	4	13	12	38
31	Botad	6	11	6	12	6	12	18	35
32	Devbhoomi Dhwarka	3	5	3	5	3	5	9	15
33	Gir Somnath	18	36	22	43	26	53	67	132
	Total	471	1367	483	1401	494	1435	1447	4203

Table-4.6.33 Proposed Cotton Shredder for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	740	383	740	393	740	401	2221	1177
2	Amreli	214	66	214	68	214	70	642	204
3	Anand	20	10	20	11	20	11	61	32
4	Banaskantha	94	49	94	51	94	52	282	151
5	Bharuch	336	174	336	179	336	182	1009	534
6	Bhavnagar	11	15	11	15	11	15	33	45
7	Gandhinagar	202	105	202	107	202	109	606	321
8	Jamnagar	7	2	7	2	7	2	21	6
9	Junagadh	10	10	12	12	14	14	36	36
10	Kachchh	1078	558	1078	572	1078	583	3233	1712
11	Kheda	155	80	155	83	155	85	464	248
12	Mehsana	330	171	330	175	330	179	991	524
13	Narmada	153	79	153	81	153	83	458	243
14	Panchmahal	58	29	58	30	58	31	173	91
15	Porbandar	10	10	10	11	10	11	30	32
16	Patan	462	239	462	244	462	249	1385	733

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
17	Rajkot	23	24	23	25	23	25	70	75
18	Sabarkantha	942	488	942	500	942	510	2827	1498
19	Surendranagar	17	17	17	18	17	18	52	53
20	Vadodara	1346	697	1346	714	1346	729	4039	2141
21	Chhota Udaipur	153	79	153	81	153	83	458	243
22	Mahisagar	462	239	462	244	462	249	1385	733
23	Aravalli	94	49	94	51	94	52	282	151
24	Botad	11	15	11	15	11	15	33	45
	Total	6928	3591	6930	3681	6932	3758	20789	11031

Table-4.6.34 Proposed Plant Protection Equipments for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4040	836	4040	857	4040	875	12120	2568
2	Amreli	239	49	239	49	239	51	718	149
3	Anand	1482	307	1482	314	1482	321	4445	942
4	Banaskantha	4376	907	4376	929	4376	947	13129	2783
5	Bharuch	606	126	606	128	606	131	1818	385
6	Bhavnagar	76	15	81	17	83	18	239	50
7	Dahod	1414	292	1414	300	1414	306	4242	898
8	Dang	357	185	357	189	357	193	1070	567
9	Gandhinagar	1010	209	1010	214	1010	218	3030	641
10	Jamnagar	66	14	71	16	76	17	212	47
11	Junagadh	242	35	263	40	303	45	808	121
12	Kachchh	3502	725	3502	743	3502	758	10505	2225
13	Kheda	159	33	159	33	159	34	476	101
14	Mehsana	2154	446	2154	458	2154	467	6463	1370

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
15	Narmada	472	97	472	100	472	102	1415	299
16	Navsari	552	115	552	117	552	119	1657	351
17	Panchmahal	1346	278	1346	286	1346	292	4039	856
18	Porbandar	202	42	202	42	202	43	606	128
19	Patan	1818	377	1818	386	1818	394	5454	1157
20	Rajkot	303	62	303	64	303	65	909	191
21	Sabarkantha	2962	613	2962	629	2962	641	8887	1884
22	Surat	1037	215	1037	220	1037	224	3112	659
23	Surendranagar	169	34	169	35	169	36	506	106
24	Tapi	7	2	8	2	9	3	24	7
25	Vadodara	1010	209	1010	214	1020	216	3040	639
26	Valsad	566	118	566	120	566	122	1697	360
27	Morbi	152	31	157	32	162	35	470	99
28	Chhota Udaipur	909	191	914	197	914	197	2737	585
29	Mahisagar	169	34	169	35	169	36	506	106
30	Aravalli	86	32	88	34	91	36	265	103
31	Botad	76	15	81	17	83	18	239	50
32	Devbhoomi Dhawarka	66	14	71	16	76	17	212	47
33	Gir Somnath	242	35	263	40	303	45	808	121
	Total	31866	6694	31939	6878	32053	7026	95858	20598

Table-4.6.35 Proposed Tractor and Bullock Drawn Seed cum Fertilizer Drill / Planter for Gujarat State Lakh)

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	189	76	189	77	189	79	567	231
2	Amreli	80	43	82	44	84	45	245	133
3	Anand	71	28	71	29	71	29	212	87
4	Banaskantha	209	84	209	85	209	87	627	256
5	Bharuch	51	20	51	20	51	21	152	62
6	Bhavnagar	78	31	78	31	78	32	233	95
7	Dahod	84	33	84	34	84	35	251	103
8	Dang	21	9	21	9	21	9	64	27
9	Gandhinagar	51	20	51	20	51	21	152	62
10	Jamnagar	68	27	68	27	68	28	203	83
11	Junagadh	134	54	134	55	134	57	403	165
12	Kachchh	173	69	173	71	173	72	518	211
13	Kheda	74	29	74	30	74	31	221	91
14	Mehsana	101	40	101	41	101	42	303	124
15	Narmada	27	11	27	11	27	11	82	33
16	Navsari	33	13	33	14	33	14	100	41
17	Panchmahal	81	32	81	33	81	33	242	99
18	Porbandar	202	81	202	83	202	84	606	247
19	Patan	90	35	90	36	90	37	270	109
20	Rajkot	493	197	493	201	493	205	1479	603
21	Sabarkantha	141	57	141	58	141	59	424	173
22	Surat	62	25	62	25	62	26	185	77
23	Surendranagar	343	137	343	140	343	143	1030	421
24	Tapi	2	1	0	0	0	0	2	1
25	Vadodara	54	21	54	22	54	22	161	66
26	Valsad	34	13	34	14	34	14	103	41
27	Morbi	27	11	27	11	27	11	82	33

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
28	Chhota Udaipur	54	21	54	22	54	22	161	66
29	Mahisagar	76	28	78	30	79	31	232	90
30	Aravalli	81	32	81	33	81	33	242	99
31	Botad	78	31	78	31	78	32	233	95
32	Devbhoomi Dhwarka	68	27	68	27	68	28	203	83
33	Gir Somnath	66	26	66	26	66	26	197	79
	Total	3393	1367	3395	1395	3398	1424	10185	4185

Table-4.6.36 Proposed Combined Harvester for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	10	249	10	255	10	260	30	764
2	Amreli	8	197	8	201	8	205	24	603
3	Anand	4	105	4	107	4	109	12	321
4	Banaskantha	4	105	4	107	4	109	12	321
5	Bharuch	3	66	3	67	3	69	9	201
6	Dahod	5	118	5	120	5	123	15	362
7	Dang	1	26	1	27	1	27	3	81
8	Gandhinagar	2	53	2	54	2	55	6	161
9	Junagadh	4	89	4	101	5	114	13	304
10	Kachchh	9	236	9	241	9	246	27	724
11	Kheda	4	105	4	107	4	109	12	321
12	Mehsana	5	131	5	134	5	136	15	402
13	Narmada	2	39	2	40	2	41	6	121
14	Navsari	2	53	2	54	2	55	6	161
15	Panchmahal	4	105	4	107	4	109	12	321
16	Porbandar	8	197	8	201	8	205	24	603
17	Patan	5	131	5	134	5	136	15	402

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
18	Sabarkantha	3	66	3	67	3	69	9	201
19	Surat	4	92	4	94	4	96	12	282
20	Tapi	1	25	0	0	0	0	1	25
21	Vadodara	6	144	6	147	6	150	18	442
22	Valsad	2	53	2	54	2	55	6	161
23	Morbi	2	52	2	52	2	52	6	155
24	Rajkot	5	126	5	127	5	128	15	382
25	Jamnagar	3	66	3	67	3	69	9	201
26	Bhavnagar	3	66	3	67	3	69	9	201
27	Surendranagar	3	66	3	67	3	69	9	201
28	Chhota Udaipur	1	25	0	0	0	0	1	25
29	Mahisagar	1	25	0	0	0	0	1	25
30	Aravalli	1	25	0	0	0	0	1	25
31	Botad	1	25	0	0	0	0	1	25
32	Devbhoomi Dhwarka	1	25	0	0	0	0	1	25
33	Gir Somnath	1	25	0	0	0	0	1	25
	Total	118	2912	112	2798	113	2864	343	8574

Table-4.6.37 Proposed Cultivator and Different Plough for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	118	18	118	19	118	19	355	57
2	Amreli	189	39	189	40	189	41	567	121
3	Anand	88	14	88	14	88	14	264	42
4	Banaskantha	263	41	263	41	263	42	788	125
5	Bharuch	64	10	64	10	64	10	191	30
6	Bhavnagar	333	70	333	71	333	72	1000	212
7	Dahod	104	16	104	16	104	17	312	49

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
8	Dang	27	4	27	4	27	4	82	12
9	Gandhinagar	31	5	31	5	31	5	94	15
10	Jamnagar	189	39	189	40	189	41	567	121
11	Junagadh	207	40	224	45	246	49	678	135
12	Kachchh	108	17	108	17	108	17	324	52
13	Kheda	94	15	94	15	94	15	282	45
14	Mehsana	121	19	121	19	121	19	364	58
15	Narmada	37	6	37	6	37	6	112	18
16	Navsari	43	7	43	7	43	7	130	21
17	Panchmahal	101	16	101	16	101	16	303	48
18	Porbandar	202	42	202	42	202	43	606	128
19	Patan	56	9	56	9	56	9	167	27
20	Rajkot	189	39	189	40	189	41	567	121
21	Sabarkantha	181	1126	181	1149	181	1172	542	3447
22	Surat	78	12	78	12	78	12	233	36
23	Surendranagar	202	42	202	42	202	43	606	128
24	Tapi	0	0	0	0	0	0	0	0
25	Vadodara	134	21	134	21	134	22	403	65
26	Valsad	42	7	42	7	42	7	127	21
27	Morbi	189	39	189	40	189	41	567	121
28	Chhota Udaipur	134	21	134	21	134	22	403	65
29	Mahisagar	101	16	101	16	101	16	303	48
30	Aravalli	101	16	101	16	101	16	303	48
31	Botad	104	16	104	16	104	17	312	49
32	Devbhoomi Dhwarka	108	17	108	17	108	17	324	52
33	Gir Somnath	207	40	224	45	246	49	678	135
	Total	4146	1845	4180	1885	4225	1927	12551	5657

Table-4.6.38 Proposed Power Tiller for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Amreli	190	114	190	116	190	119	570	349
2	Bhavnagar	111	278	111	284	111	289	333	850
3	Jamnagar	8	13	8	13	8	13	24	39
4	Junagadh	84	210	93	231	102	256	279	697
5	Porbandar	10	25	10	26	10	26	30	78
6	Rajkot	23	35	23	36	23	36	70	108
7	Surendranagar	33	76	33	78	33	79	100	232
8	Morbi	23	35	23	36	23	36	70	108
9	Chhota Udaipur	40	91	42	96	44	99	127	286
10	Mahisagar	42	96	44	99	46	101	133	296
11	Aravalli	42	96	44	99	46	101	133	296
12	Botad	40	91	42	96	44	99	127	286
13	Devbhoomi Dhwarka	8	13	8	13	8	13	24	39
14	Gir Somnath	23	35	23	36	23	36	70	108
	Total	680	1209	697	1260	714	1304	2091	3773

Table-4.6.39 Proposed Castor Decorticator for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	141	57	141	58	141	59	424	173
2	Anand	8	32	8	33	8	33	24	99
3	Banaskantha	424	170	424	173	424	177	1273	519
4	Kachchh	202	81	202	83	202	84	606	247
5	Kheda	54	21	54	21	54	22	161	65
6	Mehsana	305	122	305	124	305	127	915	374
7	Panchmahal	61	24	61	24	61	25	182	74

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
8	Patan	247	99	247	101	247	103	742	303
9	Sabarkantha	374	149	374	153	374	156	1121	458
10	Vadodara	131	53	131	54	131	55	394	161
11	Chhota Udaipur	136	56	141	61	152	63	429	179
12	Mahisagar	141	57	141	58	141	59	424	173
13	Aravalli	61	24	61	24	61	25	182	74
	Total	2286	944	2291	966	2301	987	6877	2897

Table-4.6.40 Proposed Groundnut Decorticator for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Amreli	116	59	116	59	116	59	348	176
2	Banaskantha	141	61	141	62	141	63	424	185
3	Bhavnagar	40	21	40	21	40	22	121	65
4	Dahod	5	2	5	2	5	2	15	6
5	Dang	23	10	23	10	23	10	70	30
6	Gandhinagar	15	6	15	6	15	6	45	18
7	Jamnagar	116	59	116	59	116	59	348	176
8	Junagadh	273	113	273	116	273	118	818	347
9	Kachchh	273	113	273	116	273	118	818	347
10	Porbandar	40	21	40	21	40	22	121	65
11	Rajkot	40	21	40	21	40	22	121	65
12	Sabarkantha	319	133	319	135	319	138	957	407
13	Surendranagar	56	28	56	28	56	28	167	85
14	Gir Somnath	202	81	212	83	217	86	631	249
	Total	1660	728	1671	739	1676	753	5007	2221

Table-4.6.41 Proposed Maize Sheller for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dahod	606	242	606	247	606	253	1818	742
2	Dang	17	7	17	7	17	7	52	21
3	Narmada	27	11	27	11	27	11	82	33
4	Panchmahal	505	202	505	206	505	210	1515	618
5	Vadodara	253	101	253	103	253	105	758	309
6	Chhota Udaipur	303	121	313	123	323	126	939	371
7	Mahisagar	202	81	202	81	202	81	606	242
8	Aravalli	505	202	505	206	505	210	1515	618
	Total	2418	968	2428	985	2438	1003	7284	2955

Table-4.6.42 Proposed Paddy Transplanter for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	336	270	336	275	336	280	1009	824
2	Anand	276	221	276	225	276	230	827	677
3	Bharuch	34	27	34	28	34	28	103	84
4	Dahod	36	18	36	18	36	19	109	56
5	Dang	53	41	53	42	53	43	158	127
6	Kheda	303	242	303	247	303	253	909	742
7	Narmada	40	32	40	33	40	33	121	99
8	Navsari	209	167	209	171	209	174	627	511
9	Panchmahal	195	98	195	100	195	102	585	300
10	Surat	155	124	155	126	155	129	464	380
11	Tapi	1	1	0	0	0	0	1	1
12	Vadodara	47	37	47	38	47	39	142	115
13	Chhota Udaipur	34	27	34	28	34	28	103	84
14	Valsad	235	189	235	192	235	196	706	577
	Total	1955	1496	1954	1525	1954	1555	5864	4576

Table-4.6.43 Proposed Sugarcane Transplanter for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bharuch	52	42	52	43	52	44	155	130
2	Narmada	10	8	10	8	10	9	30	25
3	Navsari	35	29	35	30	35	31	106	91
4	Surat	160	133	160	135	160	138	479	407
5	Valsad	33	28	33	28	33	29	100	86
	Total	290	241	290	245	290	253	870	739

Table-4.6.44 Proposal Farm Machinery Equipment/Implements – Reaper for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Bharuch	8	4	8	4	8	4	24	12
2	Dang	9	4	9	4	9	4	27	12
3	Gandhinagar	76	38	76	38	76	39	227	116
4	Narmada	10	5	10	5	10	5	30	15
5	Navsari	5	4	5	4	5	4	15	12
6	Surat	10	5	10	5	10	5	30	15
7	Vadodara	20	10	20	10	20	10	61	30
8	Banaskantha	91	45	101	51	126	63	318	159
9	Sabarkantha	96	47	111	56	121	61	328	164
10	Mehasana	76	38	76	38	76	39	227	116
	Total	401	202	426	215	462	234	1289	651

Table-4.6.45 Proposal Farm Machinery Equipment / Implements – Potato Planter for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Banaskantha	121	87	121	89	121	91	364	267
2	Sabarkantha	63	46	63	46	63	47	189	139
	Total	184	133	184	136	184	138	553	407

Table-4.6.46 Proposal Farm Machinery Equipment / Implements – Potato Digger for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Banaskantha	121	81	121	83	121	85	364	248
2	Sabarkantha	64	43	64	43	64	44	191	130
	Total	185	124	185	126	185	129	554	378

Table-4.6.47 Proposal Farm Machinery Equipment / Implements – Groundnut Digger for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Amreli	116	59	116	59	116	59	348	176
2	Banaskantha	141	61	141	62	141	63	424	185
3	Bhavnagar	40	21	40	21	40	22	121	65
4	Dahod	5	2	5	2	5	2	15	6
5	Dang	23	10	23	10	23	10	70	30
6	Gandhinagar	15	6	15	6	15	6	45	18
7	Jamnagar	116	59	116	59	116	59	348	176
8	Junagadh	273	113	273	116	273	118	818	347
9	Kachchh	273	113	273	116	273	118	818	347
10	Porbandar	40	21	40	21	40	22	121	65

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Rajkot	40	21	40	21	40	22	121	65
12	Sabarkantha	319	133	319	135	319	138	957	407
13	Surendranagar	56	28	56	28	56	28	167	85
14	Mahisagar	40	21	40	21	40	22	121	65
15	Gir Somanath	177	71	177	71	177	71	530	212
16	Chota Udaipur	23	10	23	10	23	10	70	30
	Total	1699	749	1699	759	1699	771	5096	2279

Table-4.6.48 Proposed Zero Till Drill for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	336	200	336	204	336	208	1009	612
2	Anand	276	164	276	167	276	171	827	503
3	Bharuch	34	20	34	21	34	21	103	62
4	Dahod	36	14	36	14	36	14	109	41
5	Dang	53	31	53	32	53	32	158	95
6	Kheda	303	180	303	184	303	188	909	551
7	Narmada	40	24	40	25	40	25	121	74
8	Navsari	209	124	209	127	209	129	627	380
9	Panchmahal	195	73	195	74	195	76	585	223
10	Surat	155	92	155	94	155	96	464	282
11	Tapi	1	1	0	0	0	0	1	1
12	Vadodara	47	28	47	29	47	29	142	86
13	Chhota Udaipur	36	14	36	14	36	14	109	41
14	Valsad	235	140	235	143	235	146	706	428
	Total	1957	1104	1956	1125	1956	1148	5870	3377

Table-4.6.49 Proposed Raised Bed Planter for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirement (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	336	227	336	231	336	235	1009	694
2	Anand	276	186	276	190	276	194	827	570
3	Bharuch	34	23	34	24	34	24	103	71
4	Dahod	36	15	36	15	36	16	109	47
5	Dang	53	35	53	36	53	37	158	107
6	Kheda	303	204	303	208	303	213	909	625
7	Narmada	40	27	40	28	40	28	121	83
8	Navsari	209	140	209	144	209	146	627	430
9	Panchmahal	195	82	195	84	195	86	585	252
10	Surat	155	105	155	106	155	109	464	320
11	Tapi	1	1	0	0	0	0	1	1
12	Vadodara	47	31	47	32	47	33	142	97
13	Chhota Udaipur	36	15	36	15	36	16	109	47
14	Valsad	235	159	235	162	235	165	706	485
	Total	1957	1251	1956	1275	1956	1301	5870	3828

Table-4.6.50 Proposed Roto/ Strip Till Drill for Gujarat State

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	118	135	118	137	118	140	355	412
2	Amreli	81	74	81	76	81	77	242	227
3	Anand	40	45	40	45	40	47	121	137
4	Banaskantha	263	292	263	299	263	304	788	895
5	Bharuch	31	36	31	36	31	36	94	108
6	Bhavnagar	148	137	148	140	148	142	445	419
7	Dahod	27	31	27	31	27	31	82	92
8	Dang	13	14	13	14	13	16	39	45
9	Gandhinagar	64	70	64	72	64	74	191	216
10	Jamnagar	8	5	8	5	8	5	24	16
11	Junagadh	485	432	582	518	698	623	1764	1573
12	Kachchh	215	239	215	245	215	250	645	734
13	Kheda	48	54	48	56	48	56	145	166
14	Mehsana	84	94	84	95	84	97	251	286
15	Narmada	17	20	17	20	17	20	52	59
16	Navsari	21	23	21	25	21	25	64	74
17	Panchmahal	51	56	51	58	51	58	152	171
18	Porbandar	10	9	10	9	10	9	30	27
19	Patan	121	135	121	137	121	140	364	412
20	Rajkot	56	77	56	79	56	81	167	238
21	Morbi	8	5	8	5	8	5	24	16
22	Sabarkantha	94	104	94	106	94	108	282	319
23	Surat	38	43	38	43	38	45	115	131
24	Surendranagar	30	34	30	34	30	34	91	103

Sr. No.	Name of Equipment	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Vadodara	68	76	68	76	68	77	203	229
26	Valsad	21	23	21	25	21	25	64	74
27	Tapi	19	20	20	22	21	25	61	67
28	Chhota Udaipur	17	18	18	20	18	20	54	58
29	Mahisagar	38	43	38	43	38	45	115	131
30	Aravalli	51	56	51	58	51	58	152	171
31	Botad	48	54	48	56	48	56	145	166
32	Devbhoomi Dhwarka	20	23	21	25	21	25	63	74
33	Gir Somnath	28	38	28	38	28	38	85	113
	Total	2384	2516	2484	2648	2601	2794	7468	7958

Table-4.6.51 Proposal Farm Machinery Equipment / Implements– other Equipments (Miscellaneous/Small Tools) for Gujarat State

Sr. No.	Name of District	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	242	51	242	52	242	53	727	155
2	Amreli	81	41	81	42	81	43	242	127
3	Anand	88	18	88	18	88	19	264	56
4	Banaskantha	101	21	101	21	101	22	303	65
5	Bharuch	64	13	64	13	64	14	191	40
6	Dahod	101	21	101	21	101	22	303	65
7	Dang	27	6	27	6	27	6	82	18
8	Gandhinagar	61	12	61	13	61	13	182	38
9	Junagadh	121	24	145	29	175	35	441	89
10	Rajkot	61	12	61	13	61	13	182	38

Sr. No.	Name of District	Year-wise Financial Requirements (Phy- unit in Nos., Fin Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Morbi	43	9	43	9	43	9	130	27
12	Jamnagar	88	18	88	18	88	19	264	56
13	Bhavnagar	101	21	101	21	101	22	303	65
14	Surendranagar	68	14	68	14	68	14	203	42
15	Kachchh	215	44	215	45	215	46	645	136
16	Kheda	98	20	98	21	98	21	294	63
17	Mehsana	121	25	121	25	121	26	364	77
18	Narmada	35	7	35	7	35	8	106	22
19	Navsari	43	9	43	9	43	9	130	27
20	Panchmahal	104	22	104	22	104	22	312	67
21	Porbandar	101	21	101	21	101	22	303	65
22	Patan	124	22	124	23	124	23	373	69
23	Sabarkantha	68	14	68	14	68	14	203	42
24	Surat	78	16	78	16	78	17	233	49
25	Tapi	0	0	0	0	0	0	0	0
26	Vadodara	134	28	134	28	134	29	403	86
27	Valsad	43	9	43	9	43	9	130	27
28	Chhota Udaipur	134	28	134	28	134	29	403	86
29	Mahisagar	78	16	78	16	78	17	233	49
30	Aravalli	104	22	104	22	104	22	312	67
31	Botad	88	18	88	18	88	19	264	56
32	Devbhoomi Dhwarka	124	22	124	23	124	23	373	69
33	Gir Somnath	88	18	88	18	88	19	264	56
	Total	3028	647	3052	661	3082	685	9162	1993

4.6.4.4 Constraint Analysis:

Table-4.6.52 Bridging the Gaps for Realizing the Vision - Agriculture Sector

Thrust Areas/ Issues	Program	Activities	Concerned Agencies/ collaborators	Approach
Farm Mecha- nization	Improved hand/power tools and small implements/equipment	Study on drudgery reduction. Training and Frontline demonstration for large-scale adoption. Introduce/ expedite the system of subsidy	DRDA/ NGOs/ co-operatives/ TSP/ KVK/ FTC/ ATMA	Farm outreach program through integration all schemes.
	Hand rotary weeder, Power tiller Shredder Farm tractors, Mechanical harvesters, Oil engines, pumps, submersible pumps, Laser land leveler, potato planter, potato digger, paddy transplanter, zero till drill, roto/strip till drill, raised bed planter bullock cart etc	Study on drudgery reduction. Training and Frontline demonstration for large-scale adoption. Introduce/ expedite the system of subsidy. Promoting the concept of custom hiring.	DRDA/ TSP/ Gujarat Agro.	Farm outreach program through integration of all schemes.

4.6.5 SOIL AND WATER MANAGEMENT:

4.6.5.1 Background:

Soil and water are vital natural resources for human survival. Growing world population and increasing standard of living are placing tremendous pressure on these resources. Because the soil and water resources are finite, their optimal management without adverse environmental consequences is necessary, if human survival is to be assured and development is to be sustained. There is growing realization throughout the world that no longer can we afford to misuse these resources. Furthermore, these resources have to be managed using an integrated approach. In Gujarat, the problem of soil and water resource degradation has been in existence in the past, however, the pace of degradation has greatly increased in recent times due to the burgeoning population and the enhanced means of exploitation of natural resources. The soil degradation problems like erosion by wind and water, lower productivity, increase in salinity and alkalinity are caused by human activities, such as deforestation, over-grazing of animals and unscientific use of agricultural land. Coastal lands of Gujarat face inundation from tidal water and possess shallow water table enriched with salt. The water problems like drought, flood, deteriorating quality of groundwater in coastal and plain areas, seawater ingress, poor quality of water, low irrigation efficiencies, low water productivity are some of the concerns that result in low productivity in agriculture. Necessary promising soil and water conservation interventions are necessary for improving productivity and reducing land degradation

Vision:

- Climate Smart Soil and Water management interventions for an inclusive growth of the agriculture in the state
- Conserve and sustain the natural resources

Mission:

- To meet the water demand for irrigated agriculture, industry, drinking etc.
- Adoption of innovative, simple eco-friendly and reliable soil and water management interventions to sustain crop productivity
- To increase the water productivity and water use efficiency in the arena of climate change.

4.6.5.2 Researchable Issues:

- Uncertain, unpredictable and erratic rainfall for water availability to irrigated and rainfed agriculture.
- Raising agricultural productivity per unit of land and water
- Gap of 15% between irrigation potential created and actually utilized
- Improving irrigation efficiency and water productivity by 20%
- Deteriorating quality of soil and water in the coastal agro-ecosystem and by addition of industrial and domestic effluents in the rivers
- Degraded, undulating, salt affected and unproductive land.
- Poor quality water in coastal areas
- Conserving runoff water during high-intensity storms
- Managing consecutive rainfall events
- Sea coast of 1600 km in the state
- North Gujarat will be affected in coverage of irrigation due to less availability of irrigation water

4.6.5.3 Priorities:

- Yield stability and narrowing gap in yield level between different districts and rainfed and irrigated areas.
- Micro-irrigation/ water harvesting structure in water deficient area and effective drainage structure in flood-prone/ low lying area
- Crop residue management for improvement of soil organic carbon content/ soil health
- Use of Photovoltaic MIS, wind energy irrigation systems etc.
- Developing awareness among farmers on Soil and Water conservation measures and efficiency of MIS.
- Developing WUA for efficient water management in canal command areas
- Implementing MIS in canal command areas and developing a mechanism for operation of MIS through WUA
- Extending water shed management programs to further areas for mitigating the water scarcity and for use in supplemental irrigation
- Increasing awareness of using organic or chemical mulching along with MIS to prevent evaporation losses during irrigations
- To encourage for using FYM for improving soil structure and infiltrability of the soil
- Reducing the farm water losses during irrigation and increasing irrigation efficiency at farm and field level

4.6.5.4 District-wise Physical and Financial Plan for Soil and Water Management:

The problems of soil and water conservations for different regions are quite different. Soil and water conservation measures are predominantly applied to meet the following purposes:

- to control runoff and thus prevent loss of soil by soil erosion, to reduce soil compaction;
- to maintain or to improve soil fertility;
- to conserve or drain water;
- to harvest (excess) water.

A variety of soil and water conservation measures are well known. These technologies can be differentiated either by their main purpose or by type. As many among them fulfill several functions simultaneously these are classified here by type

- Physical Measures (also termed mechanical or technical measures);
- Biological Measures (also termed vegetative measures);
- Agronomic Measures (sometimes called best management practices)

This classification and related information assist in utilizing the research and field experience of one place to other places of identical soil, climatic and topographic conditions. Merely technical approaches are often not successful, especially without the participation of the local farmers, forest managers, etc. It has also been recognized that under modern circumstances traditional measures alone may often be insufficient to conserve the vital soil and water resources and have to be supplemented by modern practices to achieve a sustainable resource management. The Soil and Water Conservation plan constituents for (A) Natural Resource Management includes watershed development, Soil and Water Engineering water conservation activities, check dams, reclamation of problematic soils, watershed development, etc. (B) Minor/ Micro Irrigation includes the wells, dug wells, tube wells, percolation and minor irrigation tanks, farm ponds, drip and sprinkler irrigation systems (MIS), piped water conveyance etc.

A) NATURAL RESOURCE MANAGEMENT

The activities include the followings:

1. Water Resources Development: Water Harvesting Structures (WHS) etc.
2. Groundwater recharge structures, open well, bore well recharge, etc.
3. Desilting/deepening of reservoirs/lower downstream natural depression
4. Watershed Development
5. Land reclamation, Amelioration of water logged and saline soils.

1) Water Resources Development: Water Harvesting Structures (WHS) etc.

For the Water Resources Development, the Water Harvesting Structures (WHS) of the storage capacity of 4000 cum are considered at the cost of Rs. 2 lakh per structure to harvest the excess runoff water.

Table-4.6.53 District-wise Water Resources Development (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
1	Ahmedabad	32	64	32	64	32	64	96	192
2	Amreli	25	50	25	50	25	50	75	150
3	Anand	13	26	13	26	13	26	39	78
4	Aravalli	16	32	16	32	16	32	48	96
5	Banaskantha	66	132	66	132	66	132	198	396
6	Bharuch	21	42	21	42	21	42	63	126
7	Bhavnagar	22	44	22	44	22	44	66	132
8	Botad	9	18	9	18	9	18	27	54
9	Chhota Udaipur	7	14	7	14	7	14	21	42
10	Dahod	16	32	16	32	16	32	48	96
11	Dang	24	48	24	48	24	48	72	144
12	Devbhoomi Dwarka	14	28	14	28	14	28	42	84
13	Gandhinagar	9	18	9	18	9	18	27	54
14	Gir Somnath	19	38	19	38	19	38	57	114
15	Jamnagar	49	98	49	98	49	98	147	294
16	Junagadh	25	50	25	50	25	50	75	150
17	Kheda	20	40	20	40	20	40	60	120
18	Kutch	102	204	102	204	102	204	306	612
19	Mahisagar	10	20	10	20	10	20	30	60
20	Mehsana	18	36	18	36	18	36	54	108
21	Morbi	22	44	22	44	22	44	66	132
22	Narmada	16	32	16	32	16	32	48	96
23	Navsari	27	54	27	54	27	54	81	162
24	Panchmahal	26	52	26	52	26	52	78	156
25	Patan	19	38	19	38	19	38	57	114
26	Porbandar	11	22	11	22	11	22	33	66
27	Rajkot	41	82	41	82	41	82	123	246

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
28	Sabarkantha	18	36	18	36	18	36	54	108
29	Surat	59	118	59	118	59	118	177	354
30	Surendranagar	33	66	33	66	33	66	99	198
31	Tapi	22	44	22	44	22	44	66	132
32	Vadodara	38	76	38	76	38	76	114	228
33	Valsad	36	72	36	72	36	72	108	216
		885	1770	885	1770	885	1770	2655	5310

2. Groundwater recharge structures, open well, bore well recharge, etc.

The groundwater recharge structures, open well/ bore well recharge structures, etc proposed to recharge the open well or bore well using recharge structures @ Rs.0.50 lacs per structure.

Table 4.6.54 Groundwater recharge structures, open well, bore well recharge, etc. (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
1	Ahmedabad	29	15	29	15	29	15	87	44
2	Amreli	139	70	139	70	139	70	417	209
3	Anand	13	7	13	7	13	7	39	20
4	Aravalli	18	9	18	9	18	9	54	27
5	Banaskantha	129	65	129	65	129	65	387	194
6	Bharuch	15	8	15	8	15	8	45	23
7	Bhavnagar	154	77	154	77	154	77	462	231
8	Botad	44	22	44	22	44	22	132	66
9	Chhota Udaipur	6	3	6	3	6	3	18	9
10	Dahod	57	29	57	29	57	29	171	86
11	Dang	3	2	3	2	3	2	9	5
12	Devbhoomi Dwarka	43	22	43	22	43	22	129	65

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
13	Gandhinagar	15	8	15	8	15	8	45	23
14	Gir Somnath	75	38	75	38	75	38	225	113
15	Jamnagar	96	48	96	48	96	48	288	144
16	Junagadh	162	81	162	81	162	81	486	243
17	Kheda	41	21	41	21	41	21	123	62
18	Kutch	56	28	56	28	56	28	168	84
19	Mahisagar	20	10	20	10	20	10	60	30
20	Mehsana	31	16	31	16	31	16	93	47
21	Morbi	48	24	48	24	48	24	144	72
22	Narmada	6	3	6	3	6	3	18	9
23	Navsari	31	16	31	16	31	16	93	47
24	Panchmahal	75	38	75	38	75	38	225	113
25	Patan	11	6	11	6	11	6	33	17
26	Porbandar	40	20	40	20	40	20	120	60
27	Rajkot	113	57	113	57	113	57	339	170
28	Sabarkantha	79	40	79	40	79	40	237	119
29	Surat	56	28	56	28	56	28	168	84
30	Surendranagar	81	41	81	41	81	41	243	122
31	Tapi	9	5	9	5	9	5	27	14
32	Vadodara	27	14	27	14	27	14	81	41
33	Valsad	17	9	17	9	17	9	51	26
		1739	870	1739	870	1739	870	5217	2609

3. De-silting/deepening of reservoirs/lower downstream natural depression

The de-silting/deepening of reservoirs/lower downstream natural depression are proposed @ Rs. 273 per cum of earthwork excavation and 1000 cum volume excavation from each structure.

Table 4.6.55 De-silting/deepening of reservoirs/lower downstream natural depression (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
1	Ahmedabad	12	33	12	33	12	33	36	98
2	Amreli	16	44	16	44	16	44	48	131
3	Anand	9	25	9	25	9	25	27	74
4	Aravalli	9	25	9	25	9	25	27	74
5	Banaskantha	23	63	23	63	23	63	69	188
6	Bharuch	14	38	14	38	14	38	42	115
7	Bhavnagar	17	47	17	47	17	47	51	140
8	Botad	5	14	5	14	5	14	15	41
9	Chhota Udaipur	9	25	9	25	9	25	27	74
10	Dahod	15	41	15	41	15	41	45	123
11	Dang	2	6	2	6	2	6	6	17
12	Devbhoomi Dwarka	7	19	7	19	7	19	21	58
13	Gandhinagar	8	22	8	22	8	22	24	66
14	Gir Somnath	9	25	9	25	9	25	27	74
15	Jamnagar	11	30	11	30	11	30	33	90
16	Junagadh	13	36	13	36	13	36	39	107
17	Kheda	14	38	14	38	14	38	42	115
18	Kutch	17	47	17	47	17	47	51	140
19	Mahisagar	9	25	9	25	9	25	27	74
20	Mehsana	16	44	16	44	16	44	48	131
21	Morbi	9	25	9	25	9	25	27	74
22	Narmada	6	16	6	16	6	16	18	49
23	Navsari	10	27	10	27	10	27	30	82
24	Panchmahal	13	36	13	36	13	36	39	107
25	Patan	13	36	13	36	13	36	39	107
26	Porbandar	4	11	4	11	4	11	12	33

27	Rajkot	16	44	16	44	16	44	48	131
28	Sabarkantha	12	33	12	33	12	33	36	98
29	Surat	15	41	15	41	15	41	45	123
30	Surendranagar	14	38	14	38	14	38	42	115
31	Tapi	8	22	8	22	8	22	24	66
32	Vadodara	14	38	14	38	14	38	42	115
33	Valsad	10	27	10	27	10	27	30	82
		379	1036.1	379	1036.1	379	1036.1	1137	3108

4. Watershed Development

Watershed development has been one of the major strategies to overcome the productivity bottlenecks. Watershed development has seen a great success. The sector needs a new boost of investment which will bring back the required vibrancy in the development. Watershed department has to dovetail the technological advances of the agricultural department into its strategy and that will go a long way in getting the required results. The watershed development work proposed @ Rs. 12000 per hectare area for different districts of Gujarat state.

Table-4.6.56 District-wise Watershed Development (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		ha.	Rs. In lakh	ha.	Rs. In lakh	ha.	Rs. In lakh	ha.	Rs. In lakh
1	Ahmedabad	761	91	761	91	761	91	2284	274
2	Amreli	1122	135	1122	135	1122	135	3366	404
3	Anand	716	86	716	86	716	86	2148	258
4	Aravalli	460	55	460	55	460	55	1381	166
5	Banaskantha	1326	159	1326	159	1326	159	3978	477
6	Bharuch	781	94	781	94	781	94	2343	281
7	Bhavnagar	679	81	679	81	679	81	2036	244
8	Botad	648	78	648	78	648	78	1944	233
9	Chhota Udaipur	948	114	948	114	948	114	2843	341
10	Dahod	703	84	703	84	703	84	2108	253

11	Dang	995	119	995	119	995	119	2986	358
12	Devbhoomi Dwarka	568	68	568	68	568	68	1704	204
13	Gandhinagar	354	42	354	42	354	42	1061	127
14	Gir Somnath	444	53	444	53	444	53	1333	160
15	Jamnagar	808	97	808	97	808	97	2424	291
16	Junagadh	2317	278	2317	278	2317	278	6952	834
17	Kheda	462	55	462	55	462	55	1385	166
18	Kutch	830	100	830	100	830	100	2489	299
19	Mahisagar	880	106	880	106	880	106	2639	317
20	Mehsana	547	66	547	66	547	66	1642	197
21	Morbi	798	96	798	96	798	96	2393	287
22	Narmada	755	91	755	91	755	91	2264	272
23	Navsari	382	46	382	46	382	46	1147	138
24	Panchmahal	1232	148	1232	148	1232	148	3696	443
25	Patan	759	91	759	91	759	91	2278	273
26	Porbandar	686	82	686	82	686	82	2058	247
27	Rajkot	699	84	699	84	699	84	2098	252
28	Sabarkantha	716	86	716	86	716	86	2149	258
29	Surat	1155	139	1155	139	1155	139	3466	416
30	Surendranagar	665	80	665	80	665	80	1995	239
31	Tapi	816	98	816	98	816	98	2447	294
32	Vadodara	97	12	97	12	97	12	290	35
33	Valsad	792	95	792	95	792	95	2376	285
		25901	3108	25901	3108	25901	3108	77703	9324

5. Land development: Land Reclamation, Bunding Soil Conservation, Amelioration of Water Logged and Saline Soils, Land: Lavelling:

Land development including the saline soil reclamation, reclamation of waterlogged land for different districts affected by salinity or waterlogging. Reclamation of degraded lands @Rs.1 lakh/ha were considered for the districts of Gujarat.

Table-4.6.57 District-wise Land reclamation, Amelioration of water logged and saline soils (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		ha.	Rs. In lakh	ha.	Rs. In lakh	ha.	Rs. In lakh	ha.	Rs. In lakh
1	Ahmedabad	37	37	37	37	37	37	111	111
2	Amreli	69	69	69	69	69	69	207	207
3	Anand	104	104	104	104	104	104	312	312
4	Aravalli	0	0	0	0	0	0	0	0
5	Banaskantha	21	21	21	21	21	21	63	63
6	Bharuch	12	12	12	12	12	12	36	36
7	Bhavnagar	12	12	12	12	12	12	36	36
8	Botad	12	12	12	12	12	12	36	36
9	Chhota Udaipur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhoomi Dwarka	81	81	81	81	81	81	243	243
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	3	3	3	3	3	3	9	9
15	Jamnagar	21	21	21	21	21	21	63	63
16	Junagadh	8	8	8	8	8	8	24	24
17	Kheda	12	12	12	12	12	12	36	36
18	Kutch	378	378	378	378	378	378	1134	1134
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mehsana	87	87	87	87	87	87	261	261
21	Morbi	5	5	5	5	5	5	15	15
22	Narmada	0	0	0	0	0	0	0	0
23	Navsari	0	0	0	0	0	0	0	0

24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	5	5	5	5	5	5	15	15
27	Rajkot	0	0	0	0	0	0	0	0
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	22	22	22	22	22	22	66	66
30	Surendranagar	36	36	36	36	36	36	108	108
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	1	1	1	1	1	1	3	3
33	Valsad	12	12	12	12	12	12	36	36
		938	938	938	938	938	938	2814	2814

B) Minor/Micro Irrigation System:

The activities include the followings:

- 1) Micro Irrigation System (MIS) etc.
- 2) Dug / bore well, pump sets, lift irrigation sets, Minor irrigation

1) Micro Irrigation System (MIS) etc.

The micro irrigation system (MIS) includes the drip irrigation system and sprinkler irrigation system. The area under the MIS for previous five years were taken as per GGRC. The projection of area and financial estimation was made as per the average rate of increase in area per year for last five years. The average rate of the MIS was taken as Rs. 0.51 lacs per hectare as per the average rate of last five years for different micro irrigation systems.

Table-4.6.58 District-wise Micro Irrigation System (MIS): (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		ha.	Rs. In lakh	ha.	Rs. In lakh	ha.	Rs. In lakh	ha.	Rs. In lakh
1	Ahmedabad	3565	1819	3565	1819	3565	1819	10695	5457
2	Amreli	9371	4780	9371	4780	9371	4780	28113	14340
3	Anand	378	193	378	193	378	193	1134	579
4	Aravalli	6963	3552	6963	3552	6963	3552	20889	10656
5	Banaskantha	42446	21648	42446	21648	42446	21648	127338	64944
6	Bharuch	2328	1188	2328	1188	2328	1188	6984	3564
7	Bhavnagar	8349	4258	8349	4258	8349	4258	25047	12774
8	Botad	5494	2802	5494	2802	5494	2802	16482	8406
9	Chhota Udaipur	4643	2368	4643	2368	4643	2368	13929	7104
10	Dahod	4343	2215	4343	2215	4343	2215	13029	6645
11	Dang	715	365	715	365	715	365	2145	1095
12	Devbhoomi Dwarka	6561	3347	6561	3347	6561	3347	19683	10041
13	Gandhinagar	1894	966	1894	966	1894	966	5682	2898
14	Gir Somnath	5411	2760	5411	2760	5411	2760	16233	8280
15	Jamnagar	5739	2927	5739	2927	5739	2927	17217	8781
16	Junagadh	15333	7820	15333	7820	15333	7820	45999	23460
17	Kheda	2568	1310	2568	1310	2568	1310	7704	3930
18	Kutch	9719	4957	9719	4957	9719	4957	29157	14871
19	Mahisagar	1086	554	1086	554	1086	554	3258	1662
20	Mehsana	3616	1845	3616	1845	3616	1845	10848	5535
21	Morbi	3021	1541	3021	1541	3021	1541	9063	4623
22	Narmada	2555	1304	2555	1304	2555	1304	7665	3912
23	Navsari	1877	958	1877	958	1877	958	5631	2874
24	Panchmahal	1244	635	1244	635	1244	635	3732	1905
25	Patan	4564	2328	4564	2328	4564	2328	13692	6984
26	Porbandar	3723	1899	3723	1899	3723	1899	11169	5697
27	Rajkot	10560	5386	10560	5386	10560	5386	31680	16158
28	Sabarkantha	8117	4140	8117	4140	8117	4140	24351	12420
29	Surat	2727	1391	2727	1391	2727	1391	8181	4173

30	Surendranagar	9303	4745	9303	4745	9303	4745	27909	14235
31	Tapi	4002	2042	4002	2042	4002	2042	12006	6126
32	Vadodara	1735	885	1735	885	1735	885	5205	2655
33	Valsad	1724	880	1724	880	1724	880	5172	2640
		195674	99808	195674	99808	195674	99808	587022	299424

2) Dug / Bore well, Pump Sets, Lift Irrigation Sets for Minor Irrigation:

The dug/bore well pump set or lift irrigation sets for minor irrigation are proposed at the rate of Rs. 0.5 lacs per pump set.

Table-4.6.59 District-wise Dug / Bore Well, Pump Sets, Lift Irrigation Sets for Minor Irrigation

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
1	Ahmedabad	6	3	6	3	6	3	18	9
2	Amreli	28	14	28	14	28	14	84	42
3	Anand	3	2	3	2	3	2	9	5
4	Aravalli	4	2	4	2	4	2	12	6
5	Banaskantha	26	13	26	13	26	13	78	39
6	Bharuch	3	2	3	2	3	2	9	5
7	Bhavnagar	31	16	31	16	31	16	93	47
8	Botad	9	5	9	5	9	5	27	14
9	Chhota Udaipur	2	1	2	1	2	1	6	3
10	Dahod	12	6	12	6	12	6	36	18
11	Dang	1	1	1	1	1	1	3	2
12	Devbhoomi Dwaraka	9	5	9	5	9	5	27	14
13	Gandhinagar	3	2	3	2	3	2	9	5
14	Gir Somnath	15	8	15	8	15	8	45	23
15	Jamnagar	20	10	20	10	20	10	60	30
16	Junagadh	33	17	33	17	33	17	99	50
17	Kheda	9	5	9	5	9	5	27	14

18	Kutch	12	6	12	6	12	6	36	18
19	Mahisagar	4	2	4	2	4	2	12	6
20	Mehsana	7	4	7	4	7	4	21	11
21	Morbi	10	5	10	5	10	5	30	15
22	Narmada	2	1	2	1	2	1	6	3
23	Navsari	7	4	7	4	7	4	21	11
24	Panchmahal	15	8	15	8	15	8	45	23
25	Patan	3	2	3	2	3	2	9	5
26	Porbandar	8	4	8	4	8	4	24	12
27	Rajkot	23	12	23	12	23	12	69	35
28	Sabarkantha	16	8	16	8	16	8	48	24
29	Surat	12	6	12	6	12	6	36	18
30	Surendranagar	17	9	17	9	17	9	51	26
31	Tapi	2	1	2	1	2	1	6	3
32	Vadodara	6	3	6	3	6	3	18	9
33	Valsad	4	2	4	2	4	2	12	6
		362	181	362	181	362	181	1086	543

4.6.6 RENEWABLE ENERGY:

4.6.6.1 Background:

Rural India is the backbone of India's economy and so as of the Gujarat state. Nearly 57.40% of Gujarat's population lives in villages and agricultural is the main support for their livelihood. It is, therefore, ironical that rural population shares a much larger burden of poverty as well as energy poverty. Alleviation of rural energy poverty in Gujarat has to be an important component of inclusive growth agenda. The rural energy problem in Gujarat state can be described in simple terms as a dilemma between the need to make available increased quantities of energy for rural development and the need to reduce the expenditure on import of oil, expenditure on infrastructure for coal and electricity and the impending need to put a brake on deforestation and improve quality of life of rural population. Since renewable energy technologies make use of resources available locally, they are better adaptable to small scale production, can be designed for decentralized usage patterns, have minimal fuel costs and can be assembled with local labour, and hence they are ideally suited to the state conditions and rural needs.

Energy Scenario of Gujarat State vis a vis India and World:

In India among major 20 states, Gujarat leads the country in per capita energy consumption (1839 kWh) among others states in 2016-17 which was quite above than average per capita energy consumption of India (957 kWh). However, by world standards, it is far below (2900 kWh). Furthermore, in rural areas, the consumption of energy is quite low causing poor quality of life. As compared to this, the energy consumption in some of the countries is of the order of over 7351 for Japan, over 9698 for South Korea, about 4294 for China, about 12104 for USA.

Renewable Energy: An option for Sustainable Rural Development

Gujarat is rich in solar energy, biomass and wind energy. It is also the leading state in terms of overall solar energy installation in India. As part of its renewable energy promotion policy, Gujarat enacted the country's first Wind Energy policy in 1993 and become the first state with a Solar Policy in 2009. As per the Gujarat Energy Development Agency (GEDA), the state has tremendous renewable energy potential;

Table-4.6.60 showing renewable energy potential of the state of Gujarat;

Source	Resource	Energy Generation/Saving Potential
Solar Thermal	Solar Radiation 300 days	5.75 kwh/m ² / day
Solar PV	Solar Radiation 300 days	35770 MW
Biomass	24 million tones	900 MWe of electric power could be generated to meet energy requirements of almost all villages in Gujarat.
Biogas	200 lakh cattle population (Dung available at 70% collection efficiency)	Could generate 5.6 million cubic meters of biogas per day to cater cooking gas to 2.8 million families or generate electric power equivalent to 933 MW
Biogas Energy Plantation	67 lakh hectare wasteland	Could yield 67 million tonnes of Biomass which can sustain power generation to the order of 15000 MW

Wind	Coastline and hilly regions	5000 MWe
Tidal	Gulf of Kachchh Gulf of Khambhat	9000 MWe 9000 MWe

Gujarat's overall integrated renewable energy potential is estimated to be around 748.77 GW. A study conducted by TERI, Gujarat's potential for concentrated solar power (CSP) with water availability stands at 345.71 GW, solar photovoltaic (SPV) wind hybrid excluding CSP at 240.60 GW, only SPV excluding wind and CSP at 21.36 GW, only wind excluding solar potential at 139.21 GW and biomass at 1.89 GW. Increasing power generation capacity in each year along with the growing share of Renewable energy in its total energy mix has made Gujarat a prominent destination for investment. Gujarat government is positively looking towards renewable energy which reduces dependency on conventional fuel.

Vision:

To improve the living standard of rural people of Gujarat by harnessing of Renewable Energy Sources in the state for Environment Benefits, Energy Security and Sustainable Growth.

Mission:

- Development of Green villages to increase per capita energy consumption of rural people for improving quality of their life.
- Boosting agriculture production, productivity and agro-based industry in Rural Gujarat by improving energy requirement through RES
- By 2030, rural Gujarat meets as much one fourth its energy needs by clean and CO₂-efficient biofuels, solar and wind energy.

4.6.6.2 Issues:

- Research and Development or Import of Technology?
- Low energy output as compared to fossil fuel
- Availability of land in rural area.
- Availability of quantity and quality raw material for Biofuel production
- Transportation and storage of energy with minimum losses.
- Initial cost and payback period,
- Subsidy regulation and implementation
- Qualified personnel for design, operation, maintenance and management of systems.
- Policy for promotion

Priorities

- Providing energy security by harnessing full potential of environment-friendly energy sources.
- The increase of Public Spending on RE at the State Level
- Promotion of Rural Applications of RES
- Trained manpower availability and accessibility of locations for rapid installation of RE technologies at the rural level.
- Incentivizing State agencies for RE in terms of building their human resources and technical skills by establishing world-class learning facilities and institution.
- Removing drudgery and of the rural women and children particularly in the collection of cooking fuel and smoky kitchen

- Removing health hazards problems by keeping villages clean by using RES

4.6.6.3 Recommended Interventions for the State with Detail Action Plan and Costs (District-Wise)

1 Bio-Energy:

Among various options available for bioenergy, biodiesel, bioethanol, biomass gasification (thermal and biogas) are three major options, which have huge potential in India and Gujarat too to develop as energy sources and where investments made would be economical. In 2008, the Indian Government announced its 'National Biofuel Policy'. It aims to meet 20% of India's diesel demand with fuel derived from plants.

1.1 Biogas:

Based on the availability of cattle dung alone from about 20 million cattle, there exists an estimated potential of about 1215 million cubic meters of biogas generation annually. The increasing number of poultry farms is another source and can generate biogas. Non-edible de-oiled cake from Jatropha and other plants also have a big potential. In addition, kitchens of all the institutions, universities, restaurants, barat ghars, industries, parks and gardens in urban and semi-urban areas also offer a very large potential. Cumulative Biogas plants installed: 2m³ biogas production per day is sufficient for a family of 4 persons which required 3-4 cattle/buffaloes. Large size Bio-gas plants of various capacities (25 m³/day to 85m³/day) bio-gas plants based on animal dung and alternative feedstocks are considered as Institutional Biogas Plants (IBPs) which has two categories for financial assistance. a) *Non Profitable*: Total 75% subsidy is available. b) *Profitable* 50% financial assistance is available.

Table 4.6.61: District wise fund requirements for Gobar bank and community biogas plants (85 m³ capacity each) (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	1	20	3	60	4	80
2	Amreli	3	60	4	80	6	120	13	260
3	Anand	2	40	3	60	5	100	10	200
4	Aravali	1	20	1	20	2	40	4	80
5	Banaskatha	3	60	4	80	6	120	13	260
6	Bharuch	1	20	2	40	4	80	7	140
7	Bhavnagar	1	20	2	40	3	60	6	120
8	Botad	1	20	1	20	2	40	4	80
9	Chhota udaipur	0	0	0	0	1	20	1	20
10	Dahod	0	0	1	20	2	40	3	60
11	Devbhumi Dwarka	1	20	1	20	2	40	4	80
12	Dang	0	0	1	20	3	60	4	80
13	Gandhinagar	0	0	1	20	3	60	4	80
14	Gir Somnath	1	20	1	20	2	40	4	80
15	Jamnagar	1	20	2	40	3	60	6	120
16	Junagadh	1	20	2	40	3	60	6	120
17	Kheda	1	20	2	40	4	80	7	140
18	Kutch	2	40	3	60	5	100	10	200
19	Mahisagar	0	0	0	0	1	20	1	20
20	Mehsana	3	60	4	80	6	120	13	260
21	Morbi	1	20	1	20	2	40	4	80
22	Narmada	1	20	2	40	4	80	7	140
23	Navsari	0	0	1	20	3	60	4	80
24	Panchmahal	0	0	1	20	2	40	3	60

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	1	20	2	40	4	80	7	140
26	Porbandar	1	20	2	40	4	80	7	140
27	Rajkot	1	20	2	40	3	60	6	120
28	Sabarkantha	1	20	2	40	3	60	6	120
29	Surat	2	40	3	60	5	100	10	200
30	Surendranagar	2	40	3	60	5	100	10	200
31	Tapi	1	20	2	40	4	80	7	140
32	Vadodara	1	20	2	40	4	80	7	140
33	Valsad	1	20	2	40	4	80	7	140
	Total	35	700	61	1220	113	2260	209	4180

(Phy- No of Units, Fin.: Rs in Lakh) (cost: Rs. 20.00 lacs@85 m³)

Table 4.6.62 District wise fund requirements for Domestic biogas plants (2 to 10 m³ capacity with average 6m³)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	20	30	30	45	45	77	95	152
2	Amreli	42	63	52	78	78	133	172	274
3	Anand	36	54	46	69	69	117	151	240
4	Aravali	20	30	30	45	45	77	95	152
5	Banaskatha	42	63	52	78	78	133	172	274
6	Bharuch	30	45	40	60	60	102	130	207
7	Bhavnagar	36	54	46	69	69	117	151	240
8	Botad	20	30	30	45	45	77	95	152
9	Chhota Udaipur	20	30	30	45	45	77	95	152
10	Dahod	20	30	30	45	45	77	95	152
11	Devbhumi Dwarka	20	30	30	45	45	77	95	152
12	Dang	16	24	26	39	39	67	81	130
13	Gandhinagar	28	42	38	57	57	97	123	196
14	Gir Somnath	20	30	30	45	45	77	95	152
15	Jamnagar	32	48	42	63	63	107	137	218
16	Junagadh	32	48	42	63	63	107	137	218
17	Kheda	30	45	40	60	60	102	130	207
18	Kutch	48	72	58	87	87	148	193	307
19	Mahisagar	20	30	30	45	45	77	95	152
20	Mehsana	50	75	60	90	90	153	200	318
21	Morbi	20	30	30	45	45	77	95	152
22	Narmada	18	27	28	42	42	72	88	141
23	Navsari	20	30	30	45	45	77	95	152
24	Panchmahal	20	30	30	45	45	77	95	152
25	Patan	36	54	46	69	69	117	151	240
26	Porbandar	32	48	42	63	63	107	137	218
27	Rajkot	38	57	48	72	72	122	158	251
28	Sabarkantha	40	60	50	75	75	128	165	263
29	Surat	26	39	36	54	54	92	116	185
30	Surendranagar	32	48	42	63	63	107	137	218
31	Tapi	26	39	36	54	54	92	116	185
32	Vadodara	28	42	38	57	57	97	123	196
33	Valsad	30	45	40	60	60	102	130	207
	Total	948	1422	1278	1917	1917	3266	4143	6605

(Phy- No of Units, Fin.: Rs in Lakh for average size 6m³)

1.2 Biogas Purification and Bottling:

Wide spread use of biogas is hampered by the associated problems like low energy density due to the presence of impurities, generation at low pressures and the absence of means for storing and transporting. Therefore, there is need to establish a facility at the site of biogas production for purifying, compressing, bottling and making it transportable. This can be done by compressing the gas in cylinders which is possible only after removing its CO₂, H₂S and water vapour components. Biogas purification and bottling units of size 170 m³ or higher is recommended at community biogas generation units to be located in different districts.

Table 4.6.63 District wise fund requirements for Biogas Purification and Bottling unit (average 2000 m³/day capacity)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	1	50	0	0	1	60	2	110
3	Anand	0	0	1	55	1	60	2	115
4	Aravali	0	0	1	55	0	0	1	55
5	Banaskatha	1	50	0	0	0	0	1	50
6	Bharuch	0	0	0	0	0	0	0	0
7	Bhavnagar	0	0	1	55	1	60	2	115
8	Botad	0	0	0	0	0	0	0	0
9	Chhota Udaipur	0	0	0	0	1	60	1	60
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi Dwarka	0	0	0	0	1	60	1	60
13	Gandhinagar	0	0	0	0	1	60	1	60
14	Gir Somnath	0	0	1	55	0	0	1	55
15	Jamnagar	0	0	0	0	1	60	1	60
16	Junagadh	1	50	0	0	0	0	1	50
17	Kheda	0	0	1	55	0	60	1	115
18	Kutch	1	50	0	0	0	0	1	50
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mehsana	1	50	0	0	0	0	1	50
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	0	0	0	0	0	0	0	0
23	Navsari	0	0	1	55	0	60	1	115
24	Panchmahal	0	0	0	0	1	60	1	60
25	Patan	0	0	0	0	1	60	1	60
26	Porbandar	0	0	0	0	1	60	1	60
27	Rajkot	1	50	0	0	0	0	1	50
28	Sabarkantha	1	50	0	0	0	0	1	50
29	Surat	0	0	1	55	0	60	1	115
30	Surendranagar	0	0	0	0	0	0	0	0
31	Tapi	0	0	1	55	0	60	1	115
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	1	50	0	0	0	0	1	50
	Total	8	400	8	440	10	840	26	1680

(Phy- No of Units, Fin.: Rs in Lakh)

1.3 Biomass/Crop residue:

It is estimated that Gujarat has the potential of 67 million tonnes biomass production (42 million tonnes produced in 2016-17). It is estimated that about 30% is surplus and 20% is burnt on the field (pathak *et al.*, 2010). This surplus biomass may be utilized for electricity

generation, thermal and biochemical gasification with smart stoves. Gujarat has an estimated potential of over 1500 MW of power from biomass, but very small fraction has been exploited. Thus, over 90 percent of potential capacity lies untapped.

Table 4.6.64 District wise fund requirements for briquetting units (Waste Utilization) (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4	80	6	132	8	192	18	404
2	Amreli	1	20	3	66	4	96	8	182
3	Anand	2	40	4	88	5	120	11	248
4	Aravali	0	0	1	22	2	48	3	70
5	Banaskatha	1	20	3	66	4	96	8	182
6	Bharuch	1	20	3	66	4	96	8	182
7	Bhavnagar	1	20	2	44	3	72	6	136
8	Botad	0	0	1	22	1	24	2	46
9	Chhota Udaipur	0	0	0	0	1	24	1	24
10	Dahod	0	0	2	44	2	48	4	92
11	Dang	0	0	2	44	3	72	5	116
12	Devbhumi Dwarka	0	0	1	22	1	24	2	46
13	Gandhinagar	2	40	4	88	6	144	12	272
14	Gir Somnath	0	0	0	0	1	24	1	24
15	Jamnagar	1	20	2	44	3	72	6	136
16	Junagadh	1	20	3	66	3	72	7	158
17	Kheda	0	0	2	44	3	72	5	116
18	Kutch	0	0	2	44	3	72	5	116
19	Mahisagar	0	0	0	0	1	24	1	24
20	Mehsana	2	40	4	88	5	120	11	248
21	Morbi	0	0	1	22	2	48	3	70
22	Narmada	0	0	2	44	3	72	5	116
23	Navsari	0	0	2	44	3	72	5	116
24	Panchmahal	0	0	2	44	2	48	4	92
25	Patan	1	20	3	66	4	96	8	182
26	Porbandar	0	0	2	44	3	72	5	116
27	Rajkot	2	40	3	66	4	96	9	202
28	Sabarkantha	2	40	3	66	4	96	9	202
29	Surat	2	40	4	88	6	144	12	272
30	Surendranagar	1	20	3	66	4	96	8	182
31	Tapi	0	0	2	44	3	72	5	116
32	Vadodara	2	40	4	88	6	144	12	272
33	Valsad	1	20	3	66	4	96	8	182
	Total	27	540	79	1738	111	2664	217	4942

Table 4.6.65 District wise fund requirements for biomass gasification units

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4	80	6	132	8	192	18	404
2	Amreli	1	20	3	66	4	96	8	182
3	Anand	2	40	4	88	5	120	11	248
4	Aravali	1	20	2	44	3	72	6	136
5	Banaskatha	1	20	3	66	4	96	8	182
6	Bharuch	1	20	3	66	4	96	8	182
7	Bhavnagar	1	20	2	44	3	72	6	136

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
8	Botad	0	0	1	24	1	24	2	48
9	Chotta Udaipur	0	0	0	0	1	24	1	24
10	Dahod	0	0	2	44	2	48	4	92
11	Dang	0	0	2	44	3	72	5	116
12	Devbhumi Dwarka	0	0	1	22	1	24	2	46
13	Gandhinagar	2	40	4	88	6	144	12	272
14	Gir Somnath	0	0	0	0	1	24	1	24
15	Jamnagar	1	20	3	66	4	96	8	182
16	Junagadh	1	20	2	44	3	72	6	136
17	Kheda	0	0	2	44	2	48	4	92
18	Kutch	0	0	2	44	3	72	5	116
19	Mahisagar	0	0	0	0	1	24	1	24
20	Mehsana	2	40	4	88	5	120	11	248
21	Morbi	1	20	2	44	3	72	6	136
22	Narmada	0	0	2	44	3	72	5	116
23	Navsari	0	0	2	44	3	72	5	116
24	Panchmahal	0	0	2	44	2	48	4	92
25	Patan	1	20	3	66	4	96	8	182
26	Porbandar	0	0	2	44	3	72	5	116
27	Rajkot	1	20	2	44	3	72	6	136
28	Sabarkantha	1	20	2	44	3	72	6	136
29	Surat	2	40	4	88	6	144	12	272
30	Surendranagar	1	20	3	66	4	96	8	182
31	Tapi	0	0	2	44	3	72	5	116
32	Vadodara	2	40	4	88	6	144	12	272
33	Valsad	1	20	3	66	4	96	8	182
	Total	27	540	79	1740	111	2664	217	4944

Table 4.6.66 District wise fund requirements for biomass Cookstoves/ Smokeless Chulas (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	200	4	220	4.84	250	6	670	14.84
2	Amreli	300	6	330	7.26	375	9	1005	22.26
3	Anand	300	6	330	7.26	375	9	1005	22.26
4	Aravali	200	4	180	3.96	200	4.8	580	12.76
5	Banaskatha	500	10	550	12.1	625	15	1675	37.1
6	Bharuch	500	10	550	12.1	625	15	1675	37.1
7	Bhavnagar	200	4	220	4.84	250	6	670	14.84
8	Botad	100	2	110	2.42	125	3	335	7.42
9	Chhota Udaipur	100	2	140	3.08	200	4.8	440	9.88
10	Dahod	500	10	550	12.1	625	15	1675	37.1
11	Dang	400	8	440	9.68	500	12	1340	29.68
12	Devbhumi Dwarka	100	2	110	2.42	125	3	335	7.42
13	Gandhinagar	300	6	330	7.26	375	9	1005	22.26
14	Gir Somnath	100	2	110	2.42	125	3	335	7.42
15	Jamnagar	200	4	220	4.84	250	6	670	14.84
16	Junagadh	200	4	220	4.84	250	6	670	14.84
17	Kheda	300	6	330	7.26	375	9	1005	22.26
18	Kutch	400	8	440	9.68	500	12	1340	29.68
19	Mahisagar	200	4	180	3.96	200	4.8	580	12.76

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
20	Mehsana	300	6	330	7.26	375	9	1005	22.26
21	Morbi	100	2	110	2.42	125	3	335	7.42
22	Narmada	500	10	550	12.1	625	15	1675	37.1
23	Navsari	500	10	550	12.1	625	15	1675	37.1
24	Panchmahal	300	6	370	8.14	425	10.2	1095	24.34
25	Patan	300	6	330	7.26	375	9	1005	22.26
26	Porbandar	300	6	330	7.26	375	9	1005	22.26
27	Rajkot	200	4	220	4.84	250	6	670	14.84
28	Sabarkantha	300	6	370	8.14	425	10.2	1095	24.34
29	Surat	400	8	440	9.68	500	12	1340	29.68
30	Surendranagar	400	8	440	9.68	500	12	1340	29.68
31	Tapi	300	6	330	7.26	375	9	1005	22.26
32	Vadodara	300	6	300	6.6	300	7.2	900	19.8
33	Valsad	400	8	440	9.68	500	12	1340	29.68
	Total	9700	194	10670	234.74	12125	291	32495	719.74

1.4 Bio-ethanol:

In India there is total petrol consumption is about 10^7 klit in India. If 5% alcohol is blended the requirement is about 5×10^5 klitres. Existing production is about 1.8×10^5 klitres hence demand is about 2.4×10^5 klitres. Bio-ethanol is usually obtained from the conversion of carbon-based feedstock. Ethanol can be produced from a variety of feed stocks such as sugar cane bagasse, miscanthus, sugar beet, sorghum, sunflower, fruit, molasses, corn, stover, grain, wheat, straw, cotton, other biomass, as well as many types of cellulose waste and harvesting, whichever has the best well-to-wheel assessment.

Raw material availability: There are more than 20 sugar mills operating in Gujarat with a combined installed capacity of about 12.5 Lac tons of sugar production per annum. The surplus raw material can be used for value-added product like the manufacture of Ethanol from their byproduct Molasses. Gujarat is having production of 4.5 Lac MT of molasses. As per alcohol industry, the average efficiency of conversion of sugar from molasses to alcohol is 80 to 85% in batch type distillery. The average yield of alcohol from 1 MT of Molasses is about 230 liters. To produce 100,000 Liter alcohol per day there is need of crushing capacity of approx. 1500 TCD cane crushing. However, since the sugar mills are normally running for 180 days, while alcohol plant will run for 250 days in a year, hence surplus molasses can be processed in the remaining period when sugar mills are not operating.

Table 4.6.67: District wise fund requirements for Bio-ethanol^a (10,000 liter capacity) and Bio-diesel production^b (5000 liters capacity) units

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	0	0	0	0	0	0	0	0
3	Anand	0	0	0	0	0	0	0	0
4	Aravali	0	0	0	0	0	0	0	0
5	Banaskatha	1 ^a	1200	0	0	0	0	1 ^a	1200
6	Bharuch	0	0	0	0	0	0	0	0
7	Bhavnagar	0	0	0	0	1 ^a	1200	1 [*]	1200
8	Botad	0	0	0	0	0	0	0	0

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
9	Chhota Udaipur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi Dwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	0	0	0	0
16	Junagadh	0	0	0	0	0	0	0	0
17	Kheda	0	0	0	0	0	0	0	0
18	Kutch	0	0	0	0	0	0	1*	1200
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mehsana	0	0	0	0	0	0	0	0
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	0	0	0	0	0	0	0	0
23	Navsari	0	0	0	0	0	0	0	0
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	1 ^a	1200	1*	1200
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	1	2500	0	0	1	2500
30	Surendranagar	0	0	0	0	0	0	0	0
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	1 ^a	1200	0	0	0	0	1*	1200
33	Valsad	0	0	0	0	0	0	0	0
	Total	2^a	2400	1	2500	2^a	2400	5	7300

*biodiesel plants

1.5 Solar Energy:

Gujarat has the highest solar generation potential in India –300 days of 5.6 to 6.0 kWh/sq.m/day solar radiation. Over one lakh solar cookers have been distributed in Gujarat under State Subsidy Scheme in last 20 years. Solar cookers, solar water heating, solar lantern, solar pumping, solar street light and solar power plant at remote areas are the important applications. Over 10000 domestic & industrial solar water heating systems have been installed in Gujarat in last decade totaling to daily capacity of 50-60 lakh liter have been installed in Gujarat. Acceptance of Solar Water Heaters has been best amongst other Solar Energy Systems and the market has developed on the basis of the strength of the product. About 265 X 1 kW Stand-alone SPV power systems installed. 34 Grid-connected rooftop Solar PV Systems (2350 kW) have been installed on Govt Buildings in 2012-13. 91 plants totaling to about 1121 MW capacity have been commissioned in Gujarat up to March 2016. These plants would annually generate about 2000 MU

Table 4.6.68 District wise fund requirements for solar cookers

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2500	37.5	2500	37.5	2500	37.5	7500	112.5
2	Amreli	3150	47.25	3150	47.25	3150	47.25	9450	141.75
3	Anand	2000	30	2000	30	2000	30	6000	90
4	Aravali	1000	15	1000	15	1000	15	3000	45
5	Banaskatha	2500	37.5	2500	37.5	2500	37.5	7500	112.5

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
6	Bharuch	1500	22.5	1500	22.5	1500	22.5	4500	67.5
7	Bhavnagar	5294	79.41	5294	79.41	5294	79.41	15882	238.23
8	Botad	2646	39.69	2646	39.69	2646	39.69	7938	119.07
9	Chhota Udaipur	1066	15.99	1066	15.99	1066	15.99	3198	47.97
10	Dahod	1000	15	1000	15	1000	15	3000	45
11	Dang	800	12	800	12	800	12	2400	36
12	Devbhimi Dwarka	1000	15	1000	15	1000	15	3000	45
13	Gandhinagar	1500	22.5	1500	22.5	1500	22.5	4500	67.5
14	Gir Somnath	1525	23	1525	23	1525	23	4575	69
15	Jamnagar	1000	15	1000	15	1000	15	3000	45
16	Junagadh	3050	45.75	3050	45.75	3050	45.75	9150	137.25
17	Kheda	2500	37.5	2500	37.5	2500	37.5	7500	112.5
18	Kutch	2000	30	2000	30	2000	30	6000	90
19	Mahisagar	400	6	400	6	400	6	1200	18
20	Mehsana	3000	45	3000	45	3000	45	9000	135
21	Morbi	1256	18.84	1256	18.84	1256	18.84	3768	56.52
22	Narmada	1000	15	1000	15	1000	15	3000	45
23	Navsari	1500	22.5	1500	22.5	1500	22.5	4500	67.5
24	Panchmahal	600	9	600	9	600	9	1800	27
25	Patan	2000	30	2000	30	2000	30	6000	90
26	Porbandar	850	12.75	850	12.75	850	12.75	2550	38.25
27	Rajkot	2514	37.71	2514	37.71	2514	37.71	7542	113.13
28	Sabarkantha	1500	22.5	1500	22.5	1500	22.5	4500	67.5
29	Surat	3000	45	3000	45	3000	45	9000	135
30	Surendranagar	2500	37.5	2500	37.5	2500	37.5	7500	112.5
31	Tapi	1000	15	1000	15	1000	15	3000	45
32	Vadodara	2134	32.01	2134	32.01	2134	32.01	6402	96.03
33	Valsad	2500	37.5	2500	37.5	2500	37.5	7500	112.5
	Total	61785	926.9	61785	926.9	61785	926.9	185355	2780.7

Table 4.6.69: District wise fund requirements for solar street lights

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	2500	750	2500	750	2500	750	7500	2250
2	Amreli	1850	555	1850	555	1850	555	5550	1665
3	Anand	1500	450	1500	450	1500	450	4500	1350
4	Aravali	400	120	400	120	400	120	1200	360
5	Banaskatha	2000	600	2000	600	2000	600	6000	1800
6	Bharuch	2000	600	2000	600	2000	600	6000	1800
7	Bhavnagar	1200	360	1200	360	1200	360	3600	1080
8	Botad	800	240	800	240	800	240	2400	720
9	Chhota Udaipur	800	240	800	240	800	240	2400	720
10	Dahod	2000	600	2000	600	2000	600	6000	1800
11	Dang	1500	450	1500	450	1500	450	4500	1350
12	Devbhumi Dwarka	800	240	800	240	800	240	2400	720
13	Gandhinagar	2500	750	2500	750	2500	750	7500	2250
14	Gir Somnath	500	150	500	150	500	150	1500	450
15	Jamnagar	1200	360	1200	360	1200	360	3600	1080
16	Junagadh	1000	300	1000	300	1000	300	3000	900
17	Kheda	1000	300	1000	300	1000	300	3000	900
18	Kutch	1000	300	1000	300	1000	300	3000	900
19	Mahisagar	250	75	250	75	250	75	750	225

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
20	Mehsana	2000	600	2000	600	2000	600	6000	1800
21	Morbi	400	120	400	120	400	120	1200	360
22	Narmada	1000	300	1000	300	1000	300	3000	900
23	Navsari	1000	300	1000	300	1000	300	3000	900
24	Panchmahal	250	75	250	75	250	75	750	225
25	Patan	1000	300	1000	300	1000	300	3000	900
26	Porbandar	500	150	500	150	500	150	1500	450
27	Rajkot	600	180	600	180	600	180	1800	540
28	Sabarkantha	600	180	600	180	600	180	1800	540
29	Surat	2000	600	2000	600	2000	600	6000	1800
30	Surendranagar	1000	300	1000	300	1000	300	3000	900
31	Tapi	500	150	500	150	500	150	1500	450
32	Vadodara	1200	360	1200	360	1200	360	3600	1080
33	Valsad	1000	300	1000	300	1000	300	3000	900
	Total	37850	11355	37850	11355	37850	11355	113550	34065

Table 4.6.70 District wise fund requirements for solar Lantern (6-8W)

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	3000	180	3000	180	3000	180	9000	540
2	Amreli	4000	240	4000	240	4000	240	12000	720
3	Anand	3000	180	3000	180	3000	180	9000	540
4	Aravali	1200	72	1200	72	1200	72	3600	216
5	Banaskatha	3500	210	3500	210	3500	210	10500	630
6	Bharuch	3000	180	3000	180	3000	180	9000	540
7	Bhavnagar	2000	120	2000	120	2000	120	6000	360
8	Botad	1500	90	1500	90	1500	90	4500	270
9	Chhota Udaipur	1000	60	1000	60	1000	60	3000	180
10	Dahod	5000	300	5000	300	5000	300	15000	900
11	Dang	5000	300	5000	300	5000	300	15000	900
12	Devbhumi Dwarka	1000	60	1000	60	1000	60	3000	180
13	Gandhinagar	2500	150	2500	150	2500	150	7500	450
14	Gir Somnath	1000	60	1000	60	1000	60	3000	180
15	Jamnagar	2000	120	2000	120	2000	120	6000	360
16	Junagadh	2000	120	2000	120	2000	120	6000	360
17	Kheda	3000	180	3000	180	3000	180	9000	540
18	Kutch	4000	240	4000	240	4000	240	12000	720
19	Mahisagar	1500	90	1500	90	1500	90	4500	270
20	Mehsana	2500	150	2500	150	2500	150	7500	450
21	Morbi	800	42	800	42	800	42	2400	126
22	Narmada	3500	210	3500	210	3500	210	10500	630
23	Navsari	3000	180	3000	180	3000	180	9000	540
24	Panchmahal	2500	150	2500	150	2500	150	7500	450
25	Patan	3000	180	3000	180	3000	180	9000	540
26	Porbandar	1500	90	1500	90	1500	90	4500	270
27	Rajkot	1700	102	1700	102	1700	150	5100	354
28	Sabarkantha	2300	138	2300	138	2300	138	6900	414
29	Surat	2500	150	2500	150	2500	150	7500	450
30	Surendranagar	2500	150	2500	150	2500	150	7500	450
31	Tapi	2500	150	2500	150	2500	150	7500	450
32	Vadodara	2000	120	2000	120	2000	120	6000	360

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
33	Valsad	3000	180	3000	180	3000	180	9000	540
	Total	82500	4944	82500	4944	82500	4992	247500	14880

Table 4.6.71 District wise fund requirements for 5hp submersible solar water pumping system

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	200	630	200	630	200	630	600	1890
2	Amreli	500	1575	500	1575	500	1575	1500	4725
3	Anand	300	945	300	945	300	945	900	2835
4	Aravali	100	315	100	315	100	315	300	945
5	Banaskatha	400	1260	400	1260	400	1260	1200	3780
6	Bharuch	500	1575	500	1575	500	1575	1500	4725
7	Bhavnagar	200	630	200	630	200	630	600	1890
8	Botad	100	315	100	315	100	315	300	945
9	Chhota Udaipur	50	157.5	50	157.5	50	157.5	150	472.5
10	Dahod	160	504	160	504	160	504	480	1512
11	Dang	310	976.5	310	976.5	310	976.5	930	2929.5
12	Devbhumi Dwarka	100	315	100	315	100	315	300	945
13	Gandhinagar	300	945	300	945	300	945	900	2835
14	Gir Somnath	100	315	100	315	100	315	300	945
15	Jamnagar	250	787.5	250	787.5	250	787.5	750	2362.5
16	Junagadh	150	472.5	150	472.5	150	472.5	450	1417.5
17	Kheda	250	787.5	250	787.5	250	787.5	750	2362.5
18	Kutch	300	945	300	945	300	945	900	2835
19	Mahisagar	100	315	100	315	100	315	300	945
20	Mehsana	350	1102.5	350	1102.5	350	1102.5	1050	3307.5
21	Morbi	100	315	100	315	100	315	300	945
22	Narmada	100	315	100	315	100	315	300	945
23	Navsari**	500	1575	500	1575	500	1575	1500	4725
24	Panchmahal	100	315	100	315	100	315	300	945
25	Patan	200	630	200	630	200	630	600	1890
26	Porbandar	100	315	100	315	100	315	300	945
27	Rajkot	100	315	100	315	100	315	300	945
28	Sabarkantha	150	472.5	150	472.5	150	472.5	450	1417.5
29	Surat	500	1575	500	1575	500	1575	1500	4725
30	Surendranagar	150	472.5	150	472.5	150	472.5	450	1417.5
31	Tapi	100	315	100	315	100	315	300	945
32	Vadodara	100	315	100	315	100	315	300	945
33	Valsad **	500	1575	500	1575	500	1575	1500	4725
	Total	7420	23373	7420	23373	7420	23373	22260	70119

Table 4.6.72 District wise fund requirements for SPV power plant (10 kW) for remote villages

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	1	120	1	120	1	120	3	360
2	Amreli	0	0	1	120	0	0	1	120
3	Anand	0	0	1	120	0	0	1	120

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
4	Aravali	2	240	2	240	2	240	6	720
5	Banaskatha	3	360	3	360	3	360	9	1080
6	Bharuch	1	120	1	120	1	120	3	360
7	Bhavnagar	0	0	0	0	1	120	1	120
8	Botad	0	0	0	0	0	0	0	0
9	Chhota Udaipur	1	120	1	120	1	120	3	360
10	Dahod	5	600	5	600	5	600	15	1800
11	Dang	3	360	3	360	3	360	9	1080
12	Devbhumi Dwarka	0	0	0	0	0	0	0	0
13	Gandhinagar	0	0	1	120	0	0	1	120
14	Gir Somnath	0	0	0	0	0	0	0	0
15	Jamnagar	0	0	0	0	1	120	1	120
16	Junagadh	1	120	0	0	1	120	2	240
17	Kheda	0	0	0	0	1	120	1	120
18	Kutch	0	0	2	240	2	240	4	480
19	Mahisagar	2	240	2	240	2	240	6	720
20	Mehsana	0	0	1	120	0	0	1	120
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	5	600	5	600	5	600	15	1800
23	Navsari	3	360	3	360	3	360	9	1080
24	Panchmahal	3	360	3	360	3	360	9	1080
25	Patan	2	240	2	240	2	240	6	720
26	Porbandar	0	0	1	120	0	0	1	120
27	Rajkot	0	0	0	0	1	120	1	120
28	Sabarkantha	3	360	3	360	3	360	9	1080
29	Surat	2	240	2	240	2	240	6	720
30	Surendranagar	4	480	4	480	4	480	12	1440
31	Tapi	5	600	5	600	5	600	15	1800
32	Vadodara	2	240	2	240	2	240	6	720
33	Valsad	3	360	3	360	3	360	9	1080
	Total	51	6120	57	6840	57	6840	165	19800

Table 4.6.73 Districtwise fund requirements for (a) 1 MW Agriculture (Greenhouse) cum SPV Power pilot project at SAUs @ 12.0 cr/plant^a, (b) SPV operated cold storages for 1000 MT storage capacity^b @ 15 cr (c) on farm fruits and vegetable storage for 10MT capacity @ 20 lakh

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	5 ^c	100	0	0	0	0	5	100
3	Anand	1 ^a	1200	0	0	0	0	1	1200
4	Aravali	0	0	0	0	0	0	0	0
5	Banaskatha	5 ^b	7500	1 ^a	1200	0	0	6	8700
6	Bharuch	0	0	0	0	0	0	0	0
7	Bhavnagar	3 ^c	60	0	0	2 ^b	3000	5	3060
8	Botad	2 ^c	40	0	0	1 ^b	1500	3	1540
9	Chhota Udaipur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhumi Dwarka	0	0	0	0	0	0	0	0

13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	0	0	2 ^c	40	0	0	2	40
15	Jamnagar	0	0	0	0	0	0	0	0
16	Junagadh	1 ^a	1200	3 ^c	60	0	0	4	1260
17	Kheda	0	0	5 ^c	100	0	0	5	100
18	Kutch	0	0	0	0	0	0	0	0
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mehsana	0	0	0	0	0	0	0	0
21	Morbi	0	0	0	0	0	0	0	0
22	Narmada	0	0	0	0	0	0	0	0
23	Navsari	1 ^a	1200	2 ^b	3000	5 ^c	100	8	4300
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	0	0	0	0	0	0	0	0
27	Rajkot	0	0	0	0	0	0	0	0
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	0	0	0	0	0	0	0	0
30	Surendranagar	0	0	0	0	0	0	0	0
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	0	0	0	0	0	0	0	0
	Total	18	11300	13	4400	8	4600	39	20300

1.6 Wind Energy:

Gujarat has the second largest Wind Power Plant installed capacity in the country next to Tamilnadu which is about 5613 MW (2018). Annually generating capacity is about 8650 million units of electricity. Gujarat Potential: 12000 MW, Installed Capacity: 5613 MW till date, Cost: Rs. 60 million per MW

Table 4.6.74 District wise fund requirements for Roof-top Small Solar cum Wind Turbine for Power Generation (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No.	Districts	I Year ^a		II Year ^b		III Year ^c		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	30	120	30	180	30	240	90	540
2	Amreli	22	88	22	132	22	176	66	396
3	Anand	20	80	20	120	20	160	60	360
4	Aravali	4	16	4	24	4	32	12	72
5	Banaskatha	15	60	15	90	15	120	45	270
6	Bharuch	10	40	10	60	10	80	30	180
7	Bhavnagar	7	28	7	42	7	56	21	126
8	Botad	4	16	4	24	4	32	12	72
9	Chhota Udaipur	10	40	10	60	10	80	30	180
10	Dahod	5	20	5	30	5	40	15	90
11	Dang	5	20	5	30	5	40	15	90
12	Devbhumi Dwarka	5	20	5	30	5	40	15	90
13	Gandhinagar	15	60	15	90	15	120	45	270
14	Gir Somnath	6	24	6	36	6	48	18	108
15	Jamnagar	10	40	10	60	10	80	30	180
16	Junagadh	8	32	8	48	8	64	24	144
17	Kheda	12	48	12	72	12	96	36	216
18	Kutch	20	80	20	120	20	160	60	360
19	Mahisagar	2	8	2	12	2	16	6	36
20	Mehsana	15	60	15	90	15	120	45	270
21	Morbi	6	24	6	36	6	48	18	108

22	Narmada	10	40	10	60	10	80	30	180
23	Navsari	10	40	10	60	10	80	30	180
24	Panchmahal	3	12	3	18	3	24	9	54
25	Patan	10	40	10	60	10	80	30	180
26	Porbandar	25	100	25	150	25	200	75	450
27	Rajkot	8	32	8	48	8	64	24	144
28	Sabarkantha	8	32	8	48	8	64	24	144
29	Surat	20	80	20	120	20	160	60	360
30	Surendranagar	10	40	10	60	10	80	30	180
31	Tapi	12	48	12	72	12	96	36	216
32	Vadodara	15	60	15	90	15	120	45	270
33	Valsad	15	60	15	90	15	120	45	270
	Total	377	1508	377	2262	377	3016	1131	6786

(a,b,c,: Varying capacity each year ranging between 3.0 kW to 10kW)

Table 4.6.75 District wise fund requirements for wind pumps

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr.No	District	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	50	62.5	50	67.5	50	72.5	150	202.5
2	Amreli *	80	100	80	108	80	116	240	324
3	Anand	50	62.5	50	67.5	50	72.5	150	202.5
4	Aravali	10	12.5	10	13.5	10	14	30	40
5	Banaskatha	60	75	60	81	60	87	180	243
6	Bharuch	30	37.5	30	40.5	30	43.5	90	121.5
7	Bhavnagar	40	50	40	54	40	58	120	162
8	Botad	30	37.5	30	40.5	30	43.5	90	121.5
9	Chhota Udaipur	10	12.5	10	13.5	10	14.5	30	40.5
10	Dahod	20	25	20	27	20	29	60	81
11	Devbhumi Dwarka	30	37.5	30	40.5	30	43.5	90	121.5
12	Dang	10	12.5	10	13.5	10	14.5	30	40.5
13	Gandhinagar	20	25	20	27	20	29	60	81
14	Gir Somnath	20	25	20	27	20	29	60	81
15	Jamnagar	40	50	40	54	40	58	120	162
16	Junagadh	30	37.5	30	40.5	30	43.5	90	121.5
17	Kheda	40	50	40	54	40	58	120	162
18	Kutch	80	100	80	108	80	116	240	324
19	Mahisagar	10	12.5	10	13.5	10	14.5	30	40.5
20	Mehsana	40	50	40	54	40	58	120	162
21	Morbi	20	25	20	27	20	29	60	81
22	Narmada	30	37.5	30	40.5	30	43.5	90	121.5
23	Navsari	50	62.5	50	67.5	50	72.5	150	202.5
24	Panchmahal	20	25	20	27	20	29	60	81
25	Patan	40	50	40	54	40	58	120	162
26	Porbandar	70	87.5	70	94.5	70	101.5	210	283.5
27	Rajkot#	40	50	40	54	40	58	120	162
28	Sabarkantha	30	37.5	30	40.5	30	43	90	121
29	Surat	40	50	40	54	40	58	120	162
30	Surendranagar	40	50	40	54	40	58	120	162
31	Tapi	30	37.5	30	40.5	30	43.5	90	121.5
32	Vadodara	20	25	20	27	20	29	60	81
33	Valsad	50	62.5	50	67.5	50	72.5	150	202.5
	Total	1180	1475	1180	1593	1180	1710	3540	4778

* wind Farm projects

Wind power Demonstration

4.6.6.4 Trainings to the Agricultural Staff and Farmers

Training proposed for capacity building of Agricultural staff

(Rs.800/day /person)

Table 4.6.76 Training proposed for capacity building of Agricultural staff

Sr. No.	Districts	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	100	0.8	100	0.8	100	0.8	300	2.4
2	Amreli	50	0.4	50	0.4	50	0.4	150	1.2
3	Anand	100	0.8	100	0.8	100	0.8	300	2.4
4	Aravali	20	0.16	20	0.16	20	0.16	60	0.48
5	Banaskatha	100	0.8	100	0.8	100	0.8	300	2.4
6	Bharuch	30	0.24	30	0.24	30	0.24	90	0.72
7	Bhavnagar	30	0.24	30	0.24	30	0.24	90	0.72
8	Botad	10	0.08	10	0.08	10	0.08	30	0.24
9	Chhota Udaipur	10	0.08	10	0.08	10	0.08	30	0.24
10	Dahod	20	0.16	20	0.16	20	0.16	60	0.48
11	Devbhumi Dwarka	20	0.16	20	0.16	20	0.16	60	0.48
12	Dang	20	0.16	20	0.16	20	0.16	60	0.48
13	Gandhinagar	50	0.4	50	0.4	50	0.4	150	1.2
14	Gir Somnath	50	0.4	50	0.4	50	0.4	150	1.2
15	Jamnagar	30	0.24	30	0.24	30	0.24	90	0.72
16	Junagadh	50	0.4	50	0.4	50	0.4	150	1.2
17	Kheda	30	0.24	30	0.24	30	0.24	90	0.72
18	Kutch	50	0.4	50	0.4	50	0.4	150	1.2
19	Mahisagar	10	0.08	10	0.08	10	0.08	30	0.24
20	Mehsana	60	0.48	60	0.48	60	0.48	180	1.44
21	Morbi	20	0.16	20	0.16	20	0.16	60	0.48
22	Narmada	20	0.16	20	0.16	20	0.16	60	0.48
23	Navsari	100	0.8	100	0.8	100	0.8	300	2.4
24	Panchmahal	20	0.16	20	0.16	20	0.16	60	0.48
25	Patan	30	0.24	30	0.24	30	0.24	90	0.72
26	Porbandar	20	0.16	20	0.16	20	0.16	60	0.48
27	Rajkot	30	0.24	30	0.24	30	0.24	90	0.72
28	Sabarkantha	20	0.16	20	0.16	20	0.16	60	0.48
29	Surat	50	0.4	50	0.4	50	0.4	150	1.2
30	Surendranagar	30	0.24	30	0.24	30	0.24	90	0.72
31	Tapi	20	0.16	20	0.16	20	0.16	60	0.48
32	Vadodara	30	0.24	30	0.24	30	0.24	90	0.72
33	Valsad	30	0.24	30	0.24	30	0.24	90	0.72
	Total	1260	10.08	1260	10.08	1260	10.08	3780	30.24

(Phy = No of Trainee Fin Rs. in Lakh)

Training proposed for capacity building of farmers (District wise) on different renewable energy technologies. (Rs.600/day /farmer)

Table 4.6.77 Training proposed for capacity building of farmers (District wise) on different renewable energy technologies (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No	District	I Year		II Year		III Year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	350	2.1	350	2.1	350	2.1	1050	6.3
2	Amreli	300	1.8	300	1.8	300	1.8	900	5.4
3	Anand	500	3	500	3	500	3	1500	9
4	Aravali	100	0.6	100	0.6	100	0.6	300	1.8
5	Banaskatha	500	3	500	3	500	3	1500	9
6	Bharuch	200	1.2	200	1.2	200	1.2	600	3.6
7	Bhavnagar	100	0.6	100	0.6	100	0.6	300	1.8
8	Botad	100	0.6	100	0.6	100	0.6	300	1.8
9	Chhota Udaipur	100	0.6	100	0.6	100	0.6	300	1.8
10	Dahod	100	0.6	100	0.6	100	0.6	300	1.8
11	Dang	100	0.6	100	0.6	100	0.6	300	1.8
12	Gandhinagar	200	1.2	200	1.2	200	1.2	600	3.6
13	Gir Somnath	200	1.2	200	1.2	200	1.2	600	3.6
14	Jamnagar	200	1.2	200	1.2	200	1.2	600	3.6
15	Devbhumi Dwarka	100	0.6	100	0.6	100	0.6	300	1.8
16	Junagadh	300	1.8	300	1.8	300	1.8	900	5.4
17								0	0
18	Kheda	150	0.9	150	0.9	150	0.9	450	2.7
19	Kutch	200	1.2	200	1.2	200	1.2	600	3.6
20	Mahisagar	100	0.6	100	0.6	100	0.6	300	1.8
21	Mehsana	300	1.8	300	1.8	300	1.8	900	5.4
22	Morbi	100	0.6	100	0.6	100	0.6	300	1.8
23	Narmada	200	1.2	200	1.2	200	1.2	600	3.6
24	Navsari	500	3	500	3	500	3	1500	9
25	Panchmahal	100	0.6	100	0.6	100	0.6	300	1.8
26	Patan	300	1.8	300	1.8	300	1.8	900	5.4
27	Porbandar	200	1.2	200	1.2	200	1.2	600	3.6
28	Rajkot	300	1.8	300	1.8	300	1.8	900	5.4
29	Sabarkantha	200	1.2	200	1.2	200	1.2	600	3.6
30	Surat	200	1.2	200	1.2	200	1.2	600	3.6
31	Surendranagar	200	1.2	200	1.2	200	1.2	600	3.6
32	Tapi	100	0.6	100	0.6	100	0.6	300	1.8
33	Vadodara	200	1.2	200	1.2	200	1.2	600	3.6
	Valsad	100	0.6	100	0.6	100	0.6	300	1.8
	Total	3450	20.7	3450	20.7	3450	20.7	10350	62.1

5.2 Training proposed for waste management for farmers (District wise)

Table 4.6.78 Training proposed for waste management for farmers

(Rs.600/day/farmer) (Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No	Districts	Year						Total	
		I Year		II Year		III Year		Phy	Fin
		Phy	Fin	Phy	Fin	Phy	Fin		
1	Ahmedabad	350	2.1	350	2.1	350	2.1	1050	6.3
2	Amreli	300	1.8	300	1.8	300	1.8	900	5.4
3	Anand	500	3	500	3	500	3	1500	9
4	Aravali	100	0.6	100	0.6	100	0.6	300	1.8
5	Banaskatha	500	3	500	3	500	3	1500	9
6	Bharuch	200	1.2	200	1.2	200	1.2	600	3.6
7	Bhavnagar	100	0.6	100	0.6	100	0.6	300	1.8
8	Botad	100	0.6	100	0.6	100	0.6	300	1.8
9	Chhota Udaipur	100	0.6	100	0.6	100	0.6	300	1.8
10	Dahod	100	0.6	100	0.6	100	0.6	300	1.8
11	Devbhumi Dwarka	100	0.6	100	0.6	100	0.6	300	1.8
12	Dang	100	0.6	100	0.6	100	0.6	300	1.8
13	Gandhinagar	200	1.2	200	1.2	200	1.2	600	3.6
14	Gir Somnath	200	1.2	200	1.2	200	1.2	600	3.6
15	Jamnagar	200	1.2	200	1.2	200	1.2	600	3.6
16	Junagadh	300	1.8	300	1.8	300	1.8	900	5.4
17	Kheda	150	0.9	150	0.9	150	0.9	450	2.7
18	Kutch	200	1.2	200	1.2	200	1.2	600	3.6
19	Mahisagar	100	0.6	100	0.6	100	0.6	300	1.8
20	Mehsana	300	1.8	300	1.8	300	1.8	900	5.4
21	Morbi	150	0.9	150	0.9	150	0.9	450	2.7
22	Narmada	200	1.2	200	1.2	200	1.2	600	3.6
23	Navsari	500	3	500	3	500	3	1500	9
24	Panchmahal	100	0.6	100	0.6	100	0.6	300	1.8
25	Patan	300	1.8	300	1.8	300	1.8	900	5.4
26	Porbandar	200	1.2	200	1.2	200	1.2	600	3.6
27	Rajkot	250	1.5	250	1.5	250	1.5	750	4.5
28	Sabarkantha	200	1.2	200	1.2	200	1.2	600	3.6
29	Surat	200	1.2	200	1.2	200	1.2	600	3.6
30	Surendranagar	200	1.2	200	1.2	200	1.2	600	3.6
31	Tapi	100	0.6	100	0.6	100	0.6	300	1.8
32	Vadodara	200	1.2	200	1.2	200	1.2	600	3.6
33	Valsad	100	0.6	100	0.6	100	0.6	300	1.8
	Total	6900	41.4	6900	41.4	6900	41.4	20700	124.2

4.6.6.5 Researchable and Developmental issues

1 Solar Thermal Energy:

1. **Development of advance processes** for solar detoxification of air and water, solar desalination, very high temperature applications.
2. **Development of advanced solar thermal collectors** (concentrating as well as heat-pipe) for generating heat beyond 80 deg C.
3. **Development of thermal comfort standards** for various category of habitats suitable for range of activities.
4. **Advanced solar systems for cooling** (space cooling, cold storages, and refrigerators for PHCs)
5. **Development of other applications**, which would include innovative designs for solar cooking, solar air heating and drying applications.

6. **Development of concepts and infrastructure prototypes of solar/green buildings**
7. **Designing of test set-ups** for performance characterization and test protocols
8. **Thermal Engineering** of various systems and processes including engineering modeling
9. **Designing of structures**, especially for solar thermal power projects
10. **Development of co/poly generation** solar thermal systems
11. **Environmental Impacts of Renewable Energy Uses**
12. **Solar Hydrogen Generation and storage Technology**

2 Solar PV

1. **Design and development** of Agrivoltaic system and its performance evaluation for different crops in all four regions of the Gujarat state.
2. **Design and development** of high efficiency (>50%) motor pump set of output power of up to 10 hp to lift water from shallow and deep well (about 30 – 60 meters).
3. **Design and development** of small capacity inverter cum charge controller, with high efficiency (up to 90% or more), suitable for use in solar lighting systems including LED based lighting systems.
4. **Design and development of LED** based PV systems for indoor and outdoor lighting applications
5. **Installation and Field-testing** and performance evaluation of grid interactive PV power plants at village level.
6. **Setting up of testing facilities** for different PV systems

3 Bio-Energy:

One of the fastest growing sectors in the renewable energy sector is use of Biomass for power generation or cogeneration (CHP), Biomass gasification, Biogas, Bio-methanation and Biomass to Liquids/Bio-oils (BTL) are some of the emerging technologies. Pyrolysis of biomass to generate Bio-oils and Fischer reaction to produce Hydrocarbons have been in the limelight and show immense promise.

1. High yields of quality feedstock and its production at low costs & to ensure its adequate availability are some of the most important issues for competitive production of Biofuels - biodiesel, bio-ethanol etc. Dealing with these issues is of key importance.
2. There is an increasing global emphasis to develop technologies to enhance yields, efficiencies and reduce cost of production so as to make Biofuels competitive with fossil fuel.
3. New technologies such as pyrolysis of biomass to generate Bio-oils, use of heterogeneous catalyst in Bio-diesel production and single step production of Di-methyl-ether have started occupying centre stage.
4. There is a need for R&D in the area of Applications & Utilization of Biofuels so as to make them compatible with the existing engines, other equipment and machinery for application in various sector including heating & power generation, industry, agriculture, transport, etc.
5. Design, development and introduction of online biochar system for improving soil fertility and crop residue management.

4. Technology Validation and Pilot Projects

1. Demonstration projects related to different renewable energy technology.
2. Domestic, commercial and industrial applications of Solar air conditioning systems

3. Validation of solar passive concepts
4. Solar hybrid plant with coal, gas or bio-mass to address variability and space-constraints,
5. Solar plants with/without storage, based on central receiver technology with molten salt/steam as the working fluid and other emerging technologies.,
6. Solar-based space-cooling and refrigeration systems to meet daytime and summer season peak load. (These could be installed on selected government buildings)
7. PV Based Agrivoltaic and Greenhouse Cultivation System

5. Establishment of Training & Testing Centre

1. Training & Testing center for renewable energy devices
2. Short term training courses:
 - (a) Biogas Development & Training Center (BDTC) for the state of Gujarat
 - (b) Solar and Biomass Energy Training & Testing Centre
3. Vocational Training Courses:
 - a) Greenhouse Technology & Management
 - b) Biogas development, Repair & maintenance
 - c) Biofuel Technology
 - d) Biomass utilization
 - e) Solar Energy Technology Testing and maintenance
4. Establishment of Advanced Fuel Cell & Hydrogen Energy Research Laboratory

4.6.7 BIO-FERTILIZER:

4.6.7.1 Background:

Biofertilizer annual production in India has increased 20 times in past two decades reaching 1,12,992 tons during 2015-16, including liquid formulations. All India Liquid Biofertilizer capacity and production of liquid biofertilizers was 6240.89 KL (2015-16) wherein the Lion share 2873.30 KL was from Gujarat. Gujarat is one of the major players, produced 3,963.42 tonnes and 2,873.30 KL of solid and liquid biofertilizer, respectively during 2015-16, with an annual increase of 8% and 3%, respectively as compared to the previous year 2014-15. Due to ease of use and effective application liquid biofertilizer is gaining popularity among a farming community of the state. For liquid biofertilizer, Gujarat state has an annual production capacity of 11,75,000 Liters and produced 7,38,257 Liters during 2016-17, which is 46% of total production of India (Biofertilizer Statistics, 9th ed. 2016-17, FAI, New Delhi).

Vision:

To explore agriculturally beneficial microbes and mass production as biofertilizers for sustainable agricultural production with soil health management

Mission:

Development of eco-friendly and efficient strains of biofertilizers and bio-degrader for efficient agro waste and nutrient management in an eco-friendly manner

4.6.7.2 Scope

- Biofertilizers are important products and constitute an important component of organic farming. The consumption is increasing rapidly due to awareness about organic consumption.
- Biofertilizers are low input supplementing nutrients into the soil
- Biofertilizer production requires less area with a high return

Table- 4.6.79 Details of Biofertilizer Production in Gujarat State (2011-12 to 2015-16)

Type of Biofertilizer	Production/Year					During 2015-16 % Increase over 2011-12
	2011-12	2012-13	2013-14	2014-15	2015-16	
Solid (tonnes)	2,037.35	978.48	6,411.43	3,667.93	3,963.42	+ 95%
Liquid (KL)	-	-	-	2,800.50	2,873.30	+ 100%
Total	2,037.35	978.48	6,411.43	6,468.43	6,836.72	+ 236%

Table 4.6.80 Unit wise Biofertilizer Production in Gujarat State (2016-17)

Sr. No.	Unit	Production	
		Solid (Tonnes)	Liquid (Liters)
1	Anand Agricultural University, Anand	0.00	8,429.00
2	GSFC Agrotech Ltd., Vadodara	0.00	22,850.00
3	Indian Farmers Fertilizer Cooperative Ltd., Kalol	12.20	1,23,960.00
4	Krishak Bharati Cooperative Ltd., Hajira, Surat	0.00	5,63,420.00
Total		12.20	7,18,659.00

Over and above many players like Navsari Agricultural University, Junagadh Agricultural University, Gujarat Agro Industries Corporation Limited, GUJCOMASOL, and many private organizations are in production of biofertilizers.

4.6.7.3 Challenges and issues before Biofertilizer Sector

Production: Biofertilizer being live microbes their quality and efficacy needs to be controlled at the production level

Marketing: Marketing of biofertilizers requires to be strengthened to reach to farmers easily and timely.

Farmers awareness: Training and know how to farmers of benefits and applications of biofertilizers as they are live microbes, multiply in soil and requires in less quantity as against chemical fertilizers.

Focus

Keeping in view the above facts, following key focus areas are identified in order to overcome the issue of Biofertilizer production at APMC, effective transport and supply to farmers through effective marketing channels in the agriculture sector.

- Establishment of the center of excellence on Biofertilizer research and production
- Establishment of training centers at taluka level.
- Establishment of Regional centre for organic farming effective monitoring of quality inputs for biofertilizers.
- Capacity building for improvement of human resources.
- promote linkages and collaborations with the stakeholders in both private and public sectors and also with other agencies.
- Developing cost-effective and efficient processing technologies for production of Biofertilizer formulations with extended shelf-life, and utilization of agro and city wastes to recycle into rich manure.

4.6.7.4 Priorities:

- Strengthening of existing Biofertilizer production plants in state to meet the requirement of quality products.
- Identification of link agencies/resource agencies for backward and forward linkages for the real success of Biofertilizer for sustainable agriculture.
- Establishment of Regional Biofertilizer production and Farmer's Training Centre at APMC level.

4.6.7.5 Strategic Frame and the Long Term Goals/Targets

Goal	Approach
Research on farmer friendly self-sustainable package of practices for Biofertilizer production and use	To find out cheap locally available sources to produce biofertilizers from agro wastes
HRD, Capacity building and technology transfer	Organizing need based training programmes, trainers' training programmes, interactive meets, conferences/symposia, seminars, etc.
	Dissemination of proven technologies through mass media approaches, exhibitions etc.

4.6.7.6 Researchable issues

- Development of more and more user friendly delivery system of biofertilizer at farm level
- Enhancement of shelf life of microbial inoculants to cater need of market
- Compatibility study of microbial inoculants with agro chemicals for effective integrated nutrient, pests and disease management to develop bio fertilizer product

6. Basic Marketing infrastructures for Bio fertilizer products:

- Strengthening and restructuring the activities of existing marketing channels to providing the network to the Bio fertilizer producers.

4.6.7.7 Project Outcome:

- Among various components of agriculture and allied sectors, the Biofertilizer sector has the potential as low cost input saving Govt subsidies on chemical fertilizers to be one among the best avenues to open new vistas for generating opportunities for entrepreneurship among tribal/rural youth and women and doubling the income of the farmers. Apart from this, Biofertilizer sector will play a vital role in poverty alleviation and women empowerment besides food security mission of the nation.
- Further, the proposed plan will lead to specific human resource development in Biofertilizer sector for long term sustainability as key input of organic farming.

4.6.8 PROMOTION OF EXTENSION ACTIVITY & ICT:

4.6.8.1 Background:

In the present electronic era, the role of ICT in the transfer of technologies to the farmers is utmost necessary to update the latest technical know-how of progressive agriculture.

The strength of Extension activities & Use of ICT in Agriculture in Gujarat state are:

- Well established extension units like EEI, KVK, FFS etc....
- Well-developed co-operatives and NGO's
- Good governance
- Strong and successful co-operative movement in Gujarat state
- Linkage and comprehensive work between research & extension activities
- Strong extension institutional setup and technically skilled human resources
- The training and visiting (T & V) of extension
- Well established FTC, KVKs, SHGs, ATMA and DOA and convergence work
- Krushi Mahotsav

Vision:

- Transfer of production technologies enabling farmers to get optimum returns out of the enterprise.

Mission:

- Delivery of messages of Adoption of package of practices by most of the farmers for high returns.
 - Technology assessment, refinement and transfer of technologies by Improving interface with farmers

4.6.8.2 Issues Impending Growth:

- Wide geographical area
- Scattered farms
- A high ratio of farmers to extension workers
- Lack of awareness of electronic gadgets
- Lack of awareness of regarding marketing and post-harvest technology among farmers

4.6.8.3 Recent Initiatives of Government of Gujarat for Transfer of Technology:

- ❖ Focus on agriculture and sectors through ATMA
- ❖ Use of ICT in agriculture
- ❖ E-governance

4.6.8.4 Extension Projects Proposed in Different Districts of Gujarat State:

1. Establishment of Farmer's Training cum Exhibition Centre

Now, it is necessary to develop agriculture as a family business. Male and female farmers play a crucial part in every stage of Agricultural business, so it is necessary to raise their socio-economic level. Development of Male and female who is associated with Agriculture sector is very low as compared to other sector, so training on scientific farming methods to increase agricultural production is necessary for farmers to force them to adopt new technology.

There are farmer training centers in the state is working at the district level who running various types of agriculture skill development training program. The government can achieve original intent of Agriculture extension scheme of central and state government if upgrade this type of training Centre into **Farmer's Training cum Exhibition Centre**. It will be more useful to Farmers of Gujarat.

Table-4.6.81 Cost of the Project for Each Farmer Training Cum Exhibition Centre at District Level (Rs. in Lakh)

Total no. of District of the state	No. of District in which infrastructure is available	Proposed up gradation of a new Farmer training cum exhibition Centre.	Estimated cost of a Farmer training cum exhibition Centre	Estimated Total Requirement to construct 198 Farmer training cum exhibition Centre
33	33	33	125.00	4125.00
Note: Above total Estimated Requirement includes Cost of establishment of exhibition cum Training center.				

Description	No. of Districts	Year			Total
		1 st	2 nd	3 rd	
Farmer Training Cum Exhibition Centre	33	1375	1375	1375	4125

2. Strengthening of KVK by developing models of agriculture at KVKs

The main function of the KVK is to provide technological backstopping to various stock holders of the district. Therefore, one such model farm in each district is proposed.

Table-4.6.82 Cost requirement for Strengthening of KVK by developing models of agriculture at KVKs (for each KVK)

Sr. no.	Particulars (for each KVK)	Fund required (Rs in Lakh)
1	Ideal demonstration units dairy	30.00
2	Large-scale nursery to provide quality planting material to farmers	50.00
3	Vermi-compost unit / Organic Farming	10.00
4	Net house/ poly house	10.00
5	Unit on medicinal and aromatic plants	10.00
6	Small-scale processing unit	60.00
Total		170.00

Table-4.6.83 Cost requirement for Strengthening of KVK by developing models of agriculture at KVKs (Rs in Lakh)

Description	No. of Districts	Year			Total
		1 st	2 nd	3 rd	
Models of agriculture @ 170.00	30 KVKs	1700	1700	1700	5100

3. Dissemination of Information to farming community through Android/ IOS based Mobile App (M-Agriculture)

Android App with less functionality is already developed benefiting to farmers of the specific region. Currently, App can disseminate relevant information to farmer's community. This project will cater the changing information needs of the farmers, and it will provide appropriate farming advisories in the native language and will also provide a solution of the specific farming problems on individual bases. Also, success stories of progressive farmers will be shared through this platform.

Benefits

- Research recommendation would be easily available in the native language to farmers at anywhere, any time.
- Farmers will get quick solutions for their agricultural and livestock-related queries on a fingertip. Also, farmer can be well aware of latest production and cultivation practices through this App.

Table-4.6.84 Proposed expenditure for Dissemination of Information to farming community through Android/IOS Mobile App (M-Agriculture) (Rs. in Lakh)

Description	Year			
	1 st	2 nd	3 rd	Total
Android / IOS Mobile App	75	50	50	175

4. Project for Solar Agriculture KIOSK

In Gujarat State, geographical remoteness of farm families, difficult terrain and inadequate technical manpower in Agricultural developmental departments makes the information access of rural poor become distant reality and hinder the socio – economic development of the state. Further, low agricultural productivity and food insecurity problem pose a grim scenario for the development. Considering the existing situation, the project proposes to examine the application of information technology for the agricultural information dissemination.

The proposed touch screen kiosk provides the flexibility in providing information on various mode of farming practices including the crops, commodities, and enterprises. The touch screen kiosk will be designed with the static and dynamic information. The content of touch screen kiosk will be controlled by server from the project implementing institution. In the selected villages the touch screen kiosk will be placed which will act as an information hub for the nearby villages. Training to the volunteers and farmers, senior research fellow will be stationed at the touch screen kiosk centre.

Few interested farmers will act as Para extension professionals to communicate and train the other farmers on using the kiosk.

Project Activities

Following activities will be carried out during the project period; farmers' information and knowledge needs assessment, Interactive – touch screen - farmer friendly website designing and hosting, training and capacity building among tribal farmers to use the kiosk and impact assessment. Innovation: The variety of ICT projects in rural India has been implemented in the area of agriculture but, there is no village level ICT initiative in the poorest tribal population. Hence, implementing touch screen kiosk will be innovative. Further the proposed project outcome is helpful in scaling – up the information kiosks in the entire Gujarat. IT provides timely information to the farming community; agricultural Technology & Information access to the farmers and Capacity building among farmers to use and retrieve the information from the kiosk.

Table-4.6.85 Cost for Setting up Agriculture Kiosk (Rs in Lakh)

Sr No	Programme / Schemes	No. of Talukas	Year			Total
			1 st	2 nd	3 rd	
1	A project for setting up agriculture KIOSK @3.0	249	500	244	90	834

4.6.9 ENVIRONMENT, CLIMATE CHANGE AND WEATHER FORECASTING:

4.6.9.1 Background:

The monsoon normally sets in mid-June and withdraws by mid-September. The annual average rainfall of the state is 821 mm which is not reliable neither representative. Average annual rainfall ranges from as high as 2000 mm in the sub-humid southeast to as low as 250 mm in the arid north. The distribution of rainfall, particularly wet and dry spell characteristics, has largely determined the traditional evolution of cropping patterns and agricultural practices. Much of the southern portion of the state experiences excess rainfall frequently. The northern and northwestern parts of Gujarat receive less precipitation and experience frequent failures of monsoon.

Gujarat state receives about 95% of its annual rainfall through the influence of SW monsoon during June to September period. The subdivision wise rainfall analysis revealed that Saurashtra and Kutch subdivision have mean annual rainfall of 428 mm with coefficient of variation of 44% and decreasing trend of –5% per 100 years while Gujarat sub division has mean annual rainfall of 863 mm with coefficient of variation of 32% and decreasing trend of –5% per 100 years.

IPCC (2013) has confirmed changes in Arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns and aspects of extreme weather including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones. The climate change analysis using past data of different stations of Gujarat has revealed that the temporal variability in rainfall indicated different trends in different regions of the State. In middle Gujarat increasing trend is observed in rainfall as well as maximum and minimum temperatures during different seasons. Impact of climate change study revealed that increase in temperature significantly reduced the wheat yield while decrease in temperature increased the yield. The effect of maximum temperature on yield was more than that of minimum temperature. The higher radiation receipt and lower radiation receipt caused decrease in yield under optimal condition whereas, negative effect was seen under sub-optimal condition due to either increase or decreasing radiation. The combined effect of temperature and solar radiation were very marginal at the lower side of yield. More or less similar effects with less magnitude were observed for maize crop also. The annual rainfall of different districts of Gujarat for the past five years is given in table.

Vision:

Developing climate smart agriculture through technological innovations, RS (remote sensing), GIS by establishing network of Automatic weather stations and advisory services

Mission:

- To provide short term and long term information on climatic aberrations at village level by better agro-advisories services
- To suggest suitable crops based on onset of monsoon for sustaining agriculture productivity and accruing more revenue from the farms

Table-4.6.86 District Wise Annual Rainfall (mm) During 2009 to 2013

Districts	Years				
	2009	2010	2011	2012	2013
Ahmedabad	387.1	1097.3	615.2	406.7	929.0
Amreli	513.1	931.1	686.0	344.7	901.2
Anand	357.1	863.5	730.5	571.1	1159.7
Banaskantha	369.9	986.3	790.4	439.2	966.3
Bharuch	430.4	902.6	610.5	401.7	1165.1
Bhavnagar	383.1	790.0	573.6	381.5	933.2
Dahod	439.2	586.1	572.3	731.7	802.3
Dang	1532.0	1887.0	1609.5	1450.2	1642.0
Gandhinagar	510.1	921.2	665.0	597.4	1048.0
Jamnagar	918.0	1505.8	794.6	367.2	934.1
Junagadh	1333.9	1701.7	1080.1	429.8	1192.4
Kheda	450.9	847.0	584.3	644.4	1027.2
Mehsana	448.0	823.7	748.5	456.7	835.0
Narmada	789.2	912.9	1053.5	784.0	1685.0
Navsari	1486.4	1982.0	1902.5	1073.5	2046.1
Panchmahal	487.2	710.9	746.6	778.7	1095.0
Patan	295.7	779.1	718.2	337.6	764.7
Porbandar	1455.8	1684.4	916.9	205.7	1114.3
Rajkot	540.8	1248.0	870.1	395.0	1020.4
Sabarkantha	659.9	897.7	993.8	792.1	1134.7
Surat	1307.4	1570.7	1305.8	816.9	1958.7
Surendranagar	279.4	803.0	660.5	330.7	672.0
Tapi		1428.0	1107.8	854.6	1719.3
Vadodara	526.2	950.1	866.2	624.6	1442.1
Valsad	1627.9	1515.3	2234.5	1497.2	2802.0

Table-4.6.87 Annual Rainfall (mm), Maximum Temperature (Tmax, C), Minimum Temperature (Tmin, C) and Relative Humidity (RH,%) at Different Stations

Station	2009				2010				2011				2012				2013			
	Rain fall	T max	T min	R H	Rain fall	T max	T min	R H	Rain fall	T max	T min	R H	Rain fall	T max	T min	R H	Rain fall	T max	T min	R H
Amreli	461.3	35.4	20.6	69	839.6	34.7	21.4	68	800.5	34.1	20.8	76	419.1	34.4	20.4	74	793.8	33.6	20.6	76
Anand	380.4	34.5	21.1	79	945.5	34.1	21.3	82	877.8	34.1	20.3	82	882.7	33.4	19.8	84	1375.0	33.1	20.2	86
Arnej	338.0	35.5	20.6	69	1190.0	35.3	20.8	67	833.5	34.4	20.5	71	579.0	34.9	20.1	69	870.0	34.1	20.2	72
Bharuch	405.8	34.5	21.8	70	1411.4	34.7	21.9	73	936.4	34.6	21.2	73	603.6	34.3	21.1	70	1443.4	33.7	21.4	75
Dabhoi	517.3	34.4	21.3	70	1294.5	34.1	20.9	69	1134.9	34.3	20.7	62	668.0	34.4	19.9	64	1313.0	33.7	20.6	70
D'Baria	759.5	34.7	18.7	80	1113.1	34.0	17.8	81	994.6	32.5	17.9	82	1172.7	33.1	15.4	82	1148.5	33.1	18.4	86
Derol	323.2	34.0	20.0	78	1176.4	34.1	20.6	77					757.0	32.4	19.8	83	972.3	32.2	20.3	90
Devataj	444.6	34.9	22.0	78	999.4	35.3	20.8	80	791.0	35.1	19.9	79	717.5	33.5	18.1	84	1266.4	35.5	18.4	77
Dhandhu ka	325.3	36.6	20.6	78	786.9	36.4	20.8	76	529.9	35.9	20.4	77	484.7	35.9	19.8	78	991.0	35.0	20.3	76
Dharmaj	1304.0	34.5	20.4	83	938.0	34.1	20.7	82	777.0	33.9	20.0	81	514.0	33.4	19.4	84	1304.0	33.0	20.1	82
Godhra	646.2	34.1	20.8	72	947.8	33.9	21.6	74	957.0	33.0	19.7	73	1339.2	33.0	19.0	71	1335.2	32.8	19.2	71
Jamnagar	765.5	32.8	20.9	84	1387.0	32.3	20.7	85	660.0	32.0	20.9	84	348.0	31.3	21.2	83	1209.0	31.8	20.7	83
Junagadh	830.2	34.6	21.1	73	1533.5	34.1	21.4	78	962.7	33.6	21.0	76	425.0	34.2	20.5	72	1519.5	33.4	21.0	75
Mahuva	464.0	33.2	21.1	63	728.5	32.0	18.8	62	524.0	31.7	20.4	59	88.5	32.7	19.3	60	972.0	31.8	20.2	61
Mangrol	2380.0	32.3	22.9	75	1896.0	33.9	21.1	81	624.0	33.9	20.6	78	338.0	33.3	19.2	75	832.0	32.3	20.7	80
Navagam	266.4	34.4	20.6	75	1009.2	34.2	20.8	80	591.4	33.8	20.3	76	557.3	33.6	19.8	76	1062.2	32.9	20.4	77
Navsari	1638.7	32.8	21.7	82	2181.0	32.2	21.9	87	1597.0	32.9	21.6	82	1262.0	29.3	19.3	84	2439.8	32.0	21.1	85
Paria	1901.1	33.6	19.5	86	2472.0	33.4	19.7	87	2561.4	33.4	18.2	85	1597.2	33.1	18.4	85	2819.0	32.9	18.8	87
Rajkot	459.6	34.0	20.0	75	1211.6	34.4	20.9	68	651.6	34.8	21.6	71	308.2	32.0	19.4	37	810.2	34.0	19.7	78
Sanand	314.8	35.1	20.3	73	521.5	34.6	20.8	72	275.9	34.2	19.3	78	322.4	32.1	17.5	73	756.3	32.6	18.6	71
SKNagar	393.6	34.6	18.0	76	1218.0	34.3	19.9	78	964.3	33.7	18.0	80	451.3	33.2	18.6	78	1107.5	33.0	19.6	81

4.6.9.2 Researchable Issues:

1. Need to monitor GHGs and air pollutants and study the effect of on agriculture
2. Understanding indigenous and ancient knowledge of weather forecasting
3. Weather forecasting at taluka/village levels on short, medium and extended range
4. Impact, adaptation and vulnerability of agriculture to Climate change
5. Understanding climate models and climate change projection for Gujarat
6. Climate change and its impact on livestock, poultry etc.
7. Integrating spatial information on agro climatic resources

Table - 4.6.88 List of Agrometeorological Observatories and Automatic Weather Stations in Gujarat

Sr.	District	No. of Talukas	Agromet. Observatory	AWS_ AGRI	AWS_ IMD	AWS_ ISRO
1	Ahmedabad	9	3	2	2	5
2	Amreli	12	2	1		
3	Anand	8	3	1	1	1
4	Aravalli	6	1			1
5	Banaskantha	14	1			3
6	Bharuch	9	4			3
7	Bhavnagar	9	1	1		1
8	Botad	5	1			
9	Chhota Udepur	6	1			
10	Dangs	3	1		1	
11	Devbhumi Dwarka	4			1	1
12	Dahod	8	1	1	1	1
13	Gandhinagar	4			1	1
14	Gir Somnath	6	1			1
15	Jamnagar	6	1	1		1
16	Junagadh	10	2	1	1	1
17	Kachchh	10	2		2	2
18	Kheda	10	1	1		2
19	Mahisagar	6	1			1
20	Mehsana	11	3		1	2
21	Morbi	5				1
22	Narmada	4			1	1
23	Navsari	6	2			1
24	Panchmahals	7	2	1		1
25	Patan	10	1			3
26	Porbandar	3		1		1
27	Rajkot	11	1	1	1	
28	Sabarkantha	8	1		1	1
29	Surat	10	2		1	2
30	Surendranagar	10	1	1	1	
31	Tapi	5	1			1
32	Vadodara	8	3	1	1	1
33	Valsad	6	1			
	Total	249	45	14	17	40

PROJECT -1

Title: Capacity Building for adopting Climate Change

Training facilities will be created at all the four Department/centres of Agricultural Meteorology, in each agricultural universities and regular training programme will be organized as per schedule separately for scientists, government officials and farmers. Besides, the trainees will be taken to various locations across the Gujarat and other nearby states for practical demonstration of the mitigation strategies being followed through various management practices. The resource persons will be invited from national institutes on different aspects related to climate. The duration of training may be 5-10 days. A group of 20-25 participants will be selected for each type of training programme. While in awareness programme about 100 farmers/students will be chosen.

Objectives:

1. To demonstrate the various agricultural management practices as a climate change mitigation strategy
2. To impart training to scientists'/govt. officials/ progressive farmers.
3. To organize climate change awareness programme for school students and farmers.

Financial outlay (Rs. in lakh)

Item	I st Year	II nd year	III rd year	Total
Pay and allowance	6.6	6.6	6.6	19.8
Recurring contingency	10.0	10.0	10.0	30
Non Recurring contingency	20.0	-	-	20
TOTAL	36.6	16.6	16.6	69.8

Total outlay Rs. 103.0 x 4 (Centers) = 412.0 lakh

PROJECT -2

Title: Effect of Environment on Phenotypic Performance of Dairy

Cattle/Bufaloes and Strategies to deal with in Climatic Conditions of Gujarat

It is known fact that the temperature and humidity affect the phenotypic performance of dairy animals. To minimize the effect of heat stress on cattle traditional methods are being practiced as village level. However, scientifically defined methods need to be explored and to be tested under Gujarat conditions.

Objectives:

1. To study the effect of environment and stress period round the year reciprocating temperature and relative humidity on dairy cattle and buffaloes
2. To identify threshold levels of reciprocal effect of temperature and relative humidity on milk production, lactation curve and other reproduction and production performance of dairy cows and buffaloes
3. To study threshold levels of reciprocal effect of temperature and relative humidity in different parts of Gujarat
4. To study suitable strategies to minimize the effect of heat stress on dairy production, and reproduction cattle and buffaloes

Financial outlay (Rs. in Lakh)

Item	I st Year	II nd year	III rd year	Total
Pay and allowance	30.0	33.0	36.3	99.3
Recurring contingency	120.0	132.0	145.2	397.2
Non Recurring contingency	72.0	79.2	87.1	238.3
Building- Civil works	363.0	330.0	300.0	993.0
Total	585.0	574.2	568.6	1727.8

Total outlay Rs. 1727.8 lakh
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4.6.10 AGRICULTURAL MARKETING:

4.6.10.1 Background:

To address the demands for marketing of increased and diversified agricultural marketable surplus there is a need to strengthen the network of regulated markets and augment it with alternative marketing channels. As per the recommendation of the National Farmers Commission (2004), that a regulated market should be available to farmers within a radius of 5 Km (corresponding market area of about 80 square km.). However, presently all-India average area served by a regulated market is 487.40 square km. The numbers of commodity specific markets with requisite infrastructure are also limited. Therefore, it is required to make necessary changes in agricultural marketing policy. Considering the opportunities and challenges, some suggestions are made for inclusion in state agricultural plan

Vision:

In order to keep pace with the changing production pattern and growing marketable surplus, the Government advocates development of adequate number of markets equipped with modern infrastructure, with increased private sector participation and development of other marketing channels like;

- (i) Direct marketing,
- (ii) Contract farming,
- (iii) Establishment of producers' cooperatives,
- (iv) Strengthening e-NAM,
- (v) Marketing of farm inputs and outputs *viz.*, fodder, cow milk, *etc.*,
- (vi) Developing infrastructures at farmers' level package house, and
- (vii) Value addition through agro-processing, and agribusiness *etc.*

Further, as a part of reforms, Government announced a scheme for setting up of National Agriculture Market (NAM). Under NAM, a common e-market platform is to be deployed for on-line trading across the States/Country. It is expected that NAM would address the marketing constraints of fragmentation, lack of transparency in bidding, poor price discovery, information asymmetry between sellers and buyers and provide farmers with a larger share of the consumer rupee.

Mission:

Making farming remunerative and economically sustainable by providing pro-poor marketing system and enabling environment

4.6.10.2 Marketing Related Issues and Recommended Activities:

1. **Establishing inclusive linkage among stakeholders, growers, traders, processors and exporters**

Activities:

- Establishment/ organization of commodity groups cluster wise for marketing in the State.
- Development of market extension center at each district/ block level for capacity building and dissemination of marketing information.
- Co-ordinating through State Agricultural Marketing Boards to promote inter-state marketing for better market integration.
- Arrangement of Buyers - Sellers Meets for inter and intra state.
- Developed separate platform between farmers and bulk buyers in the State.

2. Establishing wholesale markets by providing necessary infrastructure facilities.

Activities:

- ❖ Construction of roads linking villages with nearby assembling and wholesale markets.
- ❖ Development of temporarily collection center nearby vegetable producing area.
- ❖ Construction of more rural godown at village level.
- ❖ Development of cold chains for perishables in the regulated market.
- ❖ Strengthening storage system at farm level.
- ❖ Fasten the development of terminal market in the state.
- ❖ Strengthen agri-export zone effectively.
- ❖ Linking all regulated market with spot e-market platform to reduce the demand supply gap for vegetables crops.
- ❖ Develop direct marketing model as Rhytu bazar in Gujarat.
- ❖ Development of Separate export unit in all regulated market to take care of Export of different commodity or developed separate export council in the state for export of agro commodity.

3. Underdeveloped market information and intelligence mechanism

Activities:

- ✚ To strengthen Marketing Research and Market Led Extension.
- ✚ Strengthening of Market Intelligence and Information System.
- ✚ Developing effective communication network system between all APMC for exchange on information and trading of commodity.

Development of Physical facilities

Agricultural Marketing:

The success of agricultural enterprises would depend not only efficient production but also on the efficient marketing infrastructure which would ensure remunerative prices to farmers. The details of agricultural markets functioning in the state are given in Table-1.

Table-4.6.89: Marketing Infrastructure

Regions	Sr. No.	Name of district	Existing marketing facilities (2016-17)		
			Principal (No.)	Sub-market Yards (No.)	Total
South Gujarat	1.	Bharuch	7	12	19
	2.	Narmada	4	3	7
	3.	Surat	8	14	22
	4.	Tapi	5	11	16
	5.	Valsad	5	12	17
	6.	Navsari	4	7	11
	7.	Dang	1	-	1
Middle Gujarat	8.	Gandhinagar	4	7	11
	9.	Ahmedabad	9	10	19
	10.	Kheda	8	12	20
	11.	Anand	8	9	17
	12.	Vadodara	8	7	15
	13.	Chhotaudepur	5	10	15
	14.	Panchmahal	7	11	18
	15.	Dahod	7	9	16
	16.	Mahisagar	5	6	11

Regions	Sr. No.	Name of district	Existing marketing facilities (2016-17)		
			Principal (No.)	Sub-market Yards (No.)	Total
North Gujarat	17.	Sabarkantha	7	7	14
	18.	Arvali	6	7	13
	19.	Banskantha	13	9	22
	20.	Mehsana	11	7	18
	21.	Patan	8	1	9
	22.	Kuchchh	8	2	10
Saurashtra	23.	Amreli	11	2	13
	24.	Bhavnagar	10	-	10
	25.	Botad	4	1	5
	26.	Jamnagar	6	-	6
	27.	Dev. Dwarka	3	-	3
	28.	Junagadh	9	1	10
	29.	Gir Somnath	5	-	5
	30.	Porbandar	2	-	2
	31.	Rajkot	9	2	11
	32.	Morbi	3	2	5
	33.	Surendranagar	8	1	9
		Total	218	182	400

Strengthening of APMC:

Under the plan, it is proposed to strengthen the existing APMC all over the state, particularly newly formulated districts in 2013 (marked as *). The district wise numbers and financial requirement during 2017-20 has been furnished in Table-2. The total numbers of APMC strengthen during the plan will be **222** and the total financial requirement for the plan will be Rs. **33.96** crores.

Table-4.6.90: Strengthening of APMC

(Phy- unit in Nos., Fin Rs. in Lakh)

Regions	Sr. No.	Name of district	Projection for Nos. and financial requirements							
			2017-18		2018-19		2019-20		Total	
			Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
South Gujarat	1.	Bharuch	2	50	2	50	2	50	6	150
	2.	Narmada	2	30	2	30	2	30	6	90
	3.	Surat	3	50	3	50	3	50	9	150
	4.	Tapi	3	50	3	50	3	50	9	150
	5.	Valsad	3	50	3	50	3	50	9	150
	6.	Navsari	2	50	2	50	2	50	6	150
	7.	Dang	2	30	2	30	2	30	6	90
Middle Gujarat	8.	Gandhinagar	2	40	2	40	2	40	6	120
	9.	Ahmedabad	4	96	4	96	4	96	12	288
	10.	Kheda	2	40	2	40	2	40	6	120
	11.	Anand	2	48	2	48	2	48	6	144
	12.	Vadodara	3	72	3	72	3	72	9	216
	13.	Chhotaudepur *	2	20	2	20	2	20	6	60

Regions	Sr. No	Name of district	Projection for Nos. and financial requirements							
			2017-18		2018-19		2019-20		Total	
			Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
	14	Panchmahal	2	30	2	30	2	30	6	90
	15.	Dahod	2	30	2	30	2	30	6	90
	16.	Mahisagar*	2	20	2	20	2	20	6	60
North Gujarat	17.	Sabarkantha	3	30	3	30	3	30	9	90
	18.	Arvalli*	2	20	2	20	2	20	6	60
	19.	Banskantha	3	36	3	36	3	36	9	108
	20.	Mehsana	2	25	2	25	2	25	6	75
	21.	Patan	2	30	2	30	2	30	6	90
	22.	Kuchchh	2	20	2	20	2	20	6	60
Saurashtra	23.	Amreli	2	50	2	50	2	50	6	150
	24.	Bhavnagar	2	30	2	30	2	30	6	90
	25.	Botad*	2	20	2	20	2	20	6	60
	26.	Jamnagar	2	15	2	15	2	15	6	45
	27.	Dev. Dwarka*	2	20	2	20	2	20	6	60
	28.	Junagadh	2	20	2	20	2	20	6	60
	29.	Gir Somnath*	2	20	2	20	2	20	6	60
	30.	Porbandar	1	15	1	15	1	15	3	45
	31.	Rajkot	3	30	3	30	3	30	9	90
	32.	Morbi*	2	20	2	20	2	20	6	60
	33.	Surendranagar	2	25	2	25	2	25	6	75
		Total	74	1132	74	1132	74	1132	222	3396

Establishment of rural godowns:

Warehousing is one of the critical infrastructural facilities needed to support marketing of agriculture produce. In India, small and marginal farmers constituting major farming community do not have the facility to retain the farm products with themselves till the market prices are favorable. In order to create good marketing infrastructure, there is a need to have adequate warehousing capacity in conjunction with wholesale markets. Moreover, it is very much essential to provide the growers facilities for scientific storage so as to avoid produce deterioration during post-harvest period till the produce is withheld for marketing at appropriate time. Therefore, an establishment of Rural Godowns will enable small and marginal farmers to increase their holding capacity which will make them to sell their produce at remunerative prices and avoid distress sales. The following Table-3 presents the district wise numbers and financial requirement for the establishment of rural godowns in the state during the plan period. The total numbers of rural godowns created will be 10401 which require the investment of Rs. 292.80 crores in the state.

Table 4.6.91: District wise Establishment of Rural godowns (Fin. In Rs. Lakh)

Sr. No.	Name of district	2017-18 (projected)		2018-19 (projected)		2019-20 (projected)		Total (projected)	
		No.	Fin.	No.	Fin.	No.	Fin.	No.	Fin.
1.	Bharuch	64	128	64	128	64	128	192	384
2.	Narmada	11	22	11	22	11	22	33	66
3.	Surat	100	415	100	415	100	415	300	1245
4.	Tapi	40	100	40	100	40	100	120	300
5.	Valsad	35	175	35	175	35	175	105	525
6.	Navsari	40	90	40	90	40	90	120	270
7.	Dang	5	10	5	10	5	10	15	30
8.	Gandhinagar	80	240	80	240	80	240	240	720
9.	Ahmedabad	400	1400	400	1400	400	1400	1200	4200
10.	Kheda	60	120	60	120	60	120	180	360
11.	Anand	115	345	115	345	115	345	345	1035
12.	Vadodara	300	1050	300	1050	300	1050	900	3150
13.	Chhotaudepur*	40	80	40	80	40	80	120	240
14.	Panchmahal	60	120	60	120	60	120	180	360
15.	Dahod	40	80	40	80	40	80	120	240
16.	Mahisagar*	40	80	40	80	40	80	120	240
17.	Sabarkantha	254	508	254	508	254	508	762	1524
18.	Arvali*	45	90	45	90	45	90	135	270
19.	Banskantha	150	300	150	300	150	300	450	900
20.	Mehsana	90	225	90	225	90	225	270	675
21.	Patan	60	90	60	90	60	90	180	270
22.	Kuchchh	52	156	52	156	52	156	156	468
23.	Amreli	285	570	285	570	285	570	855	1710
24.	Bhavnagar	43	430	43	430	43	430	129	1290
25.	Botad*	20	60	20	60	20	60	60	180
26.	Jamnagar	45	450	45	450	45	450	135	1350
27.	Dev. Dwarka*	20	50	20	50	20	50	60	150
28.	Junagadh	241	482	241	482	241	482	723	1446
29.	Gir Somnath*	120	240	120	240	120	240	360	720
30.	Porbandar	7	14	7	14	7	14	21	42
31.	Rajkot	331	1092	331	1092	331	1092	993	3276
32.	Morbi*	120	240	120	240	120	240	360	720
33.	Surendranagar	154	308	154	308	154	308	462	924
	Total	3467	9760	3467	9760	3467	9760	10401	29280

Establishment of processing units:

Value added agriculture refers most generally to manufacturing processes that increase the value of primary agricultural commodities. Value-added agriculture may also refer to increasing the economic value of a commodity through particular production processes, e.g. organic produce, or through regionally-branded products that increase consumer appeal and willingness to pay a premium over similar but undifferentiated products. Action needed for providing effective financial support, favourable government policies and laws and linkages among producers, industry, R&D institutions and other partners are needed. The basic Marketing Infrastructure for Agro-processing units in the state is given in Table-4. The district

wise numbers proposed will be 1895 and total financial requirements for different types of processing units will stand to Rs. 111.68 crores in the state during the plan period.

Table-4.6.92: Number of processing units and financial requirements

(Phy- unit in Nos., Fin Rs. in Lakh)

Sr. No	Name of district	2017-18 (projected)		2018-19 (projected)		2019-20 (projected)		Total (projected)	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
1.	Bharuch	2	14	2	14	3	21	7	49
2.	Narmada	2	14	2	14	3	21	7	49
3.	Surat	5	115	5	115	5	115	15	345
4.	Tapi	3	35	3	35	4	36	10	106
5.	Valsad	3	50	3	50	3	50	9	150
6.	Navsari	2	35	2	35	3	52	7	122
7.	Dang	1	7	1	7	1	7	3	21
8.	Gandhinagar	4	40	4	40	5	50	13	130
9.	Ahmedabad	90	225	90	225	90	225	270	675
10.	Kheda	3	21	3	21	5	35	11	77
11.	Anand	5	50	5	50	6	60	16	160
12.	Vadodara	30	300	30	300	30	300	90	900
13.	Chhotaudepur*	3	21	3	21	3	21	9	63
14.	Panchmahal	3	21	3	21	4	28	10	70
15.	Dahod	3	21	3	21	3	21	9	63
16.	Mahisagar*	2	14	2	14	3	21	7	49
17.	Sabarkantha	100	500	100	500	100	500	300	1500
18.	Arvalli*	4	28	4	28	5	35	13	91
19.	Banskantha	90	450	90	450	90	450	270	1350
20.	Mehsana	62	372	62	372	62	372	186	1116
21.	Patan	83	581	83	581	83	581	249	1743
22.	Kuchchh	4	32	4	32	5	40	13	104
23.	Amreli	5	60	5	60	5	60	15	180
24.	Bhavnagar	4	35	4	35	5	50	13	120
25.	Botad*	2	14	2	14	3	21	7	49
26.	Jamnagar	3	230	3	230	3	230	9	690
27.	Dev. Dwarka*	2	14	2	14	2	14	6	42
28.	Junagadh	5	60	5	60	6	72	16	192
29.	Gir Somnath*	3	25	3	25	3	25	9	75
30.	Porbandar	3	25	3	25	3	25	9	75
31.	Rajkot	90	220	90	220	90	220	270	660
32.	Morbi*	3	25	3	25	4	32	10	82
33.	Surendranagar	2	20	2	20	3	30	7	70
	Total	626	3674	626	3674	643	3820	1895	11168

Development of terminal market:

It is proposed to establish four terminal markets in each zone of the state and the total financial requirements for establishment of four terminal markets will be Rs. 14.40 crores as depicted in Table-5. The terminal market will help for the export of agricultural produce to each zone for their specific exportable commodities.

Table-4.6.93: Development of Terminal market in Four Zone

(Phy – No. of units, Fin. – Rs. in lakh)

Sr. No	Districts	2017-18 (projected)		2018-19 (projected)		2019-20 (projected)		Total (projected)	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
1.	Central Zone Ahmedabad	1	120	-	120	-	120	1	360
2.	North Zone Unza	1	120	-	120	-	120	1	360
3.	Saurashtra Zone Rajkot	1	120	-	120	-	120	1	360
4.	South Zone Surat	1	120	-	120	-	120	1	360
	Total	4	480	-	480	-	480	4	1440

4.6.11 POST HARVEST MANAGEMENT AND VALUE ADDITION OF HORTICULTURE CROPS:

4.6.11.1 Background:

Losses of field and horticultural crops can be minimized by proper handling, marketing and processing of the commodities. The government has accorded high priority by providing fiscal relief and incentives to encourage commercialization and value addition to horticultural produce for minimizing pre and post-harvest wastage and generating employment and export growth. Even by processing such a meagre quantity (2.4%), the food processing industry ranks fifth in size in the country and employs 16 lakh workers which is 19% of the country's industrial labour. It accounts for 14% of the total industrial output with 18% of industrial GDP and 6.3% of countries GDP. So, food processing plays a vital role in increasing India's prosperity and thus must need expansion throughout country on priority basis. For this purpose, there is urgent need to strengthen Post Harvest Technology in SAUs of the country. Mango, sapota, banana and Papaya are important crops of the South Gujarat regions and cultivated in Navsari, Valsad, Surat, Bharuch, Narmada and Tapi districts. The consumption of the horticultural produce at domestic as well as international level in the Gujarat state is lagging behind requiring concerted effort. Though, the paradigm shifts in research and cultivation during 9th to 11th FY plan in the state aided to achieve commendable position but the current issues to be phase cannot be overlooked.

Vision:

Prevention of Post-Harvest losses and quality assurance of horticultural produce / food through processing and value addition to augment the income of farming community /entrepreneurs

Mission:

- Human Resource Development
- Research on Post-Harvest technology of Horticultural Crops
- Development of appropriate PHT technologies for industries
- Technical knowhow and advisory services
- Consultancy services
- Community Canning Services
- Commercial manufacturing of fruit and vegetable products

4.6.11.2 Crop/Area Issues:

Mango, Banana, Sapota and Papaya cultivation:

- Area: Area increasing year by year replacing cereal crops and other field crops.
- Productivity: Area wise fluctuation for yield have to be minimize gap between zone, area and soil type widely differed needs reduce.
- Scattered / uneven distribution of rainfall, often flood and draught situation risk in some pockets
- Planting material supply: supply unauthorized planting material
- Poor mechanization and acute labour shortage in major area of state
- High cost input year by year
- Emerging pests and diseases and injudicious use of insecticides rendered ineffective and uneconomical crop.
- Climate change impact
- Sustainability of cultivation

- Poor post-harvest and waste management
- Quality of produce: Trade base quality produce should have to be produced
- Macro/ micro nutrient management
- Development of saline resistant genotype
- Research for emerging/ new issues related to horticultural crops

Post harvesting:

- Storage and transportation facility to be improved and should be easily available
- Old processing machineries and poor storage facilities at many of the research centers of SAU which may replace by new one.
- Poor infrastructure for grading and quality evaluation/maintenance
- Fluctuating prices of produce during glut season.
- Farmers not aware of successful post-harvest technologies.
- Farmers not aware of type, quantity & quality of produce required in market and also not conscious about the importance of uniform quality of produce.
- Technical help to farmers on PHM is totally missing.
- Non-existence of post-harvest value chain. Fragmented supply based on production only.

4.6.11.3 Priorities:

- Promoting contract farming for organic cultivation and establishing organic input supply chain.
- Modernization and up gradation and establishing modern Processing units at new areas along with modern quality testing facilities.
- Modernization and up gradation of low temperature storage and packaging unit facilities.
- Export oriented research for post-harvest treatments
- Crop residue management for improvement of soil organic carbon content/ soil health
- Promoting pre-cooling, CA and MA storage.
- Research and training on proper ripening practices.
- Training to the grower for proper harvesting methods.
- Empowering woman for domestic and house hold processing of unmarketable produce for social Upliftment.
- Farmers training to low cost processing techniques and proper post-harvest management.
- Relevant training and effective demonstration of crop specific post-harvest technologies to line department officials, NGOs, Cooperatives and progressive farmers, followed by village \ taluka level training to other farmers. This can be done through involvement of professional research and training centers/ institutes/agencies.
- Linking farmers with Processors/Market through appropriate mechanisms such as two/three tier cooperatives, FPO/Farmer Producer Companies, selected NGOs or by direct intervention by Govt or through PPP.
- Periodic assessment of crop specific post-harvest losses at district level and subsequently crop planning and post-harvest management.
- Establishment of Cluster based Post-Harvest Handling –cum – Primary Processing Centers equipped with required modern facilities.
- Establishment of Centre of Excellence in PHM in the state for research, training, demonstration and consultancy.

- Appropriate management of crop residues in wheat, paddy, cotton and sugarcane at field level.
- Incentivize use of renewable energy and energy efficient cold chain in PHM.
- Application of ICT for training and post-harvest handling of agri produce.
- Linking farmers with Integrated Scheme for Agricultural Marketing (ISAM). Under this scheme, government provides supports to an individual, a company, a farmer, local government, NGOs and various associations, if they build or renovate rural godowns. Government provides 25% of the capital investment made in such a venture. If the Godown is built or renovated by a woman farmer, the government support is 33.33% of the total capital investment.
- Solar powered cold storage systems should be promoted.

4.6.11.4 Sustainability Issues and Gap Analysis:

Table-4.6.94 Sustainability Issues and Gap Analysis of Productivity of Different Horticultural Crop and Recourses

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
1	Mango	Ripening	Improper and illegal ripening practices	Research on residue free ripening practices	Environment friendly and hazard free methodology.	Export oriented produce
		Storage	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Export oriented produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power
2	Sapota	Ripening	Improper and illegal ripening practices	Research on residue free ripening practices	Environment friendly and hazard free methodology.	Export oriented produce
		Storage	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Export oriented produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power
3	Banana	Ripening	Improper and illegal ripening practices	Research on residue free ripening practices	Environment friendly and hazardfree methodology.	Export oriented produce
		Storage	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Export oriented produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power
4	Papaya	Ripening	Improper and illegal ripening practices	Research on residue free ripening practices	Environment friendly and hazard free methodology.	Export oriented produce
		Storage	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Export oriented produce

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power
5	Pomegranate/ Guava	Packing	Improper and illegal packing practices	Research on damage less packing practices	Environment friendly and hazard free methodology.	Export oriented produce
		Storage	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Export oriented produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power

4.6.11.5 Researchable Issues:

- Modernization and up gradation and establishing modern Processing units at new areas along with modern quality testing facilities.
- Modernization and up gradation of low temperature storage and packaging unit facilities.
- Export oriented research for post-harvest treatments
- Crop residue management for improvement of soil organic carbon content/ soil health
- Promoting pre-cooling, CA and MA storage.
- Research on proper ripening practices.

Table-4.6.95 District wise Establishment of small scale fruit and vegetable processing units (Phy – No. of units, Fin – Rs. in Lakh)

Sr. No.	Name of District	Processing Units							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	-	-	-	-	-	-
2	Amreli	-	-	-	-	-	-	-	-
3	Anand	1	10	1	10	1	10	3	30
4	Aravali	-	-	-	-	-	-	-	-
5	Banaskantha	-	-	-	-	-	-	-	-
6	Bharuch	-	-	-	-	-	-	-	-
7	Bhavnagar	-	-	-	-	-	-	-	-
8	Botad	-	-	-	-	-	-	-	-
9	Chotta Udaipur	-	-	-	-	-	-	-	-
10	Dahod	1	10	1	10	1	10	3	30
11	Dang	-	-	-	-	-	-	-	-
12	Devbhumi Dwarka	-	-	-	-	-	-	-	-
13	Gandhinagar	-	-	-	-	-	-	-	-
14	Gir Somnath	-	-	-	-	-	-	-	-
15	Jamnagar	-	-	-	-	-	-	-	-
16	Junagadh	1	10	1	10	1	10	3	30
17	Kheda	-	-	-	-	-	-	-	-
18	Kutch	-	-	-	-	-	-	-	-
19	Mahisagar	-	-	-	-	-	-	-	-
20	Mehsana	-	-	-	-	-	-	-	-
21	Morbi	-	-	-	-	-	-	-	-
22	Narmada	-	-	-	-	-	-	-	-
23	Navsari	1	10	1	10	1	10	3	30
24	Panchmahal	-	-	-	-	-	-	-	-
25	Patan	-	-	-	-	-	-	-	-
26	Porbandar	-	-	-	-	-	-	-	-
27	Rajkot	-	-	-	-	-	-	-	-
28	Sabarkantha	1	10	1	10	1	10	3	30
29	Surat	-	-	-	-	-	-	-	-
30	Surendranagar	-	-	-	-	-	-	-	-

Sr. No.	Name of District	Processing Units							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
31	Tapi	-	-	-	-	-	-	-	-
32	Vadodara	1	10	1	10	1	10	3	30
33	Valsad	1	10	1	10	1	10	3	30
	TOTAL	7	70	7	70	7	70	21	210

Cost Norms: Rs. 10 Lakh/Unit

Table-4.6.96 District wise Establishment of Cold Storage

Sr. No.	Name of Districts	Cold Storage (Phy- No. of units, Fin-Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	-	-	1	300	1	300
2	Amreli	-	-	-	-	1	300	1	300
3	Anand	-	-	-	-	1	300	1	300
4	Aravali	-	-	-	-	1	300	1	300
5	Banaskantha	-	-	-	-	1	300	1	300
6	Bharuch	-	-	-	-	1	300	1	300
7	Bhavnagar	-	-	-	-	1	300	1	300
8	Botad	-	-	-	-	1	300	1	300
9	Chotta Udaipur	-	-	-	-	1	300	1	300
10	Dahod	-	-	-	-	1	300	1	300
11	Dang	-	-	-	-	1	300	1	300
12	Devbhumi Dwarka	-	-	-	-	1	300	1	300
13	Gandhinagar	-	-	-	-	1	300	1	300
14	Gir Somnath	-	-	-	-	1	300	1	300
15	Jamnagar	-	-	-	-	1	300	1	300
16	Junagadh	-	-	-	-	1	300	1	300
17	Kheda	-	-	-	-	1	300	1	300
18	Kutch	-	-	-	-	1	300	1	300
19	Mahisagar	-	-	-	-	1	300	1	300
20	Mehsana	-	-	-	-	1	300	1	300
21	Morbi	-	-	-	-	1	300	1	300
22	Narmada	-	-	-	-	1	300	1	300
23	Navsari	-	-	-	-	1	300	1	300
24	Panchmahal	-	-	-	-	1	300	1	300
25	Patan	-	-	-	-	1	300	1	300
26	Porbandar	-	-	-	-	1	300	1	300
27	Rajkot	-	-	-	-	1	300	1	300
28	Sabarkantha	-	-	-	-	1	300	1	300
29	Surat	-	-	-	-	1	300	1	300
30	Surendranagar	-	-	-	-	1	300	1	300
31	Tapi	-	-	-	-	1	300	1	300
32	Vadodara	-	-	-	-	1	300	1	300
33	Valsad	-	-	-	-	1	300	1	300
	TOTAL	-	-	-	-	33	9900	33	9900

Cost Norms: Rs. 300 Lakh/Unit

Table-4.6.97 District Wise Establishment of Location Specific Research Unit for Value Addition

Sr. No.	District	Location Specific Research Unit (Phy- No. of units, Fin-Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	-	-	-	-	-	-
2	Amreli	-	-	-	-	-	-	-	-
3	Anand	-	-	-	-	1	50	1	50
4	Aravali	-	-	-	-	-	-	-	-
5	Banaskantha	-	-	-	-	1	50	1	50
6	Bharuch	-	-	-	-	-	-	-	-
7	Bhavnagar	-	-	-	-	-	-	-	-
8	Botad	-	-	-	-	-	-	-	-
9	Chotta Udaipur	-	-	-	-	-	-	-	-
10	Dahod	-	-	-	-	-	-	-	-
11	Dang	-	-	-	-	-	-	-	-
12	Devbhumi Dwarka	-	-	-	-	-	-	-	-
13	Gandhinagar	-	-	-	-	-	-	-	-
14	Gir Somnath	-	-	-	-	-	-	-	-
15	Jamnagar	-	-	-	-	-	-	-	-
16	Junagadh	-	-	-	-	1	50	1	50
17	Kheda	-	-	-	-	-	-	-	-
18	Kutch	-	-	-	-	-	-	-	-
19	Mahisagar	-	-	-	-	-	-	-	-
20	Mehsana	-	-	-	-	-	-	-	-
21	Morbi	-	-	-	-	-	-	-	-
22	Narmada	-	-	-	-	-	-	-	-
23	Navsari	-	-	-	-	1	50	1	50
24	Panchmahal	-	-	-	-	1	50	1	50
25	Patan	-	-	-	-	-	-	-	-
26	Porbandar	-	-	-	-	-	-	-	-
27	Rajkot	-	-	-	-	-	-	-	-
28	Sabarkantha	-	-	-	-	-	-	-	-
29	Surat	-	-	-	-	-	-	-	-
30	Surendranagar	-	-	-	-	-	-	-	-
31	Tapi	-	-	-	-	-	-	-	-
32	Vadodara	-	-	-	-	-	-	-	-
33	Valsad	-	-	-	-	-	-	-	-
	TOTAL	-	-	-	-	5	250	5	250

Cost Norms: Rs. 50 Lakh/Unit

Table-4.6.98 Training Need of Farmers for Value Addition Processing

Sr. No.	District	Year-wise Training (Phy – No. of farmer, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	120	0.6	120	0.6	120	0.6	360	1.8
2	Amreli	120	0.6	120	0.6	120	0.6	360	1.8
3	Anand	120	0.6	120	0.6	120	0.6	360	1.8
4	Aravali	120	0.6	120	0.6	120	0.6	360	1.8
5	Banaskantha	120	0.6	120	0.6	120	0.6	360	1.8
6	Bharuch	120	0.6	120	0.6	120	0.6	360	1.8
7	Bhavnagar	120	0.6	120	0.6	120	0.6	360	1.8
8	Botad	120	0.6	120	0.6	120	0.6	360	1.8
9	Chotta Udaipur	120	0.6	120	0.6	120	0.6	360	1.8
10	Dahod	120	0.6	120	0.6	120	0.6	360	1.8
11	Dang	120	0.6	120	0.6	120	0.6	360	1.8
12	Devbhumi Dwarka	120	0.6	120	0.6	120	0.6	360	1.8
13	Gandhinagar	120	0.6	120	0.6	120	0.6	360	1.8
14	Gir Somnath	120	0.6	120	0.6	120	0.6	360	1.8
15	Jamnagar	120	0.6	120	0.6	120	0.6	360	1.8
16	Junagadh	120	0.6	120	0.6	120	0.6	360	1.8
17	Kheda	120	0.6	120	0.6	120	0.6	360	1.8
18	Kutch	120	0.6	120	0.6	120	0.6	360	1.8
19	Mahisagar	120	0.6	120	0.6	120	0.6	360	1.8
20	Mehsana	120	0.6	120	0.6	120	0.6	360	1.8
21	Morbi	120	0.6	120	0.6	120	0.6	360	1.8
22	Narmada	120	0.6	120	0.6	120	0.6	360	1.8
23	Navsari	120	0.6	120	0.6	120	0.6	360	1.8
24	Panchmahal	120	0.6	120	0.6	120	0.6	360	1.8
25	Patan	120	0.6	120	0.6	120	0.6	360	1.8
26	Porbandar	120	0.6	120	0.6	120	0.6	360	1.8
27	Rajkot	120	0.6	120	0.6	120	0.6	360	1.8
28	Sabarkantha	120	0.6	120	0.6	120	0.6	360	1.8
29	Surat	120	0.6	120	0.6	120	0.6	360	1.8
30	Surendranagar	120	0.6	120	0.6	120	0.6	360	1.8
31	Tapi	120	0.6	120	0.6	120	0.6	360	1.8
32	Vadodara	120	0.6	120	0.6	120	0.6	360	1.8
33	Valsad	120	0.6	120	0.6	120	0.6	360	1.8
	TOTAL	3960	19.8	3960	19.8	3960	19.8	11880	59.4

Cost Norms: Rs. 500/ Farmer

4.6.12 POST HARVEST MANAGEMENT AND VALUE ADDITION OF FIELD CROPS:

4.6.12.1 Background:

Conservation agriculture has shown the potential for acceptance in rice-wheat system with 3- 5% increased wheat yield and 25-30% increased net return, besides saving 67% fuel and 30% irrigation water. Anticipating 5% increase in adoption of conservation agriculture practices for targeted food requirement by 2030, large number of efficient farm equipment will be required to reduce cost of operation and to achieve timeliness operations as well as processing machinery and also storage structures.

Production of fruits and vegetables in the country is 33 and 72 million tonnes, respectively. Lack of proper technologies for harvesting, handling, storage and processing results in the loss of 20- 40% of the produce costing about Rs 23,000 crores. Similarly, the losses in food grains are 10-12%. There is an urgent need to address these issues for loss prevention and value addition in the production catchment.

The primary interest, so far, for groundnut processing in Gujarat has been for oil and 85% of groundnut production is processed for oil extraction to meet 12% requirement of edible oil. Increasing attention is currently being paid to groundnut as a major protein source.

Technologies need to be developed for overcoming malnutrition of rural population by fortifying conventional foods with groundnut products.

Despite the fact that good designs of equipment are available at R&D level, non-availability of quality machines through manufacturers is one of the bottlenecks in mechanization of post-harvest technology at village level.

Poor purchase capacity of farmers is a bottleneck for adoption of high capacity machines. Cooperative society at village level should purchase the post-harvest machinery and give it to the farmers on custom hiring basis.

The sector has strong base with highly diversified cropping and a farming community, which is responsive to changes in agricultural technologies and practices. The state also has other strengths like decent logistical infrastructure like airport, seaport and extensive road & railway network.

The State of Gujarat has strength in Agro Based Industry in terms of natural resources established industrial base, skilled labour force, enterprising farmers, network of market yards and other requisite infrastructure. The State invites investment proposals from within and outside the country in all sector in general and with particular emphasis on agro based and food processing industry which has been identified as one of the thrust areas of the investment. Based on the availability of raw materials, infrastructure as well as domestic and export needs, a list of investment opportunities has been identified.

The Agro Industries are those units which add value to agricultural products/residues, both food and non-food, by processing in to products which are marketable or usable or edible, or by improving storability or by providing link from farm to the market or a part thereof. Agro industry also includes high-tech agriculture and biotechnology based agriculture.

The Agro Based and Food Processing Industry in the State consist of Small, Medium and Large Scale Sector Units producing wide variety of products. There were about 16,400 Small scale industrial units in Food Processing Beverage and Tobacco Processing Products with a share of 5.88 % of the registered units in the State. There were 1875 working factories in this sector of industry accounting for 9.20 % of the registered factories and 10.35 % share of Workers employed in factory sector in the State.

Gujarat has highest production in the world for:

- Castor (67%)
- Fennel (67%)

- Cumin (36%)
- Isabgol (35%)
- Groundnut (8%)
- Guar seed (6%)

Significant growth achieved in the past 4 years.

- Oilseeds and Cotton: 51% annual growth
- Pulses: 49% annual growth
- Cereals: 36% annual growth Achieved due to better water management and systematic planning income in agriculture sector has increased by 40%

As a result, the Agro and Food processing sector has received a big boost in the state. Some of the salient features of the Agro sector in Gujarat are as:

- Oil seed processing - 1200 oil extraction units
- 57 solvent extraction units
- 11 vanaspati ghee units
- Rice processing units 394 (small and big)
- Grain flour processing unit- 345
- 11 wheat processing unit for starch, semolina etc.
- 164- pulse mill
- 25 seed processing units
- Fruit and vegetable processing
- Dehydrated/dried / powder units for fruits and Vegetable – 113
- Processing fruits and nut for confectionery – 22
- Preserved and prepared fruits/vegetables-57
- Jams and jelly – 14
- Fruit juices -13
- Beverages- 21
- Cold storages for fruits and vegetables- 183
- Seed spices - 40 units of ground spices
- 25 units of Isabgol processing
- Fish processing - 60-65 sea food processing units
- Milk processing - 13 co-operative sector dairies
- 26 private sector dairies
- 42 sugar mill
- 54 sugar confectionery

Vision:

To make agriculture sustainable, profitable and competitive enterprise through engineering interventions of post-harvest management, value addition and energy management in production and post-harvest operations.

Mission:

To develop and introduce need-based post-harvest technology to achieve sustainable, enhanced productivity and profitability of different farming systems through agro processing.

To plan, coordinate and monitor R&D programmes and serve as an information repository in post-harvest management.

4.6.12.2 Crop/Area Issues:

- Production and Productivity of focus crops
- Agricultural Research and Education
- Productivity: Area wise fluctuation for yield have to be minimize gap between zone, area and soil type widely differed needs reduce.

- Scattered / uneven distribution of rainfall, often flood and draught situation risk in some pockets
- Planting material supply: supply unauthorized planting material
- Poor mechanization and acute labour shortage in major area of state
- High cost input year by year
- Emerging pests and diseases and injudicious use of insecticides rendered ineffective and uneconomical crop.
- Climate change impact
- Sustainability of cultivation
- Poor post-harvest and waste management
- Quality of produce: Trade base quality produce should have to be produced
- Macro/ micro nutrient management
- Development of saline resistant genotype
- Research for emerging/ new issues related to horticultural crops

Post harvesting:

- Storage and transportation facility to be improved and should be easily available
- Old processing machineries and poor storage facilities at many of the research centers of SAU which may replace by new one.
- Poor infrastructure for grading and quality evaluation/maintenance
- Fluctuating prices of produce during glut season.
- Need for pre-cleaning, primary processing and packaging in production catchments.
- Cleaning and washing of fruits and vegetables are carried out manually which are unhygienic and inefficient.
- Need for efficient and high capacity evaporative cooling systems for pre-cooling of produce immediately after harvest.
- Lack of proper technology for loading, unloading, packing and transportation leading to mechanical damage and losses.
- Low dal recovery and high broken due to inefficient processing of pulses and coarse cereals pre-treatment and milling technology.
- Lack of appropriate post-harvest technology and equipment to produce quality nutritious products from coarse cereals.
- Losses, drudgery, low economic returns from current processing of selected medicinal plants processes/ practices/ tools for extraction of active ingredient.
- Present technique and equipment leading to quantitative and qualitative loss of medicinal plants.
- Lack of technology for producing ready to eat nutritious nutritional security and fortification of healthy food products for alleviating malnutrition. conventional foods
- Lack of technologies for utilizing defatted groundnut flour.
- Need for processing equipment and pilot plants for medium fat groundnut flour, bakery products, and groundnut protein isolates.
- Lack of a cold chain, inadequate storage and infrastructural facilities from the site of production to the point of consumption;
- Lack of a network of local markets, and poor access to market information, results in unprecedented and unregulated arrivals in the local markets;

Perspective

1. Development of region and commodity specific technology packages for post-harvest loss reduction, processing and value addition for agricultural produce with a view to

- promote agro processing in production catchments and enhanced returns to the growers/ farmers
2. Up-gradation of technology in various value addition processes to maintain high quality of output, fetching higher market returns.
 3. Post-harvest management of horticulture crop processing for high growth rate, lower losses, nutritional security, employment opportunities and high returns.
 4. Pragmatic and innovative utilization of by-products and residues in agricultural production catchment and post-harvest activities.
 5. Technology and equipment for pre-cooling, washing, grading, short term storage and transport of mango, sapota, guava, banana, tomato and vegetables.
 6. Equipment and technologies for reducing post-harvest losses, value addition and primary and secondary processing in production catchments through agro-processing centers for higher returns to farmers.
 7. Process and equipment for ready-to-eat foods.
 8. Technologies and equipment for cleaning, washing, size reduction, drying and packaging of medicinal plants.
 9. Dal mills modernization of through improvement in dal recovery and working environment.
 10. Suitable technologies for long distance transport and handling of fruits and vegetables.
 11. Extrusion cooking technology for ready to eat food products from plain and fortified cereals.
 12. Cold/ cryogenic grinding of spices and high value food and medicinal raw crop produce.
 13. Utilization of groundnut as an important oilseed, processes and equipment for groundnut based food products with higher protein content are to be developed and popularized to alleviate protein deficiency in the rural areas of the country.
 14. Extrusion cooking technology for groundnut fortified cereals products.
 15. Development of food products from groundnut cake obtained from expeller and produced in solvent extraction plants.
 16. Development of Process for extraction of pectin from Mango Peels.
 17. Development of Process for Hydraulic Pressing of Groundnut kernel for oil recovery as well to obtained quality cake.
 18. Development of Process for Blanching to obtained Quality Peanut kernel for export purpose.

Thrust Areas

Energy management and utilization of conventional and non-conventional energy sources in agricultural production and processing activities

- A three-pronged strategy to reduce post-harvest losses:
 - (i) Compress supply chain by linking producers and markets
 - (ii) Promote processing of food commodities in production catchments to add value before being marketed
 - (iii) Develop small-scale processing refrigerated chambers or cold storages using conventional and non-conventional sources.
- Post harvesting engineering of cereals, pulses, oilseeds, vegetables, horticulture and dairy.
- Primary and secondary levels of value-addition and processing.
- Management of by-product utilization.

- Efficient management of energy in post-harvest sectors.
- Centre for advance Food Technology

Future Outlook

- Enhancement in agricultural productivity is imperative to meet the ever increasing food demand despite shrinking natural resources and impending climate change. Post-Harvest Technology has critical role in higher processed products production and rural employment generation.
- Periodic need assessment through surveys, operations research and liaison with the line departments, private, public and non-governmental organizations, entrepreneurs and other interest groups will be carried out for finding timely solutions for such issues.
- Post-Harvest losses of food grains in Gujarat
- Storage and marketing of food grains in selected districts of Gujarat
- Recent advances in the use of Modified Atmosphere for stored product Pest control.
- Qualities aspects of fruits & vegetables arriving in APMC of selected districts of Gujarat
- Food processing industries in Gujarat- A over view
- Research & development center for Post-Harvest Technology of Groundnut
- Establishment of Research & Development center to standardize and promote indigenous Dairy Products
- Promoting of Rural based Agro Enterprise.
- Processing of high-quality animal feeds from crop residues and waste from food-processing industries.
- Training to small and medium enterprises in the area of post-harvest technology.
- Promotional campaign for consumers highlighting the benefits of processed food.
- Primary processing of food products to increase the shelf life at rural level.
- Assessment of potential of antimicrobial compound in increasing the shelf life of food products.
- Ultra low blanching to increase the firmness of canned vegetable and maintain their shelf life.
- Role of Ozone in fresh food sterilization.
- Use of Titanium dioxide as a food safety tools.
- Use of natural antioxidant in packaging material in extension of shelf life.

4.6.12.3 Sustainability Issues and Gap Analysis:

Table-4.6.99 Sustainability issues and gap analysis of productivity of cereal crops and resources

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
1	Cereals	Lack of knowledge regarding recent technology	Inadequate and improper knowledge	Create awareness for value addition and educate farmers	Introduce the processing unit like cleaner and grader at taluka level and linkage with appropriate market	Remunerative price of the produce
		Lack of post-harvest management of the produce	Inadequate and improper knowledge	Establishment of Processing Units, cleaning/grading and packaging units	provide units on co-operative basis, marketing awareness	Remunerative price of the produce
		Lack of rural godown and	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Long term storage and remunerative price of the produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power

4.6.12.4 Researchable Issues:

For Cereals, Pulses, Oilseeds, Spices and Vegetable Crops

- Modernization and up gradation and establishing modern Processing units at new areas along with modern quality testing facilities
- Modernization and up gradation of storage and packaging unit facilities
- Export oriented research for post-harvest treatments
- Crop residue management for improvement of soil organic carbon content/ soil health
- Promoting primary processing of cereal crops.
- Research on storage and processing practices

Table-4.6.100 Establishment of Small Scale Small Cleaner cum Graders for Cereals (Power Operated)

Sr. No.	Name of Taluka	Small Scale Small Cleaner cum Graders (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	4	1.2	4	1.2	4	1.2	12	3.6
2	Amreli	4	1.2	4	1.2	4	1.2	12	3.6
3	Anand	4	1.2	4	1.2	4	1.2	12	3.6
4	Aravali	4	1.2	4	1.2	4	1.2	12	3.6
5	Banaskantha	4	1.2	4	1.2	4	1.2	12	3.6
6	Bharuch	4	1.2	4	1.2	4	1.2	12	3.6
7	Bhavnagar	4	1.2	4	1.2	4	1.2	12	3.6
8	Botad	4	1.2	4	1.2	4	1.2	12	3.6
9	Chotta Udaipur	4	1.2	4	1.2	4	1.2	12	3.6
10	Dahod	4	1.2	4	1.2	4	1.2	12	3.6
11	Dang	4	1.2	4	1.2	4	1.2	12	3.6
12	Devbhumi Dwarka	4	1.2	4	1.2	4	1.2	12	3.6
13	Gandhinagar	4	1.2	4	1.2	4	1.2	12	3.6
14	Gir Somnath	4	1.2	4	1.2	4	1.2	12	3.6
15	Jamnagar	4	1.2	4	1.2	4	1.2	12	3.6
16	Junagadh	4	1.2	4	1.2	4	1.2	12	3.6
17	Kheda	4	1.2	4	1.2	4	1.2	12	3.6
18	Kutch	4	1.2	4	1.2	4	1.2	12	3.6
19	Mahisagar	4	1.2	4	1.2	4	1.2	12	3.6
20	Mehsana	4	1.2	4	1.2	4	1.2	12	3.6
21	Morbi	4	1.2	4	1.2	4	1.2	12	3.6
22	Narmada	4	1.2	4	1.2	4	1.2	12	3.6
23	Navsari	4	1.2	4	1.2	4	1.2	12	3.6
24	Panchmahal	4	1.2	4	1.2	4	1.2	12	3.6
25	Patan	4	1.2	4	1.2	4	1.2	12	3.6
26	Porbandar	4	1.2	4	1.2	4	1.2	12	3.6
27	Rajkot	4	1.2	4	1.2	4	1.2	12	3.6
28	Sabarkantha	4	1.2	4	1.2	4	1.2	12	3.6
29	Surat	4	1.2	4	1.2	4	1.2	12	3.6
30	Surendranagar	4	1.2	4	1.2	4	1.2	12	3.6
31	Tapi	4	1.2	4	1.2	4	1.2	12	3.6
32	Vadodara	4	1.2	4	1.2	4	1.2	12	3.6
33	Valsad	4	1.2	4	1.2	4	1.2	12	3.6
	TOTAL	132	39.6	132	39.6	132	39.6	396	118.8

Cost Norms: Rs .0.30 Lakh/Unit

Table-4.6.101 Sustainability Issues and Gap Analysis of Productivity of Pulse Crops and Resources

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
1	Pulses	Lack of knowledge regarding recent technology	Inadequate and improper knowledge	Create awareness for value addition and educate farmers	Introduce the processing unit like cleaner / grader and dal mill at taluka level and linkage with appropriate market	Remunerative price of the produce
		Lack of post-harvest management of the produce	Inadequate and improper knowledge	Establishment of Processing Units, cleaning/grading/dal mill and packaging units	provide units on co-operative basis, marketing awareness	Remunerative price of the produce
		Lack of rural godown and	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Long term storage and remunerative price of the produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power

Table - 4.6.102 Strengthening of Infrastructure Facilities for Strengthening of Processing Facilities for Establishment of Mini Dal Mills (District Wise)

Sr. No.	Name of Taluka	Mini Dal Mills (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	-	-	1	3	1	3
2	Amreli	-	-	-	-	1	3	1	3
3	Anand	-	-	-	-	1	3	1	3
4	Aravali	-	-	-	-	1	3	1	3
5	Banaskantha	-	-	-	-	1	3	1	3
6	Bharuch	-	-	-	-	1	3	1	3
7	Bhavnagar	-	-	-	-	1	3	1	3
8	Botad	-	-	-	-	1	3	1	3
9	Chotta Udaipur	-	-	-	-	1	3	1	3
10	Dahod	-	-	-	-	1	3	1	3
11	Dang	-	-	-	-	1	3	1	3
12	Devbhumi Dwarka	-	-	-	-	1	3	1	3
13	Gandhinagar	-	-	-	-	1	3	1	3
14	Gir Somnath	-	-	-	-	1	3	1	3
15	Jamnagar	-	-	-	-	1	3	1	3
16	Junagadh	-	-	-	-	1	3	1	3
17	Kheda	-	-	-	-	1	3	1	3
18	Kutch	-	-	-	-	1	3	1	3
19	Mahisagar	-	-	-	-	1	3	1	3
20	Mehsana	-	-	-	-	1	3	1	3
21	Morbi	-	-	-	-	1	3	1	3
22	Narmada	-	-	-	-	1	3	1	3
23	Navsari	-	-	-	-	1	3	1	3
24	Panchmahal	-	-	-	-	1	3	1	3

Sr. No.	Name of Taluka	Mini Dal Mills (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	-	-	-	-	1	3	1	3
26	Porbandar	-	-	-	-	1	3	1	3
27	Rajkot	-	-	-	-	1	3	1	3
28	Sabarkantha	-	-	-	-	1	3	1	3
29	Surat	-	-	-	-	1	3	1	3
30	Surendranagar	-	-	-	-	1	3	1	3
31	Tapi	-	-	-	-	1	3	1	3
32	Vadodara	-	-	-	-	1	3	1	3
33	Valsad	-	-	-	-	1	3	1	3
	TOTAL	-	-	-	-	33	99	33	99

Cost Norms: Rs . 3 Lakh/Unit

Table - 4.6.103 Sustainability Issues and Gap Analysis of Productivity of Oilseed Crops Including Cotton and Resources

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
1	Oil seeds including cotton	Lack of knowledge regarding recent technology	Inadequate and improper knowledge	Create awareness for value addition and educate farmers	Introduce the processing unit like HPS, oil mills, cotton ginning, dehusking of sesame at taluka level and linkage with appropriate market	Remunerative price of the produce
		Lack of post-harvest management of the produce	Inadequate and improper knowledge	Establishment of Processing Units, like HPS, oil mills, cotton ginning, dehusking of sesame and packaging units	provide units on co-operative basis, marketing awareness	Remunerative price of the produce
		Lack of rural godown and	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Long term storage and better price of the produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts on post-harvest management	Training and demonstration	Trained and skilled man power

Table-4.6.104 Processing Units and Financial Requirements for Oil Mill (District Wise)

Sr. No.	Name of Taluka	Oil Mill (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	-	-	-	-	-	-
2	Amreli	-	-	1	5	-	-	1	5
3	Anand	-	-	-	-	-	-	-	-
4	Aravali	-	-	1	5	1	5	2	10
5	Banaskantha	-	-	-	-	1	5	1	5
6	Bharuch	-	-	1	5	1	5	2	10
7	Bhavnagar	-	-	1	5	1	5	2	10
8	Botad	-	-	-	-	1	5	1	5
9	Chotta Udaipur	-	-	-	-	1	5	1	5
10	Dahod	-	-	-	-	-	-	-	-
11	Dang	-	-	-	-	-	-	-	-
12	Devbhumi Dwarka	-	-	-	-	1	5	1	5
13	Gandhinagar	-	-	-	-	-	-	-	-
14	Gir Somnath	-	-	-	-	-	-	-	-
15	Jamnagar	-	-	1	5	1	5	2	10
16	Junagadh	-	-	1	5	1	5	2	10
17	Kheda	-	-	-	-	-	-	-	-
18	Kutch	-	-	-	-	1	5	1	5
19	Mahisagar	-	-	-	-	1	5	1	5
20	Mehsana	-	-	1	5	1	5	2	10
21	Morbi	-	-	-	-	1	5	1	5
22	Narmada	-	-	1	5	1	5	2	10
23	Navsari	-	-	-	-	-	-	-	-
24	Panchmahal	-	-	-	-	-	-	-	-

Sr. No.	Name of Taluka	Oil Mill (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	-	-	-	-	-	-	-	-
26	Porbandar	-	-	1	5	1	5	2	10
27	Rajkot	-	-	1	5	1	5	2	10
28	Sabarkantha	-	-	-	-	1	5	1	5
29	Surat	-	-	-	-	-	-	-	-
30	Surendranagar	-	-	1	5	-	-	1	5
31	Tapi	-	-	-	-	-	-	-	-
32	Vadodara	-	-	-	-	-	-	-	-
33	Valsad	-	-	-	-	-	-	-	-
	TOTAL	-	-	11	55	17	85	28	140

Cost Norms: Rs . 5 Lakh/Unit

Table - 4.6.105 Processing Units and Financial Requirements for Cotton Ginning (District Wise)

Sr. No.	Name of Taluka	Cotton Ginning (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	1	2	1	2	2	4
2	Amreli	-	-	2	4	2	4	4	8
3	Anand	-	-	1	2	1	2	2	4
4	Aravali	-	-	1	2	1	2	2	4
5	Banaskantha	-	-	1	2	1	2	2	4
6	Bharuch	-	-	1	2	1	2	2	4
7	Bhavnagar	-	-	2	4	2	4	4	8
8	Botad	-	-	1	2	1	2	2	4
9	Chotta Udaipur	-	-	1	2	1	2	2	4
10	Dahod	-	-	1	2	1	2	2	4
11	Dang	-	-	1	2	1	2	2	4
12	Devbhumi Dwarka	-	-	1	2	1	2	2	4
13	Gandhinagar	-	-	1	2	1	2	2	4
14	Gir Somnath	-	-	1	2	1	2	2	4
15	Jamnagar	-	-	1	2	1	2	2	4
16	Junagadh	-	-	1	2	1	2	2	4
17	Kheda	-	-	1	2	1	2	2	4
18	Kutch	-	-	1	2	1	2	2	4
19	Mahisagar	-	-	1	2	1	2	2	4
20	Mehsana	-	-	1	2	1	2	2	4
21	Morbi	-	-	1	2	1	2	2	4
22	Narmada	-	-	1	2	1	2	2	4
23	Navsari	-	-	2	4	2	4	4	8
24	Panchmahal	-	-	1	2	1	2	2	4

Sr. No.	Name of Taluka	Cotton Ginning (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
25	Patan	-	-	1	2	1	2	2	4
26	Porbandar	-	-	2	4	2	4	4	8
27	Rajkot	-	-	2	4	2	4	4	8
28	Sabarkantha	-	-	2	4	2	4	4	8
29	Surat	-	-	2	4	2	4	4	8
30	Surendranagar	-	-	2	4	2	4	4	8
31	Tapi	-	-	2	4	2	4	4	8
32	Vadodara	-	-	2	4	2	4	4	8
33	Valsad	-	-	2	4	2	4	4	8
	TOTAL	-	-	44	88	44	88	88	176

Cost Norms: Rs. 2 Lakh/Unit

Table-4.6.106 Sustainability Issues and Gap Analysis of Productivity of Spice Crops and Resources

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
1	spices	Lack of knowledge regarding recent technology	Inadequate and improper knowledge	Create awareness for value addition and educate farmers	Introduce the processing unit like cleaner and grader, milling and extraction of oleoresins at taluka level and linkage with appropriate market	Remunerative price of the produce
		Lack of post-harvest management of the produce	Inadequate and improper knowledge	Establishment of Processing Units, cleaning/grading/milling/ extraction of oleoresins and packaging units	provide units on co-operative basis, marketing awareness	Remunerative price of the produce
		Lack of rural godown and	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Long term storage and remunerative price of the produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts for post-harvest management	Training and demonstration	Trained and skilled man power

Table - 4.6.107 Establishment of Spice Processing Unit (Cleaning/Grading/Mill)

Sr. No.	Name of Taluka	Spice Processing Unit (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	1	5	1	5	2	10
2	Amreli	-	-	2	10	2	10	4	20
3	Anand	-	-	-	-	-	-	-	-
4	Aravali	-	-	1	5	1	5	2	10
5	Banaskantha	-	-	2	10	2	10	4	20
6	Bharuch	-	-	-	-	-	-	-	-
7	Bhavnagar	-	-	2	10	2	10	4	20
8	Botad	-	-	1	5	1	5	2	10
9	Chotta Udaipur	-	-	1	5	1	5	2	10
10	Dahod	-	-	1	5	1	5	2	10
11	Dang	-	-	-	-	-	-	-	-
12	Devbhumi Dwarka	-	-	1	5	1	5	2	10
13	Gandhinagar	-	-	1	5	1	5	2	10
14	Gir Somnath	-	-	1	5	1	5	2	10
15	Jamnagar	-	-	2	10	2	10	4	20
16	Junagadh	-	-	2	10	2	10	4	20
17	Kheda	-	-	-	-	-	-	-	-
18	Kutch	-	-	2	10	2	10	4	20
19	Mahisagar	-	-	1	5	1	5	2	10
20	Mehsana	-	-	2	10	2	10	4	20
21	Morbi	-	-	1	5	1	5	2	10
22	Narmada	-	-	-	-	-	-	-	-
23	Navsari	-	-	-	-	-	-	-	-

Sr. No.	Name of Taluka	Spice Processing Unit (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
24	Panchmahal	-	-	1	5	1	5	2	10
25	Patan	-	-	2	10	2	10	4	20
26	Porbandar	-	-	2	10	2	10	4	20
27	Rajkot	-	-	2	10	2	10	4	20
28	Sabarkantha	-	-	1	5	1	5	2	10
29	Surat	-	-	1	5	1	5	2	10
30	Surendranagar	-	-	2	10	2	10	4	20
31	Tapi	-	-	-	-	-	-	-	-
32	Vadodara	-	-	1	5	1	5	2	10
33	Valsad	-	-	-	-	-	-	-	-
	TOTAL	-	-	36	180	36	180	72	360

Cost Norms: Rs. 5 Lakh/Unit

Table-4.6.108 Strengthening of Infrastructure facilities for rural godowns for storage of food grains including cereals, pulses, oilseeds, spices, etc

Sr. No.	Name of Taluka	Number of units (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	2	6.6	2	6.6	4	13.2
2	Amreli	-	-	2	6.6	2	6.6	4	13.2
3	Anand	-	-	2	6.6	2	6.6	4	13.2
4	Aravali	-	-	2	6.6	2	6.6	4	13.2
5	Banaskantha	-	-	2	6.6	2	6.6	4	13.2
6	Bharuch	-	-	2	6.6	2	6.6	4	13.2
7	Bhavnagar	-	-	2	6.6	2	6.6	4	13.2
8	Botad	-	-	2	6.6	2	6.6	4	13.2

Sr. No.	Name of Taluka	Number of units (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
9	Chotta Udaipur	-	-	2	6.6	2	6.6	4	13.2
10	Dahod	-	-	2	6.6	2	6.6	4	13.2
11	Dang	-	-	2	6.6	2	6.6	4	13.2
12	Devbhumi Dwarka	-	-	2	6.6	2	6.6	4	13.2
13	Gandhinagar	-	-	2	6.6	2	6.6	4	13.2
14	Gir Somnath	-	-	2	6.6	2	6.6	4	13.2
15	Jamnagar	-	-	2	6.6	2	6.6	4	13.2
16	Junagadh	-	-	2	6.6	2	6.6	4	13.2
17	Kheda	-	-	2	6.6	2	6.6	4	13.2
18	Kutch	-	-	2	6.6	2	6.6	4	13.2
19	Mahisagar	-	-	2	6.6	2	6.6	4	13.2
20	Mehsana	-	-	2	6.6	2	6.6	4	13.2
21	Morbi	-	-	2	6.6	2	6.6	4	13.2
22	Narmada	-	-	2	6.6	2	6.6	4	13.2
23	Navsari	-	-	2	6.6	2	6.6	4	13.2
24	Panchmahal	-	-	2	6.6	2	6.6	4	13.2
25	Patan	-	-	2	6.6	2	6.6	4	13.2
26	Porbandar	-	-	2	6.6	2	6.6	4	13.2
27	Rajkot	-	-	2	6.6	2	6.6	4	13.2
28	Sabarkantha	-	-	2	6.6	2	6.6	4	13.2
29	Surat	-	-	2	6.6	2	6.6	4	13.2
30	Surendranagar	-	-	2	6.6	2	6.6	4	13.2
31	Tapi	-	-	2	6.6	2	6.6	4	13.2
32	Vadodara	-	-	2	6.6	2	6.6	4	13.2
33	Valsad	-	-	2	6.6	2	6.6	4	13.2
	TOTAL	-	-	66	217.8	66	217.8	132	435.6

Cost Norms: Rs. 3.3 Lakh/unit

Table - 4.6.109 Sustainability Issues and Gap Analysis of Productivity of Vegetable Crops Including Onion and Garlic resources

Sr. No.	Crop	Gap	Factors/constrains leading to gaps	Strategies	Approach and methodology	Sustainability outputs
1	Vegetables	Harvesting	Improper and illegal harvesting practices	Research on harvesting practices and time of harvest	Environment friendly and hazard free methodology.	Export oriented produce
		Storage	Inadequate facility and knowledge	To develop cost effective storage technique	Eco-friendly and economic storage methods	Export oriented produce
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Processing and Waste Management	Unhygienic Processing and processing waste Management	To develop cost effective and hygienic processing techniques.	Cost effective processing techniques	Domestic and export brand market
		Human resources	Lack of skilled man power	To train man powers from talukas of different districts on post-harvest management	Training and demonstration	Trained and skilled man power

Table-4.6.110 Strengthening of Infrastructure Facilities for Onion and Garlic Godowns (District Wise) and Budget Requirement

Sr. No.	Name of Taluka	Number of units (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Ahmedabad	-	-	-	-	-	-	-	-
2	Amreli	-	-	2	10	2	10	4	20
3	Anand	-	-	-	-	-	-	-	-
4	Aravali	-	-	2	10	2	10	4	20
5	Banaskantha	-	-	-	-	-	-	-	-
6	Bharuch	-	-	-	-	-	-	-	-
7	Bhavnagar	-	-	2	10	2	10	4	20
8	Botad	-	-	2	10	2	10	4	20
9	Chotta Udaipur	-	-	2	10	2	10	4	20
10	Dahod	-	-	-	-	-	-	-	-
11	Dang	-	-	-	-	-	-	-	-
12	Devbhumi Dwarka	-	-	2	10	2	10	4	20
13	Gandhinagar	-	-	-	-	-	-	-	-
14	Gir Somnath	-	-	2	10	2	10	4	20
15	Jamnagar	-	-	2	10	2	10	4	20
16	Junagadh	-	-	2	10	2	10	4	20
17	Kheda	-	-	-	-	-	-	-	-
18	Kutch	-	-	-	-	-	-	-	-
19	Mahisagar	-	-	2	10	2	10	4	20
20	Mehsana	-	-	2	10	2	10	4	20
21	Morbi	-	-	2	10	2	10	4	20
22	Narmada	-	-	-	-	-	-	-	-
23	Navsari	-	-	-	-	-	-	-	-
24	Panchmahal	-	-	-	-	-	-	-	-
25	Patan	-	-	2	10	2	10	4	20

Sr. No.	Name of Taluka	Number of units (Phy – No. of units, Fin – Rs. in Lakh)							
		2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
26	Porbandar	-	-	-	-	-	-	-	-
27	Rajkot	-	-	2	10	2	10	4	20
28	Sabarkantha	-	-	-	-	-	-	-	-
29	Surat	-	-	-	-	-	-	-	-
30	Surendranagar	-	-	-	-	-	-	-	-
31	Tapi	-	-	-	-	-	-	-	-
32	Vadodara	-	-	-	-	-	-	-	-
33	Valsad	-	-	-	-	-	-	-	-
	TOTAL	-	-	28	140	28	140	56	280

Cost Norms : Rs. 5 Lakh/unit

CHAPTER - 5

STATE PLAN

The proposed state plan includes agriculture, horticulture, animal husbandry, fisheries, forestry, and innovative as well as miscellaneous schemes as the major activities to be undertaken in the state. The existing status of these sectors has been elaborated in the preceding chapters with the proposed outlays for 2017-18 to 2019-20.

Growth drivers

The targets will be achieved using different growth drivers in agriculture and allied sectors as follows:

5.1 Agriculture

- Increasing area under high yielding varieties of rice, wheat, *Bajra*, castor, green gram, Bt. cotton, sorghum, lucerne and groundnut.
- Inclusion of legume/pulse crops in a cropping system to improve soil fertility as well as to generate more income and also to improve health of humans as well as animals.
- Resource conservation technologies for sustaining and improving the productivity level.
- Use of micro irrigation system with drip and sprinkler to increase water use efficiency.
- Increasing seed replacement rate and seed treatment.
- IPDM, INM and IWM.
- Demonstration and capacity building of field functionaries and farmers.
- Human resource development.
- Strengthening marketing and infrastructural facilities.
- Value addition.

5.2 Horticulture

- Increasing area under high yielding varieties of vegetable and fruit crops.
- Provision of net house/green house to the small and marginal farmers on 75 per cent subsidized basis to grow horticulture crops like capsicum, tomato, cucumber, rose etc to generate more income from small area and thereby improving the economic status of the farmers.
- Providing improved planting materials of fruit crops.
- IPM and INM
- Encouraging income and employment generation through agro based vocational trainings.
- Demonstrations and trainings including farmers and field officers.
- Strengthening marketing and infrastructural facilities.
- Value addition.

5.3 Animal Husbandry

- Adoption of mineral mixture, by pass fat and by pass protein feeding.
- Deworming.
- Clean milk production by adopting Good Dairy Management practices
- Breed improvement through community bulls and A.I.
- Ration Balancing.
- Availability of sexed semen
- Increasing area under fodder crops and growing Hybrid Napier/Guinea grass under boundaries of field or on water channel to control soil erosion and to ensure supply of continuous green fodder throughout the year.

- Establishment of fodder banks for dry fodder and crop residues at village/taluka level.
- Improvement of village ponds to provide quality water for the animals.
- Demonstration and capacity building of field functionary and farmers.
- Training on better husbandry and management practices.

5.4 Fisheries

- Improvement of village ponds.
- Making availability of good quality fish and prawn seeds.
- Balanced feeding in ponds.
- Capacity building of farmers and field functionaries.
- Strengthening marketing and infrastructural facilities.
- Value addition.

5.1 Cereal Crop:

Table- 5.1.1 Physical and Financial Program Proposed for Development of Rice under SAP (Sum of All District)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No	Activity /Projects	1 st Year		2 st Year		3 st Year		Total	
		Phy.	Fin	Phy.	Fin	Phy.	Fin	Phy.	Fin
1	Training								
	In Service (Agriculture)	10,032	90.29	10,245	92.21	10,491	94.42	30,768	276.92
	Cooperative & NGOs	5,016	45.14	5,123	46.11	5,245	47.21	15,384	138.46
	PRI Staff & Others	3,011	27.10	3,075	27.68	3,152	28.37	9,238	83.15
	Farmers	2,88,65	1,733	2,88,65	1,733	2,88,65	1,733	8,65,974	5199.00
	Total	3,06,71	1,896	3,07,10	1,899	3,07,54	1,903	9,21,364	5697.53
2	Demonstration								
	Varietal Demonstration	5200	260	5200	260	5200	260	15600	780.00
	Rice Seed Planning/Seed Village Program	13300	665	13300	665	13300	665	39,900	1995.00
	INM Demonstrations	4280	214	4280	214	4280	214	12840	642.00
	Resource Conservation Technologies -Laser Leveling	3424	171.2	3424	171.2	3424	171.2	10272	513.60
	Resource Conservation Technologies -Green	2568	128.4	2568	128.4	2568	128.4	7704	385.20
	Seed Treatment Demonstrations	2996	29.96	2996	29.96	2996	29.96	8988	89.88
	Organic Farming Demonstration	3210	160.5	3210	160.5	3210	160.5	9630	481.50
	Bio-fertilizer and Bio-compost Demonstration	2782	139.1	2782	139.1	2782	139.1	8346	417.30
	IWM Demonstration	2354	117.7	2354	117.7	2354	117.7	7062	353.10
	Total	40114	1885.8	40114	1885.8	40114	1885.8	120342	5657.58
3	Other activities								
	FFS	684	136.8	684	136.8	684	136.8	2052	410.40
	Group Formation /Commodity Interest Groups	1095	219	1095	219	1095	219	3285	657.00
	Total	1779	355.8	1779	355.8	1779	355.8	5337	1067.40
	Grand Total	3,48,61	4,137	3,48,99	4,141	3,49,43	4,145	10,47,04	12422.5

Table - 5.1.2 Physical and Financial Program Proposed for Development of Wheat under SAP (Sum of All District)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity/Projects	1 st Year		2 nd Year		3 rd Year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	Trainings								
	In service	00	00	00	00	00	00	00	00
	Farmers	313680	1882.12	313680	1882.12	313680	1882.12	941040	5646.36
	Total	313680	1882.12	313680	1882.12	313680	1882.12	941040	5646.36
2	Demonstrations								
	Varietal	12430	601.9	12430	601.9	12430	601.9	37290.00	1805.70
	Seed Village Program	24696	2288.6	27067	2508.3	29636	2746.4	81399.00	7543.30
	INM							0.00	0.00
	RCT Laser Leveling	9703	485.14	9856	492.78	9550	477.50	29109.00	1455.42
	RCT Green Manuring	11761	588.03	11876	593.80	11991	599.56	35628.00	1781.39
	Seed treatment	14494	144.94	14636	146.36	14778	52.00	43908.00	343.30
	Organic farming	14125	686.36	14263	693.09	14402	699.82	42790.00	2079.27
	Bio-fertilizer & Bio-compost	12342	1188.00	12463	603.07	12584	608.92	37389.00	2399.99
	IWM	12735	616.52	12932	626.08	12834	621.30	38501.00	1863.90
	Total	112286	6599.49	115523	6265.38	118205	6407.40	346014.00	19272.27
	Other Activities								
	FFSs	6	1.2	6	1.2	6	1.2	18	3.60
	Group formation	2371	474.2	2371	474.2	2371	474.2	7113	1422.60
	Total	2377.00	475.40	2377.00	475.40	2377.00	475.40	7131	1426.20
	Special project								
	Grand Total	428343.00	8957.01	431580.00	8622.90	434262.00	8764.92	1294185	26344.83

Table- 5.1.3 Physical and Financial Program Proposed for Development of Maize under SAP (Sum of All District)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity/Projects	1 st year		2 st year		3 st year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	A. Activity								
1	Trainings								
	In Service	1645	13.16	1645	13.16	1645	13.16	4935	39.48
	Farmers	30500	183	30500	183	30500	183	91500	549
	Total	32145	196.16	32145	196.16	32145	196.16	96435	588.48
2	Demonstrations								
	Varietal	5525	276.25	5525	276.25	5525	276.25	16575	828.75
	Total	5525	276.25	5525	276.25	5525	276.25	16575	828.75
3	Other Activities								
	FFSs	40	16.6	40	10.6	40	10.6	120	37.8
	Group Formation	1733	346	1733	347	1732	346	5198	1039
	Total	1773	362.60	1773	357.60	1772	356.60	5318	1076.80
	Grand Total	39443	835.01	39443	830.01	39442	829.01	118328	2494.03

Table- 5.1.4 Physical and Financial Program Proposed for Development of Bajara under SAP (Sum of all district)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	1541	12.33	1541	12.33	1541	12.33	4623	36.99
	Farmers	10100	60.60	10100	60.60	10100	60.60	30300	181.8
	Total	11641	72.93	11641	72.93	11641	72.93	34923	218.79
2	Demonstration								
	Varietal demo.	171	8.55	171	8.55	171	8.55	513	25.65
	INM demo.	91	4.55	91	4.55	91	4.55	273	13.65
	Resourse cons. demo. Green Manuring	171	8.55	171	8.55	171	8.55	513	25.65
	Resourse cons. demo. Lesser levelor	7300	365	7300	365	7300	365	21900	1095
	IPM demo.	111	5.55	111	5.55	111	5.55	333	16.65
	Bio fertilizer Demon.	171	5.13	171	5.13	171	5.13	513	15.39
	Vermi compost	171	8.55	171	8.55	171	8.55	513	25.65
	Plant health management	111	5.55	117	5.55	117	5.55	345	16.65
	Soil health management	171	8.55	171	8.55	171	8.55	513	25.65
	Value addition	171	5.13	171	5.13	171	5.13	513	15.39
	Seed Pro.	171	25.65	171	25.65	171	25.65	513	76.95
	Water resource development	69	69	69	69	86	86	224	224
	Total	8879	519.76	8885	519.76	8902	536.76	26666	1576.28
	Grand Total	20520	592.69	20526	592.69	20543	609.69	61589	1795.07

Table- 5.1.5 Physical and Financial Program Proposed for Development of Sorghum under SAP (Sum of All Districts)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity /Projects	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	132	23.76	176	31.68	220	39.60	528	95.04
	Farmers	528	63.36	704	84.48	880	105.60	2112	253.44
	Women	830	99.60	1185	142.20	1625	195.00	3640	436.80
	Total	1490	186.72	2065	258.36	2725	340.20	6280	785.28
2	Demonstration								
	Varietal demonstrations	1056	21.12	1408	28.16	1760	35.20	4224	84.48
	Pest Management	132	2.64	176	3.52	220	4.40	528	10.56
	Biopesticide	132	2.64	176	3.52	220	4.40	528	10.56
	Nutrient Management	132	2.64	176	3.52	220	4.40	528	10.56
	Biofertilizer	132	2.64	176	3.52	220	4.40	528	10.56
	Farm Mechanization	78	78.00	114	114.00	154	154.00	346	346.00
	Total	1662	109.68	2226	156.24	2794	206.80	6682	472.72
	Other activities								
3	FFS	95	19.00	140	28.00	180	36.00	415	83.00
4	FG	50	100.00	87	174.00	130	260.00	267	534.00
	Total	145	119.00	227	202.00	310	296.00	682	617.00
	Special project								
5	Availability of green fodder silage	5	3.75	5	3.75	5	3.75	15	11.25
6	Use of sweet sorghum as bio-fuel	0	0	1	1800.00	1	1800.00	2	3600.00
7	Value addition in Sorghum	0	0	1	342.12		255.12	1	597.24
8	Agro processing units for	12	600.00	13	650.00	15	750.00	40	2000.00
9	Farm level storage plan for	0	0	4	200.00	26	1200.00	30	1400.00
	Total	17	603.75	24	2995.87	47	4008.87	88	7608.49
	Grand Total	3314	1019.15	4542	3612.47	5876	4851.87	13732	9483.49

For No. 6. Fund may be shared with sugar factory as per condition made between Government and Sugar factory.

Table- 5.1.6 Physical and Financial Program Proposed for Development of Minor Millet (Sum of all districts)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	1500	13.5	1500	13.5	1500	13.5	4500	40.5
	Farmers	20250	78.6	20250	78.6	20250	78.6	60750	235.8
	Total	21750	92.1	21750	92.1	21750	92.1	65250	276.3
2	Demonstration								
	Varietal demonstrations	3000	4	3000	4	3000	4	9000	12
	INM	2100	8.4	2100	8.4	2100	8.4	6300	25.2
	IPM	2600	10.4	2600	10.4	2600	10.4	7800	31.2
	Seed treatment	3000	4	3000	4	3000	4	9000	12
	Total	10700	26.8	10700	26.8	10700	26.8	32100	80.4
3	FFS	18	3.6	18	3.6	18	3.6	54	10.8
4	FG	84	16.8	84	16.8	84	16.8	252	50.4
5	Physical and financial programme	10	300	10	300	10	300	30	900
	Total	112	320.4	112	320.4	112	320.4	336	961.2
	Grand Total	32562	439.3	32562	439.3	32562	439.3	97686	1317.9

Table- 5.1.7 Physical and financial Program proposed for development of Cereals under SAP (Sum of all districts)

(Phy.- No., Fin.- Rs. in Lakh)

SN	Activity /Projects	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	22877.00	225.28	23305.00	236.67	23794.00	248.59	69976.00	710.54
	Farmers	664546.00	4100.28	665077.00	4164.00	665693.00	4237.92	1995316.00	12502.20
	Total	687423.00	4325.56	688382.00	4400.67	689487.00	4486.51	2065292.00	13212.74
2	Demonstration								
	Varietal Demonstration	27382.00	1153.34	26502.00	1154.22	26546.00	1155.10	79506.00	3462.66
	Seed Planning/Seed Village Program	38167.00	2979.25	40538.00	3198.95	43107.00	3437.05	144793.00	10751.90
	INM Demonstrations	6603.00	229.59	6647.00	230.47	6691.00	231.35	19941.00	691.41
	Resource Conservation Technologies -	20427.00	1021.34	20580.00	1028.98	20274.00	1013.70	61281.00	3064.02
	Resource Conservation Technologies -	14500.00	724.98	14615.00	730.75	14730.00	736.51	43845.00	2192.24
	Seed Treatment Demonstrations	20276.00	178.90	20632.00	180.32	20774.00	85.96	61682.00	445.18
	Organic Farming Demonstration	17335.00	846.86	17473.00	853.59	17612.00	860.32	52420.00	2560.77
	Bio-fertilizer and Bio-compost	15427.00	1334.87	15592.00	750.82	15757.00	757.55	46776.00	2843.24
	IWM Demonstration	15089.00	734.22	15286.00	743.78	15188.00	739.00	45563.00	2217.00
	IPM	2843.00	18.59	2887.00	19.47	2931.00	20.35	8661.00	58.41
	Vermicompost	171.00	8.55	171.00	8.55	171.00	8.55	513.00	25.65
	Plant health management	111.00	5.55	117.00	5.55	117.00	5.55	345.00	16.65
	Soil health management	171.00	8.55	171.00	8.55	171.00	8.55	513.00	25.65
	Value addition	171.00	5.13	171.00	5.13	171.00	5.13	513.00	15.39
	Water resource development	69.00	69.00	69.00	69.00	86.00	86.00	224.00	224.00
	Biopesticide	132.00	2.64	176.00	3.52	220.00	4.40	528.00	10.56
	Farm Mechanization	78.00	78.00	114.00	114.00	154.00	154.00	346.00	346.00

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Total	178952.00	9399.36	181741.00	9105.65	184700.00	9309.07	545393.00	27814.08
3	Other activity								
	FFS	843.00	177.20	888.00	180.20	928.00	188.20	2659.00	545.60
	FG	5333.00	1156.00	5370.00	1231.00	5412.00	1316.00	16115.00	3703.00
	Total	6176.00	1333.20	6258.00	1411.20	6340.00	1504.20	18774.00	4248.60
	Special Project								
	Sorghum								
	Availability of green fodder silage making	5	3.75	5	3.75	5	3.75	15.00	11.25
	Use of sweet sorghum as bio-fuel	0	0	1	1800	1	1800	2.00	3600.00
	Value addition in Sorghum	0	0	1	342.12	0	255.12	1.00	597.24
	Agro processing units for Sorghum	12	600	13	650	15	750	40.00	2000.00
	Farm level storage plan for sorghum	0	0	4	200	26	1200	30.00	1400.00
	Minor millets								
	Physical and financial programme	10	300	10	300	10	300	30.00	900.00
	Total	27.00	903.75	34.00	3295.87	57.00	4308.87	118.00	8508.49
	Grand Total	872578.00	15961.87	876415.00	18213.39	880584.00	19608.65	2629577.00	53783.91

5.2 Oil seed Crops:

Table- 5.2.1 Physical and Financial Program Proposed for Development of Groundnut under SAP (Sum of All Districts)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	1190	190.4	1190	190.4	1190	190.4	3570	571.2
	Farmers	54600	327.6	54600	327.6	54600	327.6	163800	982.8
	Total	55790	518	55790	518	55790	518	167370	1554
2	Demonstration							0	0
	Varietal demonstrations	418	21.1	418	21.1	418	78.1	1254	120.3
	Seed production Enhancement	2120	127.2	2120	127.2	2120	127.2	6360	381.6
	INM	167.2	20.9	167.2	20.9	167.2	20.9	501.6	62.7
	Resource Conservation Technologies -Laser Leveling	167.2	20.9	167.2	20.9	167.2	20.9	501.6	62.7
	Resource Conservation Technologies -Green manuring	167.2	20.9	167.2	20.9	167.2	20.9	501.6	62.7
	Seed Treatment	418	20.9	418	20.9	418	20.9	1254	62.7
	Total	3457.6	231.9	3457.6	231.9	3457.6	288.9	10372.8	752.7
	Other activities							0	0
3	FFS	48	9.6	48	9.6	48	9.6	144	28.8
4	FG	344	68.8	344	68.8	344	68.8	1032	206.4
	Total	392	78.4	392	78.4	392	78.4	1176	235.2
	Grand Total	59639.6	828.3	59639.6	828.3	59639.6	885.3	178918.8	2541.9

Table- 5.2.2 Physical and Financial Program Proposed for Development for Sesame under SAP (Sum of All Districts)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	3000	30	3000	30	3000	30	9000	90
	Farmers	108000	864	108000	864	108000	864	324000	2592
	Total	111000	894	111000	894	111000	894	333000	2682
2	Demonstration							0	0
	Seed village Program	1000	75	1000	75	100	75	2100	225
	Demonstration on IPM	350	26.25	350	26.25	350	26.25	1050	78.75
	Demonstration on INM	350	26.25	350	26.25	350	26.25	1050	78.75
	Demonstration on improved varieties	350	26.25	350	26.25	350	26.25	1050	78.75
	Demonstration on biofertilizes	350	26.25	350	26.25	350	26.25	1050	78.75
	Demonstration on vermicompost	350	26.25	350	26.25	350	26.25	1050	78.75
	Demonstration on Effect of thinning in Sesame	350	26.25	350	26.25	350	26.25	1050	78.75
	Demonstration on Effect of irrigation at critical stage	350	26.25	350	26.25	350	26.25	1050	78.75
	Total	3450	258.75	3450	258.75	2550	258.75	9450	776.25
	Other Activities							0	0
3	FFS							0	0
4	FG							0	0
5	Special project							0	0
	Total	0	0	0	0	0	0	0	0
	Grand Total	114450	1152.75	114450	1152.75	113550	1152.75	342450	3458.25

Table- 5.2.3 Physical and Financial Program Proposed for Development of Soyabean under SAP (Sum of All Districts)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy.	Fin	Phy.	Fin	Phy.	Fin	Phy.	Fin
1	Training								
	In Service	1500	15	1500	15	1500	15	4500	45
	Farmers	80400	643.2	80400	643.2	80400	643.2	241200	1929.6
	Total	81900	658.2	81900	658.2	81900	658.2	245700	1974.6
2	Demonstration								
	Seed village program	3200	240	3400	255	3600	270	10200	765
	Demonstration on IPM	300	22.5	300	22.5	300	22.5	900	67.5
	Demonstration on INM	300	22.5	300	22.5	300	22.5	900	67.5
	Demonstration on improved varieties	350	26.25	350	26.25	350	26.25	1050	78.75
	Demonstration on bio-fertilizes	325	24.38	325	24.38	325	24.38	975	73.14
	Demonstration on vermi-compost	325	24.38	325	24.38	325	24.38	975	73.14
	Total	4800	360.01	5000	375.01	5200	390.01	15000	1125.03
	Other Activities								
3	FFS								
4	FG								
5	Special project								
	Total	0	0	0	0	0	0	0	0
	Grand Total	86700	1018.21	86900	1033.21	87100	1048.21	260700	3099.63

Table- 5.2.4 Physical and Financial Program Proposed for Development of Niger under SAP (Sum of All Districts)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	45	0.36	60	0.48	75	0.6	180	1.44
	Farmers	560	134.4	830	199.2	1132	271.68	2522	605.28
	Total	605	134.76	890	199.68	1207	272.28	2702	606.72
2	Demonstration								
	Seed village program	35	2.64	45	3.38	55	4.14	135	10.16
	Demonstration on IPM	50	3.75	95	7.13	140	10.5	285	21.38
	Demonstration on INM	40	3.01	65	4.88	90	6.75	195	14.64
	Demonstration on improved varieties	90	6.75	120	9	150	11.25	360	27
	Demonstration on bio-fertilizes	17	1.28	30	2.25	43	3.23	90	6.76
	Demonstration on vermi-compost	17	1.28	30	2.25	43	3.23	90	6.76
	Total	249	18.71	385	28.89	521	39.1	1155	86.7
	Grand Total	854	153.47	1275	228.57	1728	311.38	3857	693.42

Table- 5.2.5 Physical and financial Program proposed for development of Castor under SAP (Sum of All Districts)

(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity/ Projects	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	A. Activity								
1	Trainings								
	In Service	28795	230.4	28795	230.4	28795	230.4	86385	691.2
	Farmers	76758	384.56	76758	384.56	76758	384.56	230274	1153.68
	Total	105553.0	614.96	105553.0	614.96	105553.0	614.96	316659.0	1844.88
2.	Demonstrations								
	Varietal	10771	538.6	10771	538.6	10771	538.6	32313	1615.8
	INM	10411	208.22	10411	208.22	10411	208.22	31233	624.66
	RCTs	4301	215.05	4301	215.05	4301	215.05	12903	645.15
	Seed treatment	10411	104.11	10411	104.11	10411	104.11	31233	312.33
	Organic Farming	9899	520.55	9899	520.55	9899	520.55	29697	1561.65
	Bio-fertilizer & bio-compost	9899	520.55	9899	520.55	9899	520.55	29697	1561.65
	IWM	10241	538.55	10241	538.55	10241	538.55	30723	1615.65
	Total	65933.0	2645.63	65933.0	2645.63	65933.0	2645.63	197799	7936.89
3.									
	FFSs	544	108.8	544	108.8	544	108.8	1632	326.4
	Group Formation	2000	400	2000	400	2000	400	6000	1200
	Total	2544.0	508.8	2544.0	508.8	2544.0	508.8	7632.0	1526.4
	Grand Total	174030	3769.39	174030	3769.39	174030	3769.39	522090	11308.17

Table- 5.2.6 Physical and Financial Program Proposed for Development of Mustard under SAP (Sum of All Districts)
(Phy.- No., Fin.- Rs. in Lakh)

Sr. No.	Activity/ Projects	2017-18		2018-19		2019-20		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	A. Activity								
1	Trainings								
	InService	26395	211.2	26395	211.2	26395	211.2	79185	633.6
	Farmers	16036	80.99	16026	80.93	16026	80.93	48088	242.85
	Total	42431.0	292.19	42421.0	292.13	42421.0	292.13	127273.0	876.45
2.	Demonstrations								
	Varietal	2196	110.3	2196	110.3	2196	110.3	6588	330.90
	INM	2196	43.92	2196	43.92	2196	43.92	6588	131.76
	RCTs	1060	53	1060	53	1060	53	3180	159.00
	Seed treatment	2203	22.03	2203	22.03	2203	22.03	6609	66.06
	Organic farming	2000	11.07	2000	11.07	2000	11.07	6000	33.21
	Bio-fertilizer and	2000	11.07	2000	11.07	2000	11.07	6000	33.21
	IWM	2000	11.07	2000	11.07	2000	11.07	6000	33.21
	Total	13655.0	262.46	13655.0	262.46	13655.0	262.46	40965.0	787.38
3.									
	FFSs	113	22.6	113	22.6	113	22.6	339	67.8
	Group Formation	568	113.8	568	113.8	568	113.8	1704	341.4
	Total	681.0	136.4	681.0	136.4	681.0	136.4	2043.0	409.2
	Grand Total	56767	691.05	56757	690.99	56757	690.99	170281	2073.03

Table- 5.2.7 Physical and Financial Program Proposed for Development of Pulse Crop under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lac)

Sr. No.	Activity/ Projects	1 st year		2 st year		3 st year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	A. Activity								
1	Trainings								
	In Service	21795	133.36	21795	133.36	21795	133.36	65385.00	400.08
	Farmers	239440	873.83	239440	873.87	239440	873.87	718320.00	2621.57
	Total	261235	1007.19	261235	1007.23	261235	1007.23	783705.00	3021.65
2	Demonstrations								
	Varietal	12000	600	12000	600	12000	600	36000	1800
	Pulses Seed village programme	4000	100	4000	100	4000	100	12000	300
	INM	5685	284.25	5685	284.25	5685	284.25	17055	852.75
	IPM	-	-	-	-	-	-	-	-
	Resource Conservation Technologies -Laser	8400	420	8400	420	8400	420	25200	1260
	Resource Conservation Technologies -Green	10180	509	10180	509	10180	509	30540	1527
	Total	40265	1913.25	40265	1913.25	40265	1913.25	120795	5739.75
3	Other Activities								
	FFSs	691	138	691	138	691	138	2073	414
	Group Formation	2371	474.2	2371	474.2	2371	474.2	7113	1422.6
	Total	3062	612.2	3062	612.2	3062	612.2	9186	1836.6
	Grand Total	304562	3532.64	304562	3532.68	304562	3532.68	913686	10598

Table- 5.2.8 Physical and Financial Program Proposed for Development of Oilseed & Pulses under SAP (Sum of All Districts)
(Phy. Nos/ha, Fin.-Rs. in Lac)

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	82,720	811	82,735	811	82,750	811	248205.00	2432.52
	Farmers	5,75,794	3,309	5,76,054	3,373	5,76,356	3,446	1728204.00	10127.78
	Total	6,58,514	4,119	6,58,789	4,184	6,59,106	4,257	1976409.00	12560.30
2	Demonstration								
	Varietal Demonstration	13,385	670	13,385	670	13,385	727	40155.00	2067.00
	Seed Planning/Seed Village	10,355	545	10,565	561	9,875	576	30795.00	1681.76
	INM Demonstrations	19,149	609	19,174	611	19,199	613	57522.60	1832.76
	Resource Conservation	8,567	441	8,567	441	8,567	441	25701.60	1322.70
	Resource Conservation	15,708	798	15,708	798	15,708	798	47124.60	2393.85
	Seed Treatment Demonstrations	13,032	147	13,032	147	13,032	147	39096.00	441.12
	Organic Farming Demonstration	11,899	532	11,899	532	11,899	532	35697.00	1594.86
	Bio-fertilizer and Bio-compost	12,591	584	12,604	585	12,617	585	37812.00	1753.51
	IWM Demonstration	12,241	550	12,241	550	12,241	550	36723.00	1648.86
	IPM	700	52.5	745	55.88	790	59.25	2235.00	167.63
	Vermicompost	692	51.91	705	52.88	718	53.86	2115.00	158.65
	Demonstration on improved	790	59.25	820	61.5	850	63.75	2460.00	184.50
	Demonstration on Effect of	350	26.25	350	26.25	350	26.25	1050.00	78.75
	Demonstration on Effect of	350	26.25	350	26.25	350	26.25	1050.00	78.75
	Total	1,19,810	5,091	1,20,146	5,116	1,19,582	5,198	359536.80	15404.70
3	Other activity							0.00	0.00
	FFS	1396	279	1396	279	1396	279	4188.00	837.00
	FG	5,283	1,057	5,283	1,057	5,283	1,057	15849.00	3170.40
	Special Porject							0.00	0.00
	Total	6679	1335.8	6679	1335.8	6679	1335.8	20037.00	4007.40
	Grand Total	7,85,003	10,546	7,85,614	10,636	7,85,367	10,791	2355982.80	31972.40

5.3 Horticultural Crops:

Table- 5.3.1 Physical and Financial Program Proposed for Development of Fruit and Flower Sector under SAP (Sum of All Districts)
(Phy- No of unit, Fin- Rs. In lakh)

Activity /Projects	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Training								
Capacity building for staff	4530	35.32	4530	35.32	4530	35.32	13590	105.96
Capacity building for farmers	51650	302.70	51650	302.70	51650	302.70	154950	908.10
Total	56180.00	338.02	56180.00	338.02	56180.00	338.02	168540.00	1014.06
Demonstration								
Varietal demonstrations for fruits and flowers	1745	85.25	1745	85.25	1745	85.25	5235.00	255.75
INM for fruits and flowers	1365	67.75	1405	67.75	1405	67.75	4175.00	203.25
Resource conservation technologies	1620	76.25	1620	76.25	1620	76.25	4860.00	228.75
IPM	15	0.75	15	0.75	15	0.75	45.00	2.25
Wadi model	975	81.30	975	81.30	975	81.30	2925.00	243.90
HDP in Mango	645	1935.00	645	1935.00	645	1935.00	1935.00	5805.00
Floriculture model	25	200.00	34	272.00	29	232.00	88.00	704.00
Rejuvenation	515	257.50	515	257.50	515	257.50	1545.00	772.50
Crop diversification	471	235.50	471	235.50	471	235.50	1413.00	706.50
Organic farming	920	460.00	920	460.00	920	460.00	2760.00	1380.00
Total	8296.00	3399.30	8345.00	3471.30	8340.00	3431.30	24981.00	10301.90
Special projects/schemes								
Small scale nurseries	92	920.00	92	920.00	92	920.00	276.00	2760.00
Model nurseries	8	200.00	21	525.00	19	475.00	48.00	1200.00
Poly houses	49	735.00	56	840.00	56	840.00	161.00	2415.00
High tech green houses	21	875.00	29	1275.00	29	1275.00	79.00	3425.00

Activity /Projects	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Low cost net house	65	780.00	65	780.00	65	780.00	195.00	2340.00
Farm level small pack house	384	1152.00	384	1152.00	384	1152.00	1152.00	3456.00
Low cost ripening chamber	136	680.00	136	680.00	136	680.00	408.00	2040.00
Farm level precooling chamber	134	670.00	134	670.00	134	670.00	402.00	2010.00
Large scale ripening chamber (Mango &	7	225.00	13	825.00	12	725.00	32.00	1775.00
Primary processing unit	25	625.00	25	625.00	27	675.00	77.00	1925.00
Organic product selling centre	26	650.00	26	650.00	28	700.00	80.00	2000.00
Integrated pack house	15	425.00	15	425.00	15	425.00	45.00	1275.00
Oil extraction unit for aromatic plants	20	100.00	15	75.00	14	70.00	49.00	245.00
Chamber based cold storage	49	735.00	49	735.00	49	735.00	147.00	2205.00
Refrigerated vehicle/container (6t)	30	450.00	27	405.00	30	450.00	87.00	1305.00
Dron based technology	13	305.00	18	430.00	17	405.00	48.00	1140.00
Grading sorting unit	22	330.00	24	360.00	25	375.00	71.00	1065.00
Total	1096.00	9857.00	1129.00	11372.00	1132.00	11352.00	3357.00	32581.00
Grand Total	65572.00	13594.32	65654.00	15181.32	65652.00	15121.32	196878.00	43896.96

Table- 5.3.2 Physical and Financial Program Proposed for Development of Vegetable under SAP

(Phy. Nos/ha, Fin.-Rs. in Lac)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	Staff Training (Cost norms @900/day/ Trainee)	1730	15.57	1730	15.57	1730	15.57	5190	46.71
	Farmers Training (Cost norms @600/day/ Trainee)	24741	148.44	24741	148.44	24741	148.44	74223	445.32
	Total	26471	164.01	26471	164.01	26471	164.01	79413	492.03
2	Demonstration								
	Varietal demonstration of vegetable crops	560	28.00	560	28.00	560	28.00	1680	84.00
	INM demonstration	532	26.60	532	26.60	532	26.60	1596	79.80
	IPDM demonstration	592	29.60	592	29.60	592	29.60	1776	88.80
	Seed treatment demonstration	750	37.50	750	37.50	750	37.50	2250	112.50
	Total	2434	121.70	2434	121.70	2434	121.70	7302	365.10
	Grand Total	28905	285.71	28905	285.71	28905	285.71	86715	857.13

Table- 5.3.3 Physical and Financial Program Proposed for Development of for Seed Spices Crop under SAP

(Phy. Nos/ha, Fin.-Rs. in Lac)

Sr. No.	Activity/ Projects	1 st year		2 st year		3 st year		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	A. Activity								
1	Trainings								
	In Service								
	Farmers	7027	140.5	7027	140.5	7027	140.5	21081	421.50
Total		7027	140.5	7027	140.5	7027	140.5	21081	421.50
2	Demonstrations								
	Varietal	625	31.25	625	31.25	625	31.25	1875	93.75
	INM	654	32.70	654	32.70	654	32.70	1962	98.10
	IPDM	669	33.45	669	33.45	669	33.45	2007	100.35
	Seed treatment	448	22.4	448	22.4	448	22.4	1344	67.20
	Total	2396	119.8	2396	119.8	2396	119.8	7188	359.40
3	Other Activities								
	FFSs								
	Group Formation								
Total									
	Special project								
Total									
Grand Total		9423	260.3	9423	260.3	9423	260.3	28269	780.90

Table- 5.3.4 Physical and Financial Program Proposed for Development of Agro-forestry Sector under SAP

(Phy. Nos/ha, Fin.-Rs. in Lac)

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1.	Training								
	1a. In-service/ Field Forester	22	3.96	22	3.96	22	3.96	66	11.88
	1b. Farmers Training	86	12.90	86	12.90	86	12.90	258	38.70
	Total	108	16.86	108	16.86	108	16.86	324	50.58
2.	Demonstration								
	2a. Agroforestry/ Social Forestry/ Forest Nursery/ Apiculture/ Medicinal plants	132	5.28	132	5.28	132	5.28	396	15.84
	Total	132	5.28	132	5.28	132	5.28	396	15.84
3.	Other Activities								
	3a. FFSs-Forestry/ Agroforestry/ Social Forestry/Apiculture	33	9.57	33	9.57	33	9.57	99	28.71
	3b. Group Formation for forestry activities	33	9.57	33	9.57	33	9.57	99	28.71
	3c. Supply of tall seedlings of timber trees/NTFPs/Fruit trees/Fodder trees (clones/grafted plants) for farm field, agroforestry, wind break, road side plantation, etc.	24	600.00	24	600.00	24	600.00	72	1800.00
	Total	90	619.14	90	619.14	90	619.14	270	1857.4
Grand Total		330	641.28	330	641.28	330	641.28	990	1923.8

Table- 5.3.5 Physical and Financial Program Proposed for Development of Horticultural, Spices and Agro-forestry under SAP
(Sum of all Districts) (Phy. Nos/ha, Fin.-Rs. in Lac)

SN	Activity /Projects	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	6,282	55	6,282	55	6,282	55	18,846	164.55
	Farmers	83,504	605	83,504	605	83,504	605	2,50,512	1813.62
	Total	89,786	659	89,786	659	89,786	659	269358	1978.17
2	Demonstration								
	Varietal Demonstration	2,930	145	2,930	145	2,930	145	8,790	433.50
	INM Demonstrations	2,551	127	2,591	127	2,591	127	7,733	381.15
	Resource Conservation Technologies	1,620	76	1,620	76	1,620	76	4,860	228.75
	Seed Treatment Demonstrations	1,198	60	1,198	60	1,198	60	3,594	179.70
	Organic Farming Demonstration	920	460	920	460	920	460	2,760	1380.00
	IPDM	1276	63.8	1276	63.8	1276	63.8	3,828	191.40
	Vadi model	975	81.3	975	81.3	975	81.3	2,925	243.90
	HDP in Mango	645	1935	645	1935	645	1935	1,935	5805.00
	Floriculture model	25	200	34	272	29	232	88	704.00
	Rejuvenation	515	257.5	515	257.5	515	257.5	1,545	772.50
	Crop diversification	471	235.5	471	235.5	471	235.5	1,413	706.50
	Organic farming	920	460	920	460	920	460	2,760	1380.00
	Agroforestry/ Social Forestry/ Forest Nursery/ Apiculture/ Medicinal plants	132	5.28	132	5.28	132	5.28	396	15.84
	Total	14,178	4,106	14,227	4,178	14,222	4,138	42,627	12,422.24
3	Other activity								
	FFS	33	9.57	33	9.57	33	9.57	99	28.71

SN	Activity /Projects	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	FG	33	10	33	10	33	10	99	28.71
	Total	66	19	66	19	66	19	198	57
	Special Project								
	Fruit- Flower								
	Small scale nurseries	92	920	92	920	92	920	276	2760.00
	Model nurseries	8	200	21	525	19	475	48	1200.00
	Poly houses	49	735	56	840	56	840	161	2415.00
	High tech green houses	21	875	29	1275	29	1275	79	3425.00
	Low cost net house	65	780	65	780	65	780	195	2340.00
	Farm level small pack house	384	1152	384	1152	384	1152	1,152	3456.00
	Low cost ripening chamber	136	680	136	680	136	680	408	2040.00
	Farm level precooling chamber	134	670	134	670	134	670	402	2010.00
	Large scale ripening chamber (Mango & banana)	7	225	13	825	12	725	32	1775.00
	Primary processing unit	25	625	25	625	27	675	77	1925.00
	Organic product selling centre	26	650	26	650	28	700	80	2000.00
	Integrated pack house	15	425	15	425	15	425	45	1275.00
	Oil extraction unit for aromatic plants	20	100	15	75	14	70	49	245.00
	Chamber based cold storage	49	735	49	735	49	735	147	2205.00
	Refrigerated vehicle/container (6t)	30	450	27	405	30	450	87	1305.00
	Dron based technology	13	305	18	430	17	405	48	1140.00

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Grading sorting unit	22	330	24	360	25	375	71	1065.00
	Agro-forestry								
	Supply of tall seedlings of timber trees/NTFPs/Fruit trees/Fodder trees (clones/grafted plants) for farm field, agroforestry, wind break, road side plantation, etc.	24	600	24	600	24	600	72	1800.00
	Total	1,120	10,457	1,153	11,972	1,156	11,952	3,429	34381.00
	Grand Total	1,05,150	15222.47	105166	16809.47	105164	16749.47	3,15,480	48838.83

5.4 Cash Crops:

Table- 5.4.1 Physical and Financial Program Proposed for Development of Cotton under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lac)

SN	Activity /Projects	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	Staff training (skill upgradation)	1654	14.89	1654	14.89	1654	14.89	4962	44.67
	Farmers	38082	228.49	38082	228.49	38082	228.49	114246	685.47
	Total	39736	243.38	39736	243.38	39736	243.38	119208	730.14
2	Demonstration								
	Varietal	1834	91.70	1834	91.70	1834	91.70	5502	275.1
	INM	2578	128.90	2578	128.90	2578	128.90	7734	386.7
	Intercropping	2644	132.20	2644	132.20	2644	132.20	7932	396.6
	IPM	616	30.80	616	30.80	616	30.80	1848	92.4
	Seed Treatment (Desi)	1807	90.35	1807	90.35	1807	90.35	5421	271.05
	De-topping	1020	51.00	1020	51.00	1020	51.00	3060	153
	Total	10499	524.95	10499	524.95	10499	524.95	31497	1574.9
	Other Activities								
3	FFS	589	117.80	589	117.80	589	117.80	1767	353.4
4	FG	217	43.40	257	51.40	277	55.40	751	150.2
	Total	806	161.20	846	169.20	866	173.20	2518	503.6
	Grand Total	51041	929.53	51081	937.53	51101	941.53	153223	2808.59

Table- 5.4.2 Physical and Financial Program Proposed for Development of Sugarcane under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lac)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	1800	14.4	1800	14.4	1800	14.4	5400	43.2
	Farmers	9000	54.0	9000	54.0	9000	54.0	27000	162
	Total	10800	68.4	10800	68.4	10800	68.4	32400	205.2
2	Demonstration								
	Varietal	2880	144	2880	144	2880	144	8640	432
	IPDM demonstration	2880	144.0	2880	144.0	2880	144.0	8640	432
	Resource conservation (Inter cropping)	2880	144.0	2880	144.0	2880	144.0	8640	432
	INM demonstration	2880	144	2880	144.0	2880	144.0	8640	432
	Total	11520	576	11520	576	11520	576	34560	1728
	Other Activities								
3	FFS	2880	144.0	2880	144.0	2880	144.0	8640	432
4	FG								
5	Special project								
	Total	2880	144.0	2880	144.0	2880	144.0	8640	432
	Grand Total	25200	788.4	25200	788.4	25200	788.4	75600	2365.2

Table- 5.4.3 Physical and Financial Program Proposed for Development of Cash Crop under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lac)

Sr. No.	Activity /Projects	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	3454.00	29.29	3454.00	29.29	3454.00	29.29	10362.00	87.87
	Farmers	47082.00	282.49	47082.00	282.49	47082.00	282.49	141246.00	847.47
	Total	50536.00	311.78	50536.00	311.78	50536.00	311.78	151608.00	935.34
2	Demonstration								
	Varietal Demonstration	4714.00	235.70	4714.00	235.70	4714.00	235.70	14142.00	707.10
	INM Demonstrations	5458.00	272.90	5458.00	272.90	5458.00	272.90	16374.00	818.70
	Resource Conservation Technologies- Inter	5524.00	276.20	5524.00	276.20	5524.00	276.20	16572.00	828.60
	Seed Treatment	1807.00	90.35	1807.00	90.35	1807.00	90.35	5421.00	271.05
	De-topping	1020.00	51.00	1020.00	51.00	1020.00	51.00	3060.00	153.00
	IPDM	3496.00	174.80	3496.00	174.80	3496.00	174.80	10488.00	524.40
	Total	22019.00	1100.95	22019.00	1100.95	22019.00	1100.95	66057.00	3302.85
3	Other Activities								
	FFS	3469.00	261.80	3469.00	261.80	3469.00	261.80	10407.00	785.40
	FG	217.00	43.40	257.00	51.40	277.00	55.40	751.00	150.20
	Total	3686.00	305.20	3726.00	313.20	3746.00	317.20	11158.00	935.60
	Special project								
	Total								
	Grand Total	76241.00	1717.93	76281.00	1725.93	76301.00	1729.93	228823.00	5173.79

5.5 Animal, Poultry, Fishery and Dairy Sectors:

Table- 5.5.1 Physical and Financial Program Proposed for Development of Large Animals under SAP (Sum of All Districts):

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	2017-2018		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Special project								
a	Providing the training(extension activities),	68200	409.2	68200	409.2	68200	409.2	204600.00	1227.60
b	Fertility Improvement Programme	9080	3632	9080	3632	9080	3632	27240.00	10896.00
c	Supply of breeding bulls to villages	2040	2167	2040	2167	2040	2167	6120.00	6501.00
d	Commercial Dairy Farming	77	385	77	385	77	385	231.00	1155.00
e	Provision of shed for livestock,	27100	8130	27100	8130	27100	8130	81300.00	24390.00
f	Supply of dairy utensils to AH farmers	27100	271	27100	271	27100	271	81300.00	813.00
g	Rearing of female cattle/buffalo calf	160	640	160	640	160	640	480.00	1920.00
h	Provision of Artificial Insemination	134	1608	134	1608	134	1608	402.00	4824.00
Total		133891	17242.2	133891	17242.2	133891	17242.2	401673.00	51726.60
Grand Total		133891	17242.2	133891	17242.2	133891	17242.2	401673.00	51726.60

Table- 5.5.2 Physical and Financial Program Proposed for Development of Small Ruminants under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	0	0	0	0	0	0	0	0
	Farmers (Small ruminants)	8250	49.5	8250	49.5	8250	49.5	24750	148.5
	Farmers (Rabbit)	100	0.6	100	0.6	100	0.6	300	1.8
Total		8350	50.1	8350	50.1	8350	50.1	25050	150.3
Grand Total		8350	50.1	8350	50.1	8350	50.1	25050	150.3

Table- 5.5.3 Physical and Financial Program Proposed for Development of Poultry under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service								
	Training proposed for capacity building of field Veterinarians*	20	12.00	20	12.00	20	12.00	60	36.00
	Training proposed for capacity building of para-veterinarians and field workers*	20	15.00	20	15.00	20	15.00	60	45.00
	Training proposed for capacity building of poultry farmers on different technologies	132	72.00	132	72.00	132	72.00	396	216.00
	Total	172	99	172	99	172	99	516	297
2	Demonstration								
	Demonstration of package of practices (five in each region)	20	20.00	20	20.00	20	20.00	60	60.00
	Total	20	20.00	20	20.00	20	20.00	60	60.00
	Other Activities								
3	Group formation for specific activities	33	33.00	33	33.00	33	33.00	99	99.00
	Grand Total	225	152.00	225	152.00	225	152.00	675	456.00

Table- 5.5.4 Physical and Financial Program Proposed for Development of Dairy under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	520	3.84	520	4.16	520	4.16	1560	12.16
	Farmers	1920	11.52	1920	11.52	1920	11.52	5760	34.56
Total		2440	15.36	2440	15.68	2440	15.68	7320	46.72
2	Demonstration								
3	Special project								
	Proposals for Milking Machines	57608	5761	57608	5761	57608	5761	172824.00	17283.00
	Proposals for Support for Women Dairy Cooperatives	28967	724	28967	724	28967	724	86901.00	2172.00
Total		86575	6485.00	86575	6485.00	86575	6485.00	259725	19455
Grand Total		89015	6500.36	89015	6500.68	89015	6500.68	267045	19501.72

Table- 5.5.5 Physical and Financial Program Proposed for Development of Fishery under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service								
	Farmers & women	2075	12.45	2075	12.45	2075	12.45	6225	37.35
	Total	2075	12.45	2075	12.45	2075	12.45	6225	37.35
2	Demonstration								
	Introduction of Portable FRP Carp Hatcheries for fish seed production	45	67.5	45	67.5	45	67.5	135	202.5
	Promotion of Freshwater Prawn farming	185	74.00	185	74.00	185	74	555	222
	Village pond for fisheries development	210	84	215	86	370	148	795	318
	Pilot project for Cage/ Pen culture in Reservoirs	100	40.00	900	360.00	550	220.00	1550	620
	Financial assistance to fishing boat owners for replacement of cod end in trawl nets	1060	127.2	2460	295.2	3160	379.2	6680	801.6
	Biometric Cards for fishermen	20000	96	21000	100.8	23000	110.4	64000	307.2
	Demonstration for seaweed cultivation (<i>Kappaphycus</i>) to fish farmers and SHGs (District wise)	10	2.00	10	2.00	10	2.00	30	6
	Demonstration of seaweed liquid fertilizer to farmers	90	4.50	90	4.50	90	4.50	270	13.5
	Total	21700	495.2	24905	990	27410	1005.6	74015	2490.8
	Other Activities								
3	FFS								
4	FG								

Sr. No.	Activity /Projects	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
5	Special project								
	Strengthening of existing Fisheries Training centres	6	180	0	300	0	300	6	780
	Modernisation and developments of existing fish markets	6	150	0	1650	0	1500	6	3300
	Research on Genetic upgradation of fish species	4	40	0	240	0	240	4	520
	Establishment of Marine fish hatchery at Okha	1	6	0	20	0	20	1	46
	Strengthening of aquaculture research centres in SAU	4	20	0	200	0	140	4	360
	Total	21	396	0	2410	0	2200	21	5006
	Grand Total	23796	903.65	26980	3412.45	29485	3218.05	80261.00	7534.15

Table- 5.5.6 Physical and Financial Program Proposed for Development of Fodder production under SAP (Sum of All Districts)
(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service								
	Farmers	495	59.4	650	78	1010	121.20	2155	258.60
	Women	495	59.4	650	78	1010	121.20	2155	258.60
	Total	990	118.8	1300	156	2020	242.4	4310	517.2
2	Demonstration								
		420	8.4	490	9.8	550	11	1460	29.20
	Fodder seed production								
	Green	46	552	50	700	50	700	146.00	1952.00
	Dry	32	384	47	656	47	656	126.00	1696.00
	Storage Dry	47	1410	47	1410	47	1410	141.00	4230.00
	Total	125.00	2346.00	144.00	2766.00	144.00	2766.00	413.00	7878.00
	Grand Total	1535.00	2473.20	1934.00	2931.80	2714.00	3019.40	6183.00	8424.40

Table- 5.5.7 Physical and Financial Program Proposed for Development of Animal Science under SAP (Sum of All Districts)
(Phy. Nos/ha, Fin.-Rs. in Lakh)

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training							0	0.00
	In Service	560	30.84	560	31.16	560	31.16	1680	93.16
	Farmers	13467	264.87	13777	302.07	14497	388.47	41741	955.41
	Total	14027	295.71	14337	333.23	15057	419.63	43421	1048.57
2	Demonstration								
	Demonstration of package of practices of poultry (five in each region)	20	20	20	20	20	20	60	60.00
	Fodder Production Demonstration	420	8.4	490	9.8	550	11	1460	29.20
	Introduction of Portable FRP Carp Hatcheries for fish seed production	45	67.5	45	67.5	45	67.5	135	202.50
	Promotion of Freshwater Prawn farming	185	74	185	74	185	74	555	222.00
	Village pond for fisheries development	210	84	215	86	370	148	795	318.00
	Pilot project for Cage/ Pen culture in Reservoirs	100	40	900	360	550	220	1550	620.00
	Financial assistance to fishing boat owners for replacement of cod end in trawl nets	1060	127.2	2460	295.2	3160	379.2	6680	801.60
	Biometric Cards for fishermen	20000	96	21000	100.8	23000	110.4	64000	307.20
	Demonstration for seaweed cultivation (Kappaphycus) to fish farmers and SHGs (District wise)	10	2	10	2	10	2	30	6.00
	Demonstration of seaweed liquid fertilizer to farmers	90	4.5	90	4.5	90	4.5	270	13.50
	Total	22140	523.6	25415	1019.8	27980	1036.6	75535	2580.00
	Other activity								
3	FFS	0	0	0	0	0	0	0	0.00
4	FG	33	33	33	33	33	33	99	99.00
	Total	33	33	33	33	33	33	99	99.00
5	Special project								
	Large Animals								
	Providing the training(extension activities),	68200	409.20	68200	409.20	68200	409.20	204600	1227.60

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Fertility Improvement Programme	9080	3632.00	9080	3632.00	9080	3632.00	27240	10896.00
	Supply of breeding bulls to villages	2040	2167.00	2040	2167.00	2040	2167.00	6120	6501.00
	Commercial Dairy Farming	77	385.00	77	385.00	77	385.00	231	1155.00
	Provision of shed for livestock,	27100	8130.00	27100	8130.00	27100	8130.00	81300	24390.00
	Supply of dairy utensils to AH farmers	27100	271.00	27100	271.00	27100	271.00	81300	813.00
	Rearing of female cattle/buffalo calf	160	640.00	160	640.00	160	640.00	480	1920.00
	Provision of Artificial Insemination	134	1608.00	134	1608.00	134	1608.00	402	4824.00
	Fodder Production Demonstration								
	Fodder seed production (Green, Dry, Storage dry)	125.00	2346.00	144.00	2766.00	144.00	2766.00	413.00	7878.00
	Fishery								
	Strengthening of existing Fisheries Training centres	6	180	0	300	0	300	6	780.00
	Modernisation and developments of existing fish markets	6	150	0	1650	0	1500	6	3300.00
	Research on Genetic upgradation of fish species	4	40	0	240	0	240	4	520.00
	Establishment of Marine fish hatchery at Okha	1	6	0	20	0	20	1	46.00
	Strengthening of aquaculture research centres in SAU	4	20	0	200	0	140	4	360.00
	Dairy								
	Proposals for Milking Machines	57608	5761	57608	5761	57608	5761	172824	17283.00
	Proposals for Support for Women Dairy Cooperatives	28967	724	28967	724	28967	724	86901	2172.00
	Total	220612	26469.2	220610	28903.2	220610	28693.2	661832	84065.60
	Grand Total	256812	27321.51	260395	30289.23	263680	30182.43	780887	87793.17

Table- 5.5.8 Physical and Financial Program Proposed for Development of IPDM under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Demonstration								
	District wise IPDM Demonstrations in Cotton	6450	322.5	6450	322.5	6450	322.5	19350	967.5
	District wise IPDM Demonstrations in Paddy	2300	115	2300	115	2300	115	6900	345.0
	District wise IPDM Demonstrations in Mango	397.0	19.85	397.0	19.85	397.0	19.85	1191	59.55
Grand Total		9147	457.35	9147	457.35	9147	457.35	27441	1372.05

Table- 5.5.9 Physical and Financial Program Proposed for Development of Soil Health under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy.	Fin	Phy.	Fin	Phy.	Fin	Phy.	Fin
1	Special project SAP								
	Soil Health Cards to be prepared			2300000	4600	2300000	4600	4600000	9200
	Subsidies for soil health inputs *Rs. 10 lakh/district/year				625		625		1250
Total				2300000	5225	2300000	5225	4600000	10450
Grand Total				2300000	5225	2300000	5225	4600000	10450

Table- 5.5.10 Physical and Financial Program Proposed for Development of Organic Farming under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Activity /Projects	1 st year		2 st year		3 st year		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Training								
In Service	810	7.37	975	8.86	1140	10.34	2925	26.57
Farmers	21950	132.9	22100	133.8	24950	150.9	69000	417.6
Total	22760	140.27	23075	142.66	26090	161.24	71925	444.17
Demonstration								
Demonstration of package, manure preparation, botanical pesticide preparation etc.	1195	71.7	1195	71.7	1195	71.7	3585	215.1
Vermi-compost units	468	234	518	259	693	346.5	1679	839.5
NADEP compost	850	102	980	117.6	1210	145.2	3040	364.8
Total	2513	407.7	2693	448.3	3098	563.4	8304	1419.4
Other activity								
FFS								
FG	82	16.4	87	17.4	95	19	264	52.8
Special project								
Proposal for organic seed production and storage	54	1080	54	1080	54	1080	162	3240
Proposal for infrastructure development for storage of organic produce	33	660	33	660	41	820	107	2140
Proposal for strengthening of research on organic and testing facilities		4050		3970		5470		13490
Proposal for providing processing tools and facilities	43	215	53	265	73	365	169	845
Proposal for marketing, supply chain, certification etc. under organic farming	47	235	55	275	61	305	163	815
Total	259	6256.4	282	6267.4	324	8059	865	20582.8
Grand Total	25532	6804.37	26050	6858.36	29512	8783.64	81094	22446.37

Table- 5.5.11 Physical and Financial Program Proposed for Development of Farm Mechanization under SAP (Sum of All Districts)
(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	Farmers	10000	60	10000	60	10000	60	30000	180
	Total	10000	60	10000	60	10000	60	30000	180
2	Special project								
1	Proposed tractors District wise for Gujarat State	2940	16903	2974	17376	3017	17906	8931	52186
2	Proposed Mini Tractors District wise for Gujarat State	1975	5212	2007	5395	2047	5594	6029	16201
3	Proposed power weeder district wise for Gujarat State	2618	1408	2620	1436	2625	1466	7863	4310
4	Proposed rotavator district wise for Gujarat State	2384	1412	2484	1486	2601	1568	7468	4465
5	Proposed Diesel Engine with pump for Gujarat State	4691	1668	4769	1715	4869	1776	14330	5158
6	Proposed Threshers for Gujarat State	1039	2383	1049	2432	1066	2503	3154	7317
7	Proposed Laser leveler for Gujarat State	471	1367	483	1401	494	1435	1447	4203
8	Proposed Cotton shredder for Gujarat State	6928	3591	6930	3681	6932	3758	20789	11031
9	Proposed Plant Protection Equipments for Gujarat State	31866	6694	31939	6878	32053	7026	95858	20598
10	Proposed Tractor and Bullock drawn seed cum fertilizer drill / planter for Gujarat State	3393	1367	3395	1395	3398	1424	10185	4185
11	Proposed Combine harvester for Gujarat State	118	2912	112	2798	113	2864	343	8574
12	Proposed Cultivator and different Plough for Gujarat State	4146	1845	4180	1885	4225	1927	12551	5657
13	Proposed Power Tiller for Gujarat State	680	1209	697	1260	714	1304	2091	3773
14	Proposed Castor Decorticator for Gujarat State	2286	944	2291	966	2301	987	6877	2897
15	Proposed Groundnut Decorticator for Gujarat State	1660	728	1671	739	1676	753	5007	2221
16	Proposed Maize Sheller for Gujarat State	2418	968	2428	985	2438	1003	7284	2955
17	Proposed Paddy Transplanter for Gujarat State	1955	1496	1954	1525	1954	1555	5864	4576
18	Proposed Sugarcane Transplanter for Gujarat State	290	241	290	245	290	253	870	739

Sr. No.	Activity /Projects	2017-18		2018-19		2019-20		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
19	Proposal farm machinery equipment / implements – Reaper for Gujarat State	401	202	426	215	462	234	1289	651
20	Proposal farm machinery equipment / implements – Potato planter for Gujarat State	184	133	184	136	184	138	553	407
21	Proposal farm machinery equipment / implements – Potato Digger for Gujarat State	185	124	185	126	185	129	554	378
22	Proposal farm machinery equipment / implements – Groundnut digger for Gujarat State	1699	749	1699	759	1699	771	5096	2279
23	Proposed Zero Till Drill for Gujarat State	1957	1104	1956	1125	1956	1148	5870	3377
24	Proposed Raised Bed Planter for Gujarat State	1957	1251	1956	1275	1956	1301	5870	3828
25	Proposed Roto/ Strip Till Drill for Gujarat State	2384	2516	2484	2648	2601	2794	7468	7958
26	Proposal farm machinery equipment / implements – Other Equipment (miscellaneous / small tools) for Gujarat State	3028	647	3052	661	3082	685	9162	1993
Total		83653	59074	84215	60543	84938	62302	252806	181919
Grand Total		93653	59134	94215	60603	94938	62362	282806	182099

Table- 5.5.12 Physical and Financial Program Proposed for Development of Soil and Water Management Plan under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Special project								
	Water Resources Development: Water Harvesting Structures (WHS) etc..	885	1770	885	1770	885	1770	2655	5310
	Groundwater recharge structures, open well, bore well recharge, etc.	1739	870	1739	870	1739	870	5217	2609
	De-silting/deepening of reservoirs/lower downstream natural depression	379	1036.1	379	1036.1	379	1036.1	1137	3108
	Watershed Development	25901	3108	25901	3108	25901	3108	77703	9324
	Land reclamation, Amelioration of water logged and saline soils	938	938	938	938	938	938	2814	2814
	Micro Irrigation System (MIS) etc.	195674	99808	195674	99808	195674	99808	587022	299424
	Dug / bore well pump sets, lift irrigation sets for Minor irrigation	362	181	362	181	362	181	1086	543
	Total	225878	107711.10	225878	107711.10	225878	107711.10	677634	323133.30

Table- 5.5.13 Physical and Financial Program Proposed for Development of Renewable Energy under SAP

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	1260	10.08	1260	10.08	1260	10.08	3780.00	30.24
	Farmers (different renewable energy technologies and waste management)	10350	62.1	10350	62.1	10350	62.1	31050	186.30
	Total	11610	72.18	11610	72.18	11610	72.18	34830	216.54
2	Special project								
	Gobar bank and community biogas plants (85 m ³ capacity each)	35	700	61	1220	113	2260	209	4180
	Domestic biogas plants (2 to 10 m ³ capacity with average 6m ³)	948	1422	1278	1917	1917	3266	4143	6605
	Biogas Purification and Bottling unit (average 2000 m ³ /day capacity)	8	400	8	440	10	840	26	1680
	Briquetting units (Waste Utilization)	27	540	79	1738	111	2664	217	4942
	Biomass gasification	27	540	79	1740	111	2664	217	4944
	Biomass Cook stoves/ Smokeless Chulas	9700	194	10670	234.74	12125	291	32495	719.74
	Bio-ethanol ^a (10,000 liter capacity) and Bio-diesel production ^b (5000 liters capacity) *biodiesel plants	2a	2400	1	2500	2a	2400	1	7300
	solar cookers	61785	926.9	61785	926.9	61785	926.9	185355	2780.7

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	solar street lights	37850	11355	37850	11355	37850	11355	113550	34065
	solar Lantern (6-8W)	82500	4944	82500	4944	82500	4992	247500	14880
	solar water pumping system	7420	23373	7420	23373	7420	23373	22260	70119
	SPV power plant (10 kW) for remote villages	51	6120	57	6840	57	6840	165	19800
	(a) 1 MW Agriculture (Greenhouse) cum SPV Power pilot project at SAUs@ 12.0 cr/plant ^a , (b) SPV operated cold storages for 1000 MT storage capacity ^b @ 15 cr(c) on farm fruits and vegetable storage for 10MT capacity@ 20 lakh	18	11300	13	4400	8	4600	39	20300
	Roof-top Small Solar cum Wind Turbine for Power Generation	377	1508	377	2262	377	3016	1131	6786
	Wind pumps	1180	1475	1180	1593	1180	1710	3540	4778
	Total	201926	67197.90	203358	65483.64	205564	71197.90	610848	203879
	Grand Total	213536	67270.08	214968	65555.82	217174	71270.08	645678.00	204095.98

Table- 5.5.14 Physical and Financial Program Proposed for Development of Extension Activity and ICT under SAP

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Special project								
	Establishment of Farmer's Training cum Exhibition Centre	11	1375	11	1375	11	1375	33	4125
	Strengthening of KVK by developing models of agriculture at KVKs	10	1700	10	1700	10	1700	30	5100
	Dissemination of Information to farming community through Android/ IOS based Mobile App (M-Agriculture)		75		50		50		175
	Projects for Solar Agriculture KIOSK		500		244		90		834
	Total	11	3650	21	3369	21	3215	63	10234
	Grand Total	11	3650	21	3369	21	3215	63	10234

Table- 5.5.15 Physical and Financial Program Proposed for Environment, Climate Change and Weather Forecasting under SAP (Sum of All Districts)

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Special project								
	Capacity Building for adopting Climate Change	4	146.4		66.4		66.4	4	279.2
	Effect of environment on phenotypic performance of dairy cattle/buffaloes and strategies to deal with in climatic conditions of Gujarat		585		574.2		568.6	0	1727.8
	Total	4	731.4	0	640.6	0	635	4	2007
	Grand Total	4	731.4	0	640.6	0	635	4	2007

Table- 5.5.16 Physical and Financial Program Proposed for Development of Agricultural Marketing under SAP (Sum of All Districts) (Phy – No. of units, Fin. – Rs. in lakh)

Sr. No.	Name of district	2017-18		2018-19		2019-20		Total	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
1.	Special projects								
	Strengthening of APMC	74	1132	74	1132	74	1132	222	3396
	Establishment of Rural godowns	3467	9760	3467	9760	3467	9760	10401	29280
	Establishment of processing units	626	3674	626	3674	643	3820	1895	11168
	Development of terminal market	4	480	-	480	-	480	4	1440
	Total	4171	15046	4167	15046	4184	15192	12522	45284
	Grand Total	4171	15046	4167	15046	4184	15192	12522	45284

Table- 5.5.17 Physical and Financial Program Proposed for Development of Post Harvest Management under SAP (Sum of**All Districts)**

(Phy. Nos/ha, Fin.-Rs. in Lakh)

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy.	Fin	Phy.	Fin	Phy.	Fin	Phy.	Fin
1	Training								
	Farmers	3960	19.80	3960	19.80	3960	19.80	11880	59.40
Total		3960	19.80	3960	19.80	3960	19.80	11880	59.40
2	Special project								
	District wise Establishment of small scale fruit and vegetable processing units	7	70	7	70	7	70	21	210.00
	District wise Establishment of cold storage	0	0	0	0	33	9900	33	9900.00
	District wise Establishment of location specific research unit for value addition	0	0	0	0	5	250	5	250.00
	Establishment of small scale small cleaner cum graders for cereals (Power operated)	132	39.6	132	39.6	132	39.6	396	118.80
	Strengthening of Infrastructure facilities for Strengthening of processing facilities For Establishment of Mini Dal mills (district wise)					33	99	33	99.00
	Number of processing units and financial requirements for oil mill(district wise)			11	55	17	85	28	140.00
	Number of processing units and financial requirements for cotton ginning(district wise)			44	88	44	88	88	176.00
	Establishment of spice processing unit (Cleaning/grading/mill)			36	180	36	180	72	360.00

Sr. No.	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy.	Fin	Phy.	Fin	Phy.	Fin	Phy.	Fin
	Strengthening of Infrastructure facilities for rural godownsfor storage of food grains including cereals, pulses, oilseeds, spices, etc			66	217.8	66	217.8	132	435.60
	Strengthening of Infrastructure facilitiesforonion &garlic godowns(district wise) and Budget requirement			28	140	28	140	56	280.00
Total		139	109.60	324	790.40	401	11069.40	864	11969.40
Grand Total		4099	129.40	4284	810.20	4361	11089.20	12744	12028.80

Table- 5.5.18 Overall Physical and Financial Program Proposed for Development of Other Sectors under SAP (Sum of All Districts)
(Phy. Nos/ha, Fin.-Rs. in Lakh)

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training								
	In Service	2070.00	17.45	2235.00	18.94	2400.00	20.42	6705.00	56.81
	Farmers	46260.00	274.80	46410.00	275.70	49260.00	292.80	141930.00	843.30
	Total	48330.00	292.25	48645.00	294.64	51660.00	313.22	148635.00	900.11
2	Demonstration								
	Demonstration of package, manure preparation, botanical pesticide preparation etc.	1195.00	71.70	1195.00	71.70	1195.00	71.70	3585.00	215.10
	Vermi-compost units	468.00	234.00	518.00	259.00	693.00	346.50	1679.00	839.50
	NADEP compost	850.00	102.00	980.00	117.60	1210.00	145.20	3040.00	364.80
	District wise IPDM Demonstrations in Cotton	6450.00	322.50	6450.00	322.50	6450.00	322.50	19350.00	967.50
	District wise IPDM Demonstrations in Paddy	2300.00	115.00	2300.00	115.00	2300.00	115.00	6900.00	345.00
	District wise IPDM Demonstrations in Mango	397.00	19.85	397.00	19.85	397.00	19.85	1191.00	59.55
	Total	11660.00	865.05	11840.00	905.65	12245.00	1020.75	35745.00	2791.45
	Other activity								
3	FFS								
4	FG	82.00	16.40	87.00	17.40	95.00	19.00	264.00	52.80
	Total								

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
5	Special project								
	Soil Health								
	Soil Health Cards to be prepared	0.00	0.00	2300000.00	4600.00	2300000.00	4600.00	4600000.00	9200.00
	Subsidies for soil health inputs *Rs. 10 lac/district/year	0.00	0.00	0.00	625.00	0.00	625.00	0.00	1250.00
	Organic Farming							0.00	0.00
	Proposal for organic seed production and storage	54.00	1080.00	54.00	1080.00	54.00	1080.00	162.00	3240.00
	Proposal for infrastructure development for storage of organic produce	33.00	660.00	33.00	660.00	41.00	820.00	107.00	2140.00
	Proposal for strengthening of research on organic and testing facilities	0.00	4050.00	0.00	3970.00	0.00	5470.00	0.00	13490.00
	Proposal for providing processing tools and facilities	43.00	215.00	53.00	265.00	73.00	365.00	169.00	845.00
	Proposal for marketing, supply chain, certification etc. under organic farming	47.00	235.00	55.00	275.00	61.00	305.00	163.00	815.00
	Farm Mechenization								
	Proposed tractors District wise for Gujarat State	2940	16903	2974	17376	3017	17906	8931.00	52185.00

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SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Proposed Mini Tractors District wise for Gujarat State	1975	5212	2007	5395	2047	5594	6029.00	16201.00
	Proposed power weeder district wise for Gujarat State	2618	1408	2620	1436	2625	1466	7863.00	4310.00
	Proposed rotavator district wise for Gujarat State	2384	1412	2484	1486	2601	1568	7469.00	4466.00
	Proposed Diesel Engine with pump for Gujarat State	4691	1668	4769	1715	4869	1776	14329.00	5159.00
	Proposed Threshers for Gujarat State	1039	2383	1049	2432	1066	2503	3154.00	7318.00
	Proposed Laser leveler for Gujarat State	471	1367	483	1401	494	1435	1448.00	4203.00
	Proposed Cotton shredder for Gujarat State	6928	3591	6930	3681	6932	3758	20790.00	11030.00
	Proposed Plant Protection Equipments for Gujarat State	31866	6694	31939	6878	32053	7026	95858.00	20598.00
	Proposed Tractor and Bullock drawn seed cum fertilizer drill / planter for Gujarat State	3393	1367	3395	1395	3398	1424	10186.00	4186.00
	Proposed Combine harvester for Gujarat State	118	2912	112	2798	113	2864	343.00	8574.00

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Proposed Cultivator and different Plough for Gujarat State	4146	1845	4180	1885	4225	1927	12551.00	5657.00
	Proposed Power Tiller for Gujarat State	680	1209	697	1260	714	1304	2091.00	3773.00
	Proposed Castor Decorticator for Gujarat State	2286	944	2291	966	2301	987	6878.00	2897.00
	Proposed Groundnut Decorticator for Gujarat State	1660	728	1671	739	1676	753	5007.00	2220.00
	Proposed Maize Sheller for Gujarat State	2418	968	2428	985	2438	1003	7284.00	2956.00
	Proposed Paddy Transplanter for Gujarat State	1955	1496	1954	1525	1954	1555	5863.00	4576.00
	Proposed Sugarcane Transplanter for Gujarat State	290	241	290	245	290	253	870.00	739.00
	Proposal farm machinery equipment / implements – Reaper for Gujarat State	401	202	426	215	462	234	1289.00	651.00
	Proposal farm machinery equipment / implements – Potato planter for Gujarat State	184	133	184	136	184	138	552.00	407.00
	Proposal farm machinery equipment	185	124	185	126	185	129	555.00	379.00

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	/ implements – Potato Digger for Gujarat State								
	Proposal farm machinery equipment / implements – Groundnut digger for Gujarat State	1699	749	1699	759	1699	771	5097.00	2279.00
	Proposed Zero Till Drill for Gujarat State	1957	1104	1956	1125	1956	1148	5869.00	3377.00
	Proposed Raised Bed Planter for Gujarat State	1957	1251	1956	1275	1956	1301	5869.00	3827.00
	Proposed Roto/ Strip Till Drill for Gujarat State	2384	2516	2484	2648	2601	2794	7469.00	7958.00
	Proposal farm machinery equipment / implements – Other Equipment (miscellaneous / small tools) for Gujarat State	3028	647	3052	661	3082	685	9162.00	1993.00
	Soil and Water management								
	Water Resources Development: Water Harvesting Structures (WHS) etc..	885	1770	885	1770	885	1770	2655	5310
	Groundwater recharge structures,	1739	870	1739	870	1739	870	5217	2609

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	open well, bore well recharge, etc.								
	De-silting/deepening of reservoirs/lower downstream natural depression	379	1036.1	379	1036.1	379	1036.1	1137	3108
	Watershed Development	25901	3108	25901	3108	25901	3108	77703	9324
	Land reclamation, Amelioration of water logged and saline soils	938	938	938	938	938	938	2814	2814
	Micro Irrigation System (MIS) etc.	195674	99808	195674	99808	195674	99808	587022	299424
	Dug / bore well pump sets, lift irrigation sets for Minor irrigation	362	181	362	181	362	181	1086	543
	Re. Energy							0.00	0.00
	Gobar bank and community biogas plants(85 m3 capacity each)	35.00	700.00	61.00	1220.00	113.00	2260.00	209.00	4180.00
	Domestic biogas plants (2 to 10 m3 capacity with average 6m3)	948.00	1422.00	1278.00	1917.00	1917.00	3266.00	4143.00	6605.00
	Biogas Purification and Bottling unit (average 2000 m3/day capacity)	8.00	400.00	8.00	440.00	10.00	840.00	26.00	1680.00

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Briquetting units(Waste Utilization)	27.00	540.00	79.00	1738.00	111.00	2664.00	217.00	4942.00
	Biomass gasification	27.00	540.00	79.00	1740.00	111.00	2664.00	217.00	4944.00
	Biomass Cook stoves/ Smokeless Chulas	9700.00	194.00	10670.00	234.74	12125.00	291.00	32495.00	719.74
	Bio-ethanola(10,000 liter capacity) and Bio-diesel productionb (5000 liters capacity) *biodiesel plants	2.00	2400.00	1.00	2500.00	2.00	2400.00	5.00	7300.00
	solar cookers	61785.00	926.90	61785.00	926.90	61785.00	926.90	185355.00	2780.70
	solar street lights	37850.00	11355.00	37850.00	11355.00	37850.00	11355.00	113550.00	34065.00
	solar Lantern (6-8W)	82500.00	4944.00	82500.00	4944.00	82500.00	4992.00	247500.00	14880.00
	solar water pumping system	7420.00	23373.00	7420.00	23373.00	7420.00	23373.00	22260.00	70119.00
	SPVpower plant (10 kW) for remote villages	51.00	6120.00	57.00	6840.00	57.00	6840.00	165.00	19800.00
	(a) 1 MW Agriculture (Greenhouse) cum SPV Power pilot project at SAUs@ 12.0 cr/planta, (b) SPV operated cold storages for 1000 MT storage capacity@ 15 cr(c) on farm fruits and vegetable storage for 10MT capacity@ 20 lakh	18.00	11300.00	13.00	4400.00	8.00	4600.00	39.00	20300.00

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Roof-top Small Solar cum Wind Turbine for Power Generation	377.00	1508.00	377.00	2262.00	377.00	3016.00	1131.00	6786.00
	Wind pumps	1180.00	1475.00	1180.00	1593.00	1180.00	1710.00	3540.00	4778.00
	Promotion of Extension Activity and ICT								
	Establishment of Farmer's Training cum Exhibition Centre	11.00	1375.00	11.00	1375.00	11.00	1375.00	33.00	4125.00
	Strengthening of KVK by developing models of agriculture at KVKs	10	1700.00	10.00	1700.00	10.00	1700.00	30.00	5100.00
	Dissemination of Information to farming community through Android/IOS based Mobile App (M-Agriculture)	0.00	75.00	0.00	50.00	0.00	50.00	0.00	175.00
	Projects for Solar Agriculture KIOSK	0.00	500.00	0.00	244.00	0.00	90.00	0.00	834.00
	Environment, Climate Change and Weather Forecasting								
	Capacity Building for adopting Climate Change	4.00	146.40		66.40		66.40	4.00	279.20
	Effect of environment on phenotypic performance of dairy cattle/buffaloes and strategies to deal with in climatic conditions of Gujarat		585.00		574.20		568.60	0.00	1727.80
	Agricultural Marketing								

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SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Strengthening of APMC	74.00	1132.00	74.00	1132.00	74.00	1132.00	222.00	3396.00
	Establishment of rural godowns	3467.00	9760.00	3467.00	9760.00	3467.00	9760.00	10401.00	29280.00
	Establishment of processing units	626.00	3674.00	626.00	3674.00	643.00	3820.00	1895.00	11168.00
	Development of terminal market	4.00	480.00		480.00		480.00	4.00	1440.00
	Post harvest								
	District wise Establishment of small scale fruit and vegetable processing units	7	70	7	70	7	70	21.00	210.00
	District wise Establishment of cold storage	0	0	0	0	33	9900	33.00	9900.00
	District wise Establishment of location specific research unit for value addition	0	0	0	0	5	250	5.00	250.00
	Establishment of small scale small cleaner cum graders for cereals (Power operated)	132	39.6	132	39.6	132	39.6	396.00	118.80
	Strengthening of Infrastructure facilities for Strengthening of processing facilities For Establishment of					33	99	33.00	99.00

SN	Activity /Projects	1 st year		2 st year		3 st year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Mini Dal mills (district wise)								
	Number of processing units and financial requirements for oil mill(district wise)			11	55	17	85	28.00	140.00
	Number of processing units and financial requirements for cotton ginning(district wise)			44	88	44	88	88.00	176.00
	Establishment of spice processing unit (Cleaning/grading/mill)			36	180	36	180	72.00	360.00
	Strengthening of Infrastructure facilities for rural godownsfor storage of food grains including cereals, pulses, oilseeds, spices, etc			66	217.8	66	217.8	132.00	435.60
	Strengthening of Infrastructure facilitiesforonion &garlic godowns(district wise) and Budget requirement			28	140	28	140	56.00	280.00
	Total	2823269.00	1731973.70	5135267.00	1742274.44	5148618.00	1767053.10	13107164.00	5241301.24
	Grand Total	2883341.00	1733147.40	5195839.00	1743492.13	5212618.00	1768406.07	13291808.00	5245045.60

Table- 5.5.19 Overall Physical and Financial Program Proposed for Development of All Sectors under SAP (Sum of All Districts)
(Phy. Nos/ha, Fin.-Rs. in Lakh)

SN	Crop/Enterprise	1 st year		2 nd year		3 rd year		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Rice	3,48,396.00	4,137.19	3,48,994.00	4,140.66	3,49,439.00	4,144.66	10,46,829.00	12,422.51
2	Wheat	4,28,343.00	8,957.01	4,31,580.00	8,622.90	4,34,262.00	8,764.92	12,94,185.00	26,344.83
3	Maize	39,443.00	835.01	39,443.00	830.01	39,442.00	829.01	1,18,328.00	2,494.03
4	Bajara	20,520.00	592.69	20,526.00	592.69	20,543.00	609.69	61,589.00	1,795.07
5	Sorghum	3,314.00	1,019.15	4,542.00	3,612.47	5,876.00	4,851.87	13,732.00	9,483.49
6	Small Millet	32,562.00	439.30	32,562.00	439.30	32,562.00	439.30	97,686.00	1,317.90
	Total	8,72,578.00	15,980.35	8,77,647.00	18,238.03	8,82,124.00	19,639.45	26,32,349.00	53,857.83
7	Sugarcane	25,200.00	788.40	25,200.00	788.40	25,200.00	788.40	75,600.00	2,365.20
8	Cotton	51,041.00	929.53	51,081.00	937.53	51,101.00	941.53	1,53,223.00	2,808.59
	Total	76,241.00	1,717.93	76,281.00	1,725.93	76,301.00	1,729.93	2,28,823.00	5,173.79
9	Groundnut	59,639.60	828.30	59,639.60	828.30	59,639.60	885.30	1,78,918.80	2,541.90
10	Castor	1,74,030.00	3,769.39	1,74,030.00	3,769.39	1,74,030.00	3,769.39	5,22,090.00	11,308.17
11	Mustard	56,767.00	691.05	56,757.00	690.99	56,757.00	690.99	1,70,281.00	2,073.03
12	Sesamum	1,14,450.00	1,152.75	1,14,450.00	1,152.75	1,13,550.00	1,152.75	3,42,450.00	3,458.25
13	Soyabean	86,700.00	1,018.21	86,900.00	1,033.21	87,100.00	1,048.21	2,60,700.00	3,099.63
14	Niger	854.00	153.47	1,275.00	228.57	1,728.00	311.38	3,857.00	693.42
	Total	4,92,440.60	7,613.17	4,93,051.60	7,703.21	4,92,804.60	7,858.02	14,78,296.80	23,174.40
15	Pulses	3,04,562.00	3,532.64	3,04,562.00	3,532.68	3,04,562.00	3,532.68	9,13,686.00	10,598.00
	Total	3,04,562.00	3,532.64	3,04,562.00	3,532.68	3,04,562.00	3,532.68	9,13,686.00	10,598.00
16	Fruit and Flower	65,572.00	13,594.32	65,654.00	15,181.32	65,652.00	15,121.32	1,96,878.00	43,896.96
17	Vegetables	28,905.00	285.71	28,905.00	285.71	28,905.00	285.71	86,715.00	857.13
18	Spices	9,423.00	260.30	9,423.00	260.30	9,423.00	260.30	28,269.00	780.90
19	Agro forestry	330.00	641.28	330.00	641.28	330.00	641.28	990.00	1,923.84

STATE PLAN

SN	Crop/Enterprise	1 st year		2 st year		3 st year		Total	
	Total	1,04,230.00	14,781.61	1,04,312.00	16,368.61	1,04,310.00	16,308.61	3,12,852.00	47,458.83
20	Large animal	1,33,891.00	17,242.20	1,33,891.00	17,242.20	1,33,891.00	17,242.20	4,01,673.00	51,726.60
21	Small Ruminant	8,350.00	50.10	8,350.00	50.10	8,350.00	50.10	25,050.00	150.30
22	Poultry	225.00	152.00	225.00	152.00	225.00	152.00	675.00	456.00
23	Pack Animal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Fodder production	1,535.00	2,473.20	1,934.00	2,931.80	2,714.00	3,019.40	6,183.00	8,424.40
25	Fishery	23,796.00	903.65	26,980.00	3,412.45	29,485.00	3,218.05	80,261.00	7,534.15
26	Dairy Science	89,015.00	6,500.36	89,015.00	6,500.68	89,015.00	6,500.68	2,67,045.00	19,501.72
27	Animal Health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	2,56,812.00	27,321.51	2,60,395.00	30,289.23	2,63,680.00	30,182.43	7,80,887.00	87,793.17
28	IPDM	9,147.00	457.35	9,147.00	457.35	9,147.00	457.35	27,441.00	1,372.05
29	Soil Health	0.00	0.00	23,00,000.00	5,225.00	23,00,000.00	5,225.00	46,00,000.00	10,450.00
30	Organic Farming	25,532.00	6,804.37	26,050.00	6,858.36	29,512.00	8,783.64	81,094.00	22,446.37
31	Farm Mechenization	93,653.00	59,134.00	94,215.00	60,603.00	94,938.00	62,362.00	2,82,806.00	1,82,099.00
32	Soil & Water Mng	2,25,878.00	1,07,711.10	2,25,878.00	1,07,711.10	2,25,878.00	1,07,711.10	6,77,634.00	3,23,133.30
33	Re. Energy	2,13,536.00	67,270.08	2,14,968.00	65,555.82	2,17,174.00	71,270.08	6,45,678.00	2,04,095.98
34	Ext & ICT	11.00	3,650.00	21.00	3,369.00	21.00	3,215.00	53.00	10,234.00
35	Climate Change	4.00	731.40	0.00	640.60	0.00	635.00	4.00	2,007.00
36	Marketing	4,171.00	15,046.00	4,167.00	15,046.00	4,184.00	15,192.00	12,522.00	45,284.00
37	Post Harvest	4,099.00	129.40	4,284.00	810.20	4,361.00	11,089.20	12,744.00	12,028.80
	Total	5,76,031.00	2,60,933.70	28,78,730.00	2,66,276.43	28,85,215.00	2,85,940.37	63,39,976.00	8,13,150.50
	GT	26,82,894.60	3,31,880.91	49,94,978.60	3,44,134.12	50,08,996.60	3,65,191.49	1,26,86,869.80	10,41,206.52

CHAPTER - 6

STATE INFRASTRUCTURE DEVELOPMENT PLAN

A: Flagship program:**6.1. Title: Establishment of Liquid Bio-fertilizer Mass Production Units (Bio-fertilizer Plants) for Fertigation and Soil Health Improvement (Flagship Program for Gujarat State)**

Although, Bio-fertilizer production in India has increased 20 times in past 2 decades reaching 1,12,992 tonnes per annum during 2015-16, including liquid formulations. West India zone comprising of Gujarat, Madhya Pradesh, Chhattisgarh, Maharashtra, Rajasthan and Goa states produced highest 3403 KL of liquid biofertilizer and among them Gujarat stood first in the country with annual (2015-16) production of 2,873 KL of liquid biofertilizer (Bio-fertilizer Statistics 2016-17-page no.3, FAI, New Delhi)

Presently in Gujarat 8 to 10 small to medium enterprise are producing Bio-fertilizers like N/ P/K cultures in powder and liquid forms but maximum capacity is only one tenth of total requirements, hence ample of scope for sale considering around total 145 lakh ha of cultivable land of Gujarat.

Bio-fertilizers are microbial inoculants containing live or latent cells of efficient strains of microorganisms. They are used for enhancing the productivity of the soil. They fix atmospheric nitrogen and solubilise/mobilize phosphorus and potash. Also they stimulate plant growth through synthesis of plant growth promoting substances and/or antibiotics. The low cost, high efficiency technology of bio-fertilizer application has an important role to play in increasing agricultural production. Role of bio-fertilizer in the agriculture enterprise becomes more important as it economizes the fertilizer application to crops. Application of bio-fertilizer has thus, become integral component of Integrated Nutrient Management (INM) System.

Department of Microbiology & Bio-fertilizer Projects, AAU, Anand first developed the technology in 2002 and working since last 30 years for bio-fertilizer and developed 'Anubhav Liquid Bio-fertilizers' (*Azotobacter*, *Azospirillum*, *Rhizobium*, Phosphate and Potash solubilizer cum mobilizer) followed by now NAU and JAU, who have also promoted and marketed Liquid Bio-fertilizers (LBF), as 'Navroj LBF' and 'Savaj LBF' brand formulations respectively and demonstrated in various crops. Bio-fertilizers are recommended in various crops for farming community (more than 50 recommendations) in Gujarat state. LBF is most suitable for drip irrigation and green house cultivation and creates zero pollution.

Project Proposal for Bio-fertilizer Production Unit

Set up of bio-fertilizer mass production unit with production of LBF 2 Lakh litre / annum capacity by shake flask technology at District level at six stations under supervision of JDA regional offices in FTC or ATMA centres and followed with at APMCs for across the Gujarat state.

Note:

- ✓ The proposed facilities for general bio input production, hence also be useful as dual/multy utility for mass production of Biodegrades decomposing bacteria for Farm / Agro wastes degradation and recycling it as manure.
- ✓ Also the plant will be useful for production of Microbial pesticides (after getting registration from CIB, GOI, Faridabad) on demand of farmers as phase-2 in the facility created.
- ✓ This plant will also address environment pollution and waste management issues under Swachh Bharat Abhiyan (SBA) (or Clean India Mission in English) campaign of GOI in coming years.

Types of products:

- **Nitrogen fixers** like *Azotobacter*, *Azospirillum* and *Rhizobium* for diverse cropping system.
- **Phosphate / Potash solubilizing & mobilizing bacterial cultures** (*Bacillus*, *Enterobacter sp.* etc)

Product Range: As per the market and farmer's survey, size may be decided. Otherwise the following packing options are suggested.

- 250 ml (Trial pack, Home pack for pot plants, kitchen garden packs for urban markets, *Krishi mela* etc.)
- 500 ml or 1 liter (For small and marginal farmers)
- 5 liters or 20 liters (For large, progressive farmers and bulk buyers)

Raw materials:

Identification of locations, wholesalers and retailers for sourcing the material along with the cost and other related issues like logistics

Budget:**Table- 6.1 Total Financial Outlays for 3 Years Plan for 30 APMC based LBF
Production Units having Capacity up to 2 lakh Liters per Annum**

Particulars	Cost per Unit	Proposed Plants at APMC per District	Total Cost for 30 Units for 3 Years
	Rs. in Lakh		
Civil works without land	90.0	30	2700
Equipment / machinery	47.0	30	1410
Operational expenditure	21.0	5 yrs x 30	3150
Total			7260

Infrastructure (i) Civil, (ii) Equipment/Machinery, (iii & iv) Operational Expenditures**Costing:**

- Fixed cost :(Land, building, machines, instruments, accessories of reputed brand and indigenous manufacturers, furnishing, fabrication, installation, electric connection).
- Variable cost: raw material, variable accessories, packing, labeling transportation, distribution channels, advertising etc.
- Manpower cost: Manpower required along with monitoring cost for a full-fledged independent unit with annual capacity defined.

**Table- 6.2 Civil Works for Establishment of Liquid Bio-fertilizer Mass Production
Units****Appendix 1**

Land: Approx 700 sq.m. land with shade and building to be provided by stations under supervision of JDA regional offices in FTC or ATMA centres / APMCs.

Optional expenditure proposed as under.

Civil works	Establishment of mass production unit for Bio-fertilizers (500 Sq meter @ Rs.18,000/- per sq.m.)	Rs. lakh 90.00
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Table- 6.3 List of Equipment / Machinery Required for Establishment of Liquid Bio-fertilizer Mass Production Units *Appendix 2*

Equipments	Cost/Unit Rs. in Lakh	Units Reqd.	Total Rs. in Lakh	Justification
Rotary shaker (with speed controller)	0.70	7	4.90	Preparation of starter culture and mass production of biofertilizer.
Research microscope	2.00	1	2.00	Study of microorganisms
Horizontal Autoclave (big)	8.00	2	16.00	Sterilization of bulk media, glassware, containers etc.
Autoclave (small)	0.25	2	0.50	Sterilization of media in low quantity
Refrigerator 350 lit single door.	0.30	2	0.60	Storage of microorganisms, perishable chemicals, reagents etc
Laminar Airflow	1.20	2	2.40	For providing the microorganisms free atmosphere
Electronic balance	0.25	1	0.25	For weighing chemicals etc.
RO System with 2000 lt. / day	2.00	1	2.00	For water requirements
pH meter	0.20	1	0.20	For adjustment of pH
BOD incubator 6 cubic foot	0.80	1	0.80	Growth of microorganisms.
Colorimeter	0.15	1	0.15	Quality control
Lab centrifuge small	0.25	1	0.25	Quality control
Colony counter	0.15	1	0.15	Quality control
Micro kjeldahl digestion and distillation unit	3.00	1	3.00	Quality control
Air conditioner 1.5 ton with heating facility	0.60	3	1.80	For providing controlled conditions (cooling and heating facility) in laboratories
Other small equipment's costing around Rs. 10,000/-	1.0	-	1.0	Trolleys, mixer grinder, hand mixer, water storage tanks food grade and top pan-plastic balance etc.
Bottling unit mixing tank with 1HP motor.	1.0	4	3.0	Design will be provided.
Power Generator	10.0	1	10.0	Emergency alternative in power failure
Total			49.00	

Table- 6.4 Operational Expenditure for Establishment of Liquid Bio-fertilizer**Mass Production Units***Appendix 3*

Details of Expenditure			Costs Rs. in Lakh
1.	Salary and manpower (Fixed pay)**		
	Microbiologist M. Sc. (Micro) Rs.16,000/- x11 months	1	1.760
	Jr. Microbiologist B. Sc. (Micro) with Lab technology course and laboratory experience of 1 year preferred. Rs. 8500/-x 11 months	1	0.935
	Lab technician cum assistant Rs. 5000/- x 11months	1	0.550
	Unskilled labor Rs 3200/-x11 months	2	0.704
	TA & DA		0.051
	Total per annum (11 month contract)	5	4.000
2.	Chemical cost (Media ingredients, lab sanitation liquids, buffer solutions etc.)		6.500
3.	Plastic ware (beakers, test tube stand, microtip, tip box, test tube basket, pipette stands		2.000
4.	Glass wares (petri dishes, culture tubes, test tubes, measuring cylinder, wash bottle, burette, pipettes etc.)		5.000
5.	Lab wares (thread, cotton, loops, tripod stand, burner, spreader, wire gauge, brush, gloves, forcep, scissor, parafilm etc.)		2.000
6.	Miscellaneous Electricity, water etc. charges		0.500
7.	University scientist consultancy hand holding, Training etc. per day 6 hr. for training the staff of plant		1.000
TOTAL			21.00

6.2. Title: Establishment of Agrisnet for Gujarat State (Flagship program for Gujarat state)

The National Agriculture Policy emphasizes the use of Information and Communication Technology (ICT) to accelerate sustainable agricultural development and enhance productivity in India. The major components of AGRISNET includes establishing Internet/Intranet services, enable e-Commerce, Video Conferencing facilities and networking (LAN, MAN, WAN) using terrestrial/Satellite/Wireless Communication, development of decision support systems and disaster management plans. It is also planned to support this

through the development and integration of multiple sub-networks for fertilizer, horticulture, crop information, Agriculture credit, marketing and research.

Benefits

- Encourage farmers to seek answers through the web rather than physically travel to offices for information's they required
- Provide historical data for micro level planning
- Create learning opportunities
- Provide an efficient and accurate forecasting mechanism
- Provide information on market trends for farmers to analyze
- Provide information on input prices, quality parameters, departmental policy declaration, farmer rights and eligibility for availing benefits offered by the government
- Provide a user-friendly and conducive discursive platform
- Offer agricultural extension services (i.e. Online Market Place, Forums, Blog, Directory) to ensure farmer long-term security

Implementation Strategy:

To facilitate the implementation, it is proposed to establish AGRISNET nodes at the state, district and block levels through internet/intranet gateways for transfer of technology to the grass root level at high speed and accuracy. Currently the connectivity exists up to the Taluka level which needs to be extended up to the village level. This connectivity will be provided through Gujarat State Wide Area Network (GSWAN) by the project execution authority. A total of 18618 villages will be connected across 226 talukas and 27 districts.

For web portal it is proposed that already available database of soil health card is used to inform farmers about web portal and start using it. Currently soil Health Card system has 42,00,000 (42 Lakh) Farmers database which can be used to engage Farmers with AGRISNET project. The main focus and target group being the rural populace in general and the farming community of Gujarat in particular, it is proposed to implement the project in a multi-lingual mode with a default Gujarati interface having options to dynamically change the interface to English. It is also proposed to setup four studios with Video conferencing facilities, one each in the participating universities to facilitate interaction between the scientists and the farmers through GSWAN, V-Sat and satellite communication. It is intended to link this with the proposed AGRISNET. As indicated above, AGRISNET portal is proposed to be implemented as an integrated Web solution catering to multiple users and user groups through a common interface. The requirement is hence for a total web enabling solution to configure the AGRISNET portal as a Web based system allowing for user creation, web editing, data query and analysis to establish a robust decision support system addressing the Agriculture sector.

Table- 6.5 Cost for Establishment Agrisnet for Gujarat State

Sr. No.	Particular	Quantity	Approx. Rate (Rs. in Lakh)	Type of Expense
1	Digital certificate	1	0.20	Recurring
2	OS	6	N/A (Open Source)	Support charge if applicable can be done in Misc. Expenses
3	Database Server	6	N/A (Open Source)	Support charge if applicable can be done in Misc. Expenses
4	GSM Modem	4	0.60	Non-recurring
5	High End Server	2	4.00	Non-recurring
6	Mid-Level Server	4	5.00	Non-recurring
7	Antivirus & Firewall	1	3.00	Recurring
8	SMS cost	-	8.00	Recurring
9	Content Creation	-	15.00	Non-Recurring
10	Content up-gradation	-	2.50	Recurring
11	Portal Development *	1	210.00	Non-Recurring
12	Portal Maintenance & up-gradation	1	5.00	Recurring for every year (After one year)
13	Multimedia Studio setup**	1	26.16	Non-recurring
	Misc (Advt., CD/DVD/USB, hardware maintenance, Network equipments, cables, cords etc...)	-	2.50	Recurring
14	Institution expense	-	2.00	Recurring
15	TOTAL(Approx)		274.46 (For First Year 84.60, for next two years as recurring expense based on above figures)	
16	Total Project Cost (Approx)		359.06 (Considering for three years)	

B. Regular Program:**6.3 Title: Use of Sweet Sorghum as Bio-Fuel Production and Source of Second Generation Ethanol**

<p>1. Objective aim of the project:</p>	<ol style="list-style-type: none"> 1. To increase production of food grain as well as fodder and the ethanol 2. Additional income to the sorghum grower farmers from grain as well as selling stalk to the sugar factory. 3. Providing employment to sugar factory labour throughout the year. 4. Running sugar mills throughout the years 5. To fulfil shortage of ethanol for blending with petrol. 6. To reduce BOD, COD of spent wash for effective environment improvement 7. Utilization of bio-waste for the production of energy and electricity 8. To increase in production of Alcohol Increase in production of organic manure (Bio-Compost) and saving in baggase.
<p>2. Genesis:</p>	<p>In Gujarat state sugar factories are remaining closed from April to Dec. due to non availability of sugar cane for crushing. Thus labours remains unemployed and sugar factory infrastructure remain unused during this period. By crushing sweet sorghum for ethanol production during this period will provide employments to the labour and utilizes of sugar factory infrastructure. This will lead to supplementary income to the sugar mills and to the farmers and fulfil ethanol demand of the country. In addition to above, during the distillery process, spent wash is generated as a waste material. Bio-gas can generated from the spent wash through bio-methanation process. Bio-gas will be use in sugar factories boilers and the equivalent quantity of bagases will be spared for extra revenue generation. Also increase quantity of spent wash will be concentrate and used for bio-composting to get best quality of organic manure. Due to bio-methanation BOD and COD of spent wash will be reduce for effective environment improvement. The system will be zero discharge as on effective pollution control method.</p>

<p>3. Brief note on the process with timeline:</p>	<ul style="list-style-type: none"> ▪ About 60 K.L.P.D. rectified sprit will be produced instead of 33 K.L.P.D. with some modification in fermentation and distillation plant. ▪ The juice of sweet sorghum stalk will be extracted in milling plant, clarified and the juice will be process in our distillery plant for the production of additional 27 KL of ethanol. ▪ About 345 qubic meter of spent wash will be available per day will be biomethinizedin a reacator to get about 22600 qubic meter of bio gas. ▪ The bio gas will be utilized as a fuel in boiler. The 50 ton baggase will be save/day. This energy will be considered as renuable energy.
<p>4. Area of the project:</p>	<p>Sugar Factory</p>
<p>5. Benefit of the new technology:</p>	<ul style="list-style-type: none"> ▪ Farmers of south Gujarat having the semi irrigation facility can cultivate sweet sorghum and harvest grain as well as supplementary benefits from selling stalk to sugar factory for crushing. ▪ Sugar factory can be remaining functional throughout year and thereby getting extra revenue and provide continues employment to the labour. ▪ Fulfilment of ethanol shortage of the country. ▪ About 54 lakh lit. Of ethanol will be produced additionally which will be used in EBP. ▪ Bio-gas normally contains 60% menthane gas which is well-recognized fuel gas with minimum air pollution potential. ▪ After production of bio gas the residual spent wash contains considerable amount of nutrients & microbes, which will be concentrated and utilized for spraying on pres mud which is generated from sugar mill is utilized to produce compost. This system can achieve zero discharge effluent. ▪ 65% of BOD, COD of spent wash will be reduce & bio gas will be generated. ▪ By using bio gas in to boiler, an equivalent quantity of baggase will be spared. By selling these excess baggase in market as fodder. Extra revenue will be generated & distributed among the sugar cane growing farmers. ▪ Utilization of bio waste to protect environment..

6. Types of beneficiaries for the project	Member farmer of sugar factory.		
7. Operation modalities of the project with terms & condition	-----		
8. Component & year wise projection cost	As per below Rs. 1700 lakh		
9. Physical financial target	Sr. No.	Section	INR in lakhs
	1.	Design, engineering and supply of equipment, bought outs, instrumentation, piping, electrical in distillation & fermentation section for capacity expansion to 60 KLPD	330
	2.	Design, engineering and supply of equipment, bought outs, instrument air compressor, instrumentation, piping, electrical in integrated evaporator two effects for capacity of 60 KLPD.	370
	3.	Design, engineering, manufacture, supply, erection and supervision of commission for biogas plant for 60 KLPD	500
	4.	Milling & process equipment	300
	5.	Cultivation of sweet sorghum (seed, agriculture practice, extension activities etc.)	200
		TOTAL	1700
10. Whether this project will be implemented by your office or by private entrepreneur in project	Sugar factory.		
11. Investment to be made by entrepreneur in project	-----		
12. The amount of assistance under the project	Rs. 1800 lakh		
13. Name of implementing agency	Sugar factory.		
14. Work plan for implementation of the project	Factory premises		
15. Requirement of fund under RKVY	----		

Table- 6.6 Use of Sweet Sorghum as Bio-fuel Production and Source of Second Generation Ethanol

Year	Physical	Finance (Rs. In Lakh)
2017-18	0	
2018-19	1	1800
2019-20	1	1800
Total	2	3600

Fund may be shared with sugar factory as per condition made between Government and Sugar factory.

6.4 Title: Value Addition in Sorghum

Justifications:

At present most of the sorghum produced in India is consumed in the form of *roti* or *chapatti* (unleavened flat bread). Due to increasing awareness of people regarding health consciousness and health benefits of sorghum for human diet, the grain sorghum have good potential for preparation of many traditional foods, beverages and in bakery preparations like bread, cakes and biscuits etc. Kharif sorghum grain can be polished with pearling machine and used for other food products like snack foods and baked foods.

Objective

- Sorghum is known for its nutritional quality, the consumption of this cereal is decreasing due to easy availability of rice and wheat through public distribution system and easy methods of processing and cooking of fine cereals (such as rice).
- To explore the global utilization of sorghum as a food.
- Technologies for production of shelf-stable refined flour, grits and semolina from sorghum and millet have been developed and laboratory studies have demonstrated their successful utilization and incorporation into various traditional foods (idli, dosa, chakli, papad, etc.) and newer convenience health products (vermicelli, noodles, plain and ready-to-eat flakes, extruded products, weaning and supplementary foods, and bakery products).
- Efforts are being made for popularization and wider adoption of the successful technologies to promote sorghum for diversification of their utilization among the non-traditional urban population

1. Relevance of proposed project

Nutritional Value of Sorghum

- Sorghum gluten free cereal
- Reach source of minerals, vitamins, protein and fibers
- Not problem of rancidity as in pearl millet

- Grain sorghum protein varies from 4.4 to 21.1% with a mean value of 11.4%.
- The Lysine content ranges from 1.06 to 3.64%.
- The protein fractionation studies in sorghum indicated that the distribution of albumin-globulin, prolamin and glutelin is about 15, 26 and 44% respectively of total nitrogen.
- Starch is the major constituent of grain accounting for 56-75% of the total dry matter in the grain.
- The total content of soluble sugars of sorghum grain ranged from 0.7 to 4.2% and the reducing sugars from 0.05 to 0.53%.
- Fat content in sorghum grain varies from 2.1 to 7.6%, crude fibre from 1.0 to 3.4% and ash from 1.3 to 3.3% .

Traditional foods in India

The various traditional food preparations in India encompass the following:

- | | | |
|-----------|-------------|-------------------------|
| 5.1 Roti | 5.3 Sankati | 5.5 Upma |
| 5.2 Annam | 5.4 Kanji | 5.6 <i>Hurda (Pauk)</i> |

Bakery Products

Substitution of wheat with local cereals like maize and sorghum in biscuit production was studied to improve the nutritional quality of biscuits. At NRCS, efforts were made to prepare common bakery products like bread, cakes and biscuits. Fine sorghum flour made out of kharif grain (pearled) equal to the consistency of *maida* (refined wheat flour) is used in combination with *Maida* for the preparation of various bakery products like bread (whole sorghum), mixed bread (bread made from sorghum, ragi and bajra in 2:1:1 ratio), plum cake, biscuits, Noodles and pasta etc.

Nutritional enrichment of sorghum with other cereal/ pulse grain

It is ideal for making different snack foods from sorghum which are usually made with rice and wheat to reduce malnutrition in children. It is also ideal to be included in the mid day meal program as the school children need complete balanced diet.

Natural Syrup from sweet sorghum juice

- The juicy stalk of sweet sorghum, which is similar to sugarcane, can be utilized for preparation of syrup and jaggery.
- Cultivation of sweet sorghum is economical in rainfed areas where growing sugarcane is not feasible. Sweet sorghum has the ability to yield 40-45 t/ha green cane and 1-1.5 t/ha of grain and an average brix of 18.4%. It consistently produces a minimum of 12% sucrose and atleast 15% total fermentables, at 50-60% recovery.

- A protocol was developed for the production of natural, chemical free, quality syrup from the juice of sweet sorghum hybrid “Madhura” developed by NARI.
- A bottling machine has been used successfully to package the syrup so that its shelf-life is increased.
- The nutritional quality of syrup was also found to be excellent.
- During extensive screening, large number of sweet sorghum genotypes produced good quality syrup.
- The concentrated and sterilized juice to make natural syrup can be used in the dairy and confectionery industry for its use as a sweetener. This syrup can be used in place of honey and can be served also along with breakfast foods.
- This syrup in the name of “sorghum honey” has the immediate marketability potential.
- The chemical composition of sweet sorghum syrup is similar to honey

2. Strength and Infrastructural Facility Available at NAU, Navsari:

- Experience of handling the Plan, Non-plan, World Bank and other agency projects.
- Colleges and Laboratories related to Agricultural and Allied field for technical support.
- World class and hi-tech library, equipped with national and international periodicals
- Main Sorghum Research Station
- Processing plant related fruits and vegetable processed products
- Drying and packing units for fruits and vegetables
- Cold Storage Facility
- Centre of Excellence on Post Harvest Technology,
- NABL Accredited Food Quality Testing Laboratory
- Set up KVKs for ToT of technology

3. Duration of project: Three years

4. Area of project: South Gujarat Particular and Gujarat state in General

5. Details of Investigator

Position	Name	Designation
Principal-investigator	Er Parag S. Pandit	Assistant Professor, PHTC, NAU, Navsari
Co-investigator	Prof.Lalita H. Saini	Asstt. Res. Sci. (Agro), MSRS, Surat
Co-investigator	Dr. Vineet Sharma	Assistant Professor, Dept. of Agril. Engg., NMCA, NAU, Navsari
Co-investigator	Prof. N. V. Radadiya	Asstt. Res. Sci. (Ento), MSRS, Surat
Associated Scientists	Dr. Vipul Patel	Asst. Prof. (A. Nutrition), CoVSc, NAU, Navsari
Associated Scientists	Dr. H. G. Suthar	Asst. Prof. (Microbiology), PHTC, NAU, Navsari

Associated Scientists	Er. F. M. Sahu	Assistant Professor, PHTC, NAU, Navsari
Associated Scientists	Er. A. k. Senapati	Assistant Professor, PHTC, NAU, Navsari

6. Place of Work: Navsari Agricultural University, Navsari/Surat

7. The amount of assistance under the project by RKVY: Rs. 598.24 lakh.

8. Contribution of Implementing Agency (NAU, Navsari): Land and Technical Manpower as well as available facility.

Table- 6.7 Budgetary Requirement for Value Addition in Sorghum

Year	Particular				Total Budget
	Contractual Tech. Staff	Recurring	Non Recurring	Building	
2017-18	-	-	-	-	
2018-19	9.12	49.00	100.00	185.00	343.12
2019-20	9.12	46.00	200.00	-	255.12
Total	18.24	95.00	300.00	185.00	598.24

9. Plan of Work:

Year	Activity
2017-18	--
2018-19	<ul style="list-style-type: none"> • Purchase and establishment of bakery related Equipment and Machinery • Development of sorghum based bakery products and ready to eat formulations. • Development of special purpose sorghum based processed products. • Development of green sorghum sweet flour and related processed products. • Development and evaluation of handling, Separation and storage technology for sorghum seed and syrup. • Modeling, development and tools design for sorghum crop handling for reduction in losses. • Training to farmers, entrepreneur, and women. • Workshop on processing of sorghum products for farmers, entrepreneur, exporter and women. • Publication of literature, video and photo gallery on sorghum based processed products. • Organization of Buyer- Seller Meet. • Establishment of Farmers Company.
2019-20	<ul style="list-style-type: none"> • Purchase and establishment of sweet sorghum syrup and grain related equipment and machinery • Development of sweet sorghum based technology. • Utilization of sorghum syrup in bottled/pouch/RTS drinks.

	<ul style="list-style-type: none"> • Cereal based RTP sachet pouch and cup packing products. • Sorghum seed based frozen technology. • Development, modification and evaluation of handling, Separation and storage technology for sorghum seed and syrup. • Modeling, development and tools design for sorghum crop handling for reduction in losses. • Training to farmers, entrepreneur, and women. • Workshop on processing of sorghum products for farmers, entrepreneur, exporter and women. • Publication of literature, video and photo gallery on sorghum based processed products. • Organization of Buyer (Exporter)-Seller (Farmers/Small Processor) Meet. • Establishment of Farmers Company.
Total	

10. Contractual Staff and Budgets:

Year	Contractual Technical Staff	Discipline	Budget
2017-18	-	-	-
2018-19	Junior Research Fellow - 1	Food Technology/Chemistry	1.20
	Junior Research Fellow - 1	Mechanical Engineering	1.20
	Senior Research Fellow - 1	Processing and Food Engineering	3.36
	Senior Research Fellow - 1	Food Processing Technology	3.36
2019-20	Junior Research Fellow - 1	Food Technology/Chemistry	1.20
	Junior Research Fellow - 1	Mechanical Engineering	1.20
	Senior Research Fellow - 1	Processing and Food Engineering	3.36
	Senior Research Fellow - 1	Food Processing Technology	3.36
		Total	18.24

11. Recurring contingency and Budget:

Year	Particular	Budget
2017-18	-	-
2018-19	Minor modifications in Civil, Electrical and Mechanical works	10.00
	Laboratory expenses	12.00
	Report, literature, ToT related expenses	9.00
	Computer software, stationary and other miscellaneous expenses	18.00

2019-20	Minor modifications in Civil, Electrical and Mechanical works and maintenance.	12.00
	Laboratory expenses	10.00
	Report, literature, ToT related expenses	12.00
	Computer software, stationary and other miscellaneous expenses	12.00
		95.00

12. Non-recurring Items and Budget:

Year	Particular	Unit	Budget
2017-18	-		-
2018-19	Grain cleaner cum grader, Sorting Unit, Grain Crushers, Rotape Screen, Mixtures, Rolling and Sheeting Unit, Cutting and Slicing Unit, Oven and Baking Units, Cup Sealer, Vacuum Packing Machine, Popping Unit, Form Fill and Seal Unit, Microwave Dryer, Misc. Laboratory Equipment	20	100.00
2019-20	Juice Press, Filer Unit, Vacuum Evaporator, Sterilizer, Steam Generator (Boiler), Individual Quick Freezing Unit, Crowing Machine, Capping Machine, Sachet pouch machine, Protein Analyzer, Aseptic packaging unit, Microbiology Equipment, Laboratory Equipment, Misc. Item etc.	15	200.00
	Total	35	300.00

13. Building and Budget:

Year	Particular	Unit	Budget
2017-18	-	-	-
2018-19	Processing Area for Sorghum (Ground Floor)	2500 sqm	125.00
	Laboratory and store (first floor)	1500 sqm	60.00
2019-20	-	-	-
	Total	4000 sqm	185.00

6.5 Title: Discrimination of white spot of grain in wheat

Wheat (*Triticum aestivum* (L) Moench) is a premier crop of the semi arid tropics and a major staple food. It is grown in *Rabi* seasons for the utility as food, feed, forage and industrial food material. In Gujarat, wheat ranks next to rice and is cultivated in an area of about 11.49 million hectares. However, a productivity is low i.e. 31.26 kg/ha (Anon., 2014). Both biotic and abiotic factors are responsible for low productivity. Grain white spot is most wide spread physiological disorder by nutrient migration from grain to wheat organ, especially when dough

stage commences, grain development and maturity coincide with malnutrition of nutritional product and nutrition migration. Particularly on last irrigation of crop is used for grain purpose and North Gujarat is heavy affected due to scarce irrigation water at dough stage. This condition promotes development of white spot of wheat grain. Due to grain white spot price of wheat affected in market hence farmer lost the worthy market value beside this loss in yield due to grain white spot was also recorded.

Hence, it is badly needed to develop wheat variety or physiologically having tolerance/resistance to white spot. Such variety might assure poor farmers of semiarid areas, high yield and better quality of wheat so that they can get profit from wheat cultivation.

Objectives:

- Information or documentation on genetic diversity of **grain** white spot isolates which infect wheat.
- Screening of sorghum germplasm against most prevalent and virulent strain of white spot
- Development of mapping population and molecular mapping of **grain** white spot resistance gene(s) in wheat
- Transferring grain white spot resistance from related in elite cultivars/advance lines of wheat.
- Nutritional transformation of wheat with proteins/starch for enhanced white spot resistance.

Expertise and infrastructure facilities:

(a) Infrastructure facilities:

1. Basic material will be available from Main Sorghum Research Station, Vijapur
2. Bio technological work will be carried out at Gujarat Agricultural Bio- technological institute.

Duration of the project in year: 3 years

Work Plan:

a. Methodology: Agronomical/Physiological/Approaches

- Some tolerant or moderately tolerant genotypes which have half grain or fully covered grain with proper irrigation may be used as one of the parent in crossing programme. The second parent will be released improved varieties having high yield and early maturity. The irrigation programme will take three season then will be raised in next three Rabi season for evaluation of grain white spot. It required, F₃ will be subjected to segregation. Selection, irrigation schedule will be done for grain white spot in segregating materials and desired plant will be subjected to irrigate at proper dough stage up to F₃ generation.
- Back cross method may be use to get identical improved variety with grain white spot

which is one of the parellar in raising programme.

- Bio technological work will be carried out as per procedure.

Table- 6.8 Timeline of Activity Discrimination of White Spot of Grain in Wheat

S. N.	Year	Activity
1.	1 st year	1. Collection & evaluation of grain malnutrition against white spot 2. Molecular diversity analysis by using Rep-PCR 3. Optimization of regeneration and transformation protocol in sorghum 4. Evaluation of new fungicides against Grain mould fungus
2.	2 nd Year	1. Crossing programme and to raise F1 2. Parental screening for markers 3. Development of Plant expression constructs harboring genes for antifungal proteins. 4. Development of colloidal nanomaterials for fungicide delivery into sorghum 5. Testing of promising fungicide in field condition
3.	3 rd Year	1. Advance rrigating system and selection in F2 and F3 2. Parental screening for markers (cont...) 3. Transformation of Wheat with starch/proteins
4.	4 th Year	1. Advance generation and selection in F2 and F3 2. Parental screening for markers (cont...) 3. Characterization of T1 transgenic plants 4. Development of nutritional grain by Agro-practices.
5.	5 th Year	1. Advance generation and selection in F2 and F3 2. Evaluation of material in F3 3. Phenotyping for grain White spot 4. Genotyping of mapping population 5. QTL mapping for grain White spot 6. Characterization of T2 transgenic plants for grain mould resistance 7. Validation and application of irrigation in field conditions
N.B.: After 3 years the promising material having grain White spot resistance will be subjected to further evaluation.		

Expected Outcome:

- Improved grain variety with better grain quality will be developed.
- Total amount will be Rs. 50 lakhs for three years. Detailed item-wise break up will be given at the time of final proposal.

Table- 6.9 Year - wise Requirement for Discrimination of White Spot of Grain in Wheat

Sr. No.	Item	Total (Rs. in Lakh)			
		1 st Year	2 nd year	3 rd year	Total
	(i) Operational Cost	16.33	16.33	16.34	50.00
Total		16.33	16.33	16.34	50.00

6.6 Title: Strengthening of Infrastructure Facilities Proposal for Infrastructural strengthening for research on wheat at Main Wheat research station, SDAU, Vijapur

S. N.	Description	Particulars/Remarks
1	Name of the project	Infrastructural strengthening for research on wheat at Main Wheat research station, SDAU, Vijapur
2	Brief note of the project	<p>➤ In India, about 60 million people work with cotton production in different way, amounting to 30 per cent of India's total export of cotton and textile -about 22 per cent of the global production. India has emerged as the second largest producer of cotton in the world and occupies the first position in terms of total area under crop production at over 121 million hectares.</p> <p>➤ Gujarat a leading cotton growing state which growing cotton on about 3.02 million ha producing 11.72 million bales of lint. It stands first for production and productivity amongst cotton growing states of the country. However, the productivity level can be improved.</p> <p>➤ The amount of dust and trash particles depends mainly on the species and plant type of cotton and its harvesting method. Presence of trash in commercial cotton at varying amounts may bring down the market value and further influences in the end use qualities Trash content in Indian cotton is main obstacle for export. To ensure trading and with high, there we to have precision quality testing machine</p> <p>➤ Efforts are in place at Main Cotton Research station, NAU, Surat to increase the productivity along with quality fibre since its inception (1896). In order to further strengthen the research activities there is need for modernization of infrastructural facilities along with instrumentation and sufficient facility may get.</p>
3	Type of beneficiaries for the schemes	<p>➤ Farmers may get good quality seeds at a reasonable rate and proper time.</p> <p>➤ Farmers may enhance production and quality of cotton from healthy seeds.</p> <p>Fiber industries may produce sufficient quantity of cotton cloth/ yarn</p> <p>➤ implement generation it may improve Socio-economic status of the farmers.</p>
4.	Operation modality of the scheme with terms & conditions	Main Cotton Research Station, Surat has developed many technologies viz. improved varieties and hybrids recommended for the farmers of Gujarat/ Central zone. It has a very competent multidisciplinary team to take up the project as per condition of the RKVY.

5	Total requirement of fund	As per Appendix I
6	The amount of subsidy under the scheme	Nil
7	Implementing agency proposed	Rastriya Krishi Vikas Yojna
8.	Physical targets	Infrastructural strengthening requirements operational cost as Non recurring (290.10 Lakh)
9	Proposed financial targets	Rs 610.8 Lakh
10.	Requirement of funds under the R.K.V.Y.	Rs 610.8 Lakh

Table- 6.10 Budgetary Provision for Infrastructural Strengthening for Research on Wheat (Total Financial Break Up) Appendix-I

S N	Item	I Year	II Year	III Year	Total (Rs. in Lakh)
1	Civil works	225.0	-	-	225.0
2	Equipments	290.1	-	-	290.1
3.	Recurring Contingencies	50.9	11.9	10.9	95.7
Total		566.0	11.9	10.9	610.8

A. Land required: Already available

B. Building required: Rs. 225. 000 lakh

6.7 Title: Climate Change Impact Assessment, Adaptation and Mitigation

Strategies for wheat in Gujarat

The project proposed is representing most sensitive environmental issue of global warming and green house gaseous measurement and their impact on agriculture. But for study and accessing climate change and global warming impacts on agriculture, required instruments and control condition chamber/phytotron facilities are not available anywhere in Gujarat. Therefore, Ultrasensitive Methane and CO₂ analyzer is proposed to measure methane and CO₂ emissions from agricultural systems and animal farms. Eddy covariance system required to study the energy balance exchanges over the crop fields. Photosynthesis system proposed to measure physiological responses (photosynthesis, transpiration, leaf temperature, stomata conduction) of crops to climate change and temperature rise. Growth

chamber/phytotron is proposed to conduct experiments under different controlled climatic conditions similar to observed due to climate change and global warming during coming decades. Workstation/ computer/ Laptop, Plotter/Printer, Internet connectivity, GIS/GPS/software are required for office/data analysis work. Such facilities will be created at all the four campuses of State Agricultural Universities.

Objectives:

1. To measure the different greenhouse gases released by agricultural systems
2. To quantify the extent of temperature rise due to change in GHG on crop phenology, physiology, growth and yield of different crops.
3. To suggest mitigation and adoptive options to cope up with climate change and global

Table- 6.11 Financial Requirements for Climate Change Impact Assessment, Adaptation and Mitigation Strategies in Gujarat

Item	1 st Year	2 nd Year	3 rd Year	Total Cost (Rs. in Lakh)
Pay and allowance	30.00	33.00	36.30	99.30
Recurring contingency	20.00	20.00	20.00	60.00
Non Recurring contingency	300.00	200.00	100.00	600.00
Works	200.00	100.00	100.00	400.00
TOTAL	550.00	353.00	256.30	1159.30

6.8 Title: Modernizing Existing Infrastructure for Quality Testing of Cotton at Main Cotton Research Station, NAU, Surat and Cotton Research Station, JAU, Junagadh

Sr. No.	Description	Particulars/Remarks
1	Name of the project	Modernizing existing infrastructure for quality testing of cotton at Main cotton research station, NAU, Surat and Cotton Research Station, JAU, Junagadh
2	Brief note of the project	<ul style="list-style-type: none"> ➤ In India, about 60 million people work with cotton production in different way, amounting to 30 per cent of India's total export of cotton and textile -about 22 per cent of the global production. India has emerged as the second largest producer of cotton in the world and occupies the first position in terms of total area under crop production at over 121 million hectares. ➤ Gujarat a leading cotton growing state which growing cotton on about 3.02 million ha producing 11.72 million bales of lint. It stands first for production and productivity amongst cotton growing states of the

		<p>country. However, the productivity level can be improved.</p> <ul style="list-style-type: none"> ➤ The amount of dust and trash particles depends mainly on the species and plant type of cotton and its harvesting method. Presence of trash in commercial cotton at varying amounts may bring down the market value and further influences in the end use qualities Trash content in Indian cotton is main obstacle for export. To ensure trading and with high, there we to have precision quality testing machine ➤ Efforts are in place at Main Cotton Research station, NAU, Surat to increase the productivity along with quality fibre since its inception (1896). In order to further strengthen the research activities there is need for modernization of infrastructural facilities along with instrumentation and sufficient facility may get.
3	Type of beneficiaries for the schemes	<ul style="list-style-type: none"> • Farmers may get good quality seeds at a reasonable rate and proper time. • Farmers may enhance production and quality of cotton from healthy seeds. • Fibre industries may produce sufficient quantity of cotton cloth/ yarn • Employment generation it may improve Socio-economic status of the farmers.
4.	Operation modality of the scheme with terms & conditions	Main Cotton Research Station, Surat and Cotton Research Station, Junagadh has developed many technologies viz. improved varieties and hybrids recommended for the farmers of Gujarat/ Central zone. It has a very competent multidisciplinary team to take up the project as per condition of the RKVY.
5	Total requirement of fund for (2017-18 to 2019-20)	As per Appendix I
6	The amount of subsidy under the scheme	Nil
7	Implementing agency proposed	Rastriya Krishi Vikas Yojna
8.	Physical targets (for 2017-18 to 2019-20)	Infrastructural strengthening requirements operational cost as Non recurring (578.2 lakhs)
9	Proposed financial targets	Rs 1101.6 lakhs
10.	Requirement of funds under the R.K.V.Y. in (for 2017-18 to 2019-20)	Rs 1101.6 lakhs

11	Purpose of budget requirement	<ul style="list-style-type: none"> • Development of tissue culture laboratories, strengthening of fibre testing and bio fertilizer laboratory and purchase of laboratory equipments. • Improvement in the production and quality of cotton through quality seeds. • Improved awareness of the cotton growers on capacity building. • Construction of storage facilities.
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Appendix-I

Table- 6.12 Budgetary Provision Modernizing Existing Infrastructure for Quality Testing of Cotton at Main Cotton Research Station, NAU, Surat and Cotton Research Station, JAU, Junagadh (Total Financial Break Up)

Rs. In Lakh

Sr No	Item	2017-18	2018-19	2019-20	Total
1	Civil works (As per Appendix II Point D)	450.00	-	-	450.00
2	Equipments (As per Appendix II Point C)	580.20	-	-	580.20
3.	Recurring Contingencies	25.80	23.80	21.80	71.40
	Grand total (Budgetary provision for two centres i.e., MCRS, Suart & CRS, Junagadh)	1056.00	23.80	21.80	1101.60

Appendix-II

- A. Land required : Already available
- B. Building required : Rs. 225. 000 lakh
- C. Equipment required : Non-recurring contingency of Rs 290.10 Lakh

Sr. No.	Items	Requirements	Approximately Cost Rs. In Lakh	Justification
1	ELISA Reader (robotic)	1	50.00	For detection of viral diseases of cotton
2.	Oven (Hot air)	1	2.50	For sterilizing glass wares
3.	Autoclaves	2	1.00	For sterilizing media
4.	Microscope	1	1.50	For examine plant pathogen
5.	Air conditioners	10	6.00	Cooling system for laboratory

STATE INFRASTRUCTURE DEVELOPMENT PLAN

6.	Deep freeze (-20°C)	1	10.00	For storage of chemicals
7	Deep freeze (-80°C)	1	10.00	For storage of DNA samples
8	Computer with accessories	3	5.00	Data analysis and reporting work
9	Furniture's & Fixtures	-	10.00	Facility building / protection of instruments
10	Incubator	1	0.50	For pathological study
11	Laminar flow (6' X 2')	2	4.00	For isolation of pathogen in aseptic condition
12	pH meter	3	0.60	For measuring pH.
13	Tissue culture racks with timer control	10	20.00	for putting plantlets tubes
14.	Microwave oven	1	0.50	For sterilizing media
15	Electronic balance (mg/µg)	1	1.00	Weighing of reagents
16	Centrifuge	1	1.50	For DNA & Plasmid isolation
17.	Magnetic Stirrer	1	2.00	For dissolving the chemicals
18.	Vortex Mixture	1	1.00	For mixing of chemicals
19.	Refrigerator	2	0.50	For storing chemicals
20.	BOD incubator shaker	1	6.00	Use in microbial culture
21	Air purification screen	1	1.50	For purification of air
22	Testing of fibre quality	1	150.00	Testing of quality parameters of fibre
	High volume Instrument (HVI)			
	Advance fibre information system (AFIS)			
23	Leaf analyzer	1	5.00	To analyze micro and macro nutrients of leaf tissue
Total			290.10	
Total for two centres i.e., MCRS, Suart & CRS, Junagadh)			580.20	

D Civil works (Tissue culture laboratory, other supporting laboratories, storage godown, fibre testing laboratory etc.)

Sr. No.	Items	Total Sq. mt.
1	Well furnished tissue culture laboratory	100
2	Fibre testing lab	100
3	Other supporting well furnished laboratories	200
4.	Godown seed cotton storage	600
5	Biotechnology lab	100
6.	Scientist chambers with bio fertilizer lab	200
7.	Seminar/ Conference hall with all amenities	200
Total		1500

Estimated construction rate (Furnished) @ Rs. 15,000 per sq. mt

Total area = 1500 sq. mt

Estimated cost = Rs. 1500 X 15,000 = 225. 000 lakhs

Estimated cost for two centres (MCRS, Surat & CRS, Junagadh) = 450

E. Break up of annual recurring contingencies (Rs in Lakh)

Sr No	Item	2017-18	2018-19	2019-20	Total
1	Fertilizers	0.75	0.75	0.75	2.25
2	Chemicals for ELISA and media for tissue culture labs	8.00	8.00	8.00	24.00
3	Agri inputs insecticides/ pesticides/ fungicides	0.50	0.50	0.50	1.50
4	POL and Maintenance of implements	0.50	0.50	0.50	1.50
5	Stationary	0.15	0.15	0.15	0.45
6	Glass wares and plastic wares	3.00	2.00	1.00	6.00
	Total	12.90	11.90	10.90	35.70
	Total for two centres i.e., MCRS, Suart & CRS, Junagadh)	25.80	23.80	21.80	71.40

6.9 Title: Promoting Cultivation of Salt Tolerant Cotton Varieties in Salt Affected Soils of Gujarat

Sr. No.	Description	
1	Name of the project	Promoting cultivation of salt tolerant cotton varieties in salt affected soils of Gujarat
2	Brief note of the project	Soil salinity is one of the major environmental constraints in agricultural crop production. Salt affected soils occur to a tune of 6.74 M ha in India of which Gujarat accounts for 2.22 M ha i.e.,

	<p>32 per cent of the country's total and thus needs a holistic approach for generating economically viable agro-management strategies. Water and soil management practices have facilitated agricultural production on soils marginalized by salinity but additional gain by these approaches seems problematic. Cotton is the major crop grown in this region. Gujarat ranks first in cotton production and productivity in India, and it is contributing nearly 35% production from 24% area in the country. Rapid expansion of saline areas of cotton zones imposes serious threat to the national economy as there is yield reduction at high salinity levels. Hence sustainable measures need to be taken to enhance and stabilize cotton yield and production in saline areas to realize the goals.</p> <p><i>Desi</i> cotton is known for its inherent resistance against abiotic stresses such as salinity and drought; and to major pests and diseases. In addition to these, <i>desi</i> cotton has been found good for attributes such as high ginning outturn, low cost of management and wide adaptability under rainfed cultivation due to deep root system. Hence any variety evolved from <i>desi</i> cotton would be immense value for farming community of the country if it can achieve high yield and better quality characters. As <i>desi</i> cotton, especially <i>G. herbaceum</i> is grown commercially in Gujarat which is also having maximum salt affected area in the country; it is very much imperative to carry out research for development of salt tolerant varieties of <i>desi</i> cotton and its promotion among various stakeholders.</p> <p>Premier institutes like Main Cotton Research Station (MCRS) of NAU, Navsari and ICAR-CSSRI, RRS, Bharuch have developed and identified many salt tolerant cultivars which are very popular among farming communities. However, actual potential is yet to be realized mainly due to limitation of seed production, seed availability and lack of awareness among farmers and seed producing agencies. Moreover, catastrophic situation created by Bt cotton hybrids for poor farmers in most part of the country also demands promotion of salt tolerant native cotton varieties. Keeping in view the challenges posed by salinity and potential of salt tolerant cotton varieties in ameliorating these problems, the present project is being proposed for research on development of salt tolerant varieties and its promotion through demonstration</p>
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		and seed production in collaboration with progressive farmers /agri start-ups. The proposed project area is saline Bara tract comprising three Talukas; Amod, Jambusar and Vagra of Bharuch district and for three years 2017-2020.
3	Type of beneficiaries for the schemes	<ol style="list-style-type: none"> 1. Small and marginal cotton growing farmers of salt affected area of Gujarat 2. Progressive farmers/ Agri-Startups through small scale seed production 3. Scientific community can utilize improved germplasm in breeding new varieties
4.	Operation modality of the scheme with terms & conditions	<ol style="list-style-type: none"> 1. Identification of salt tolerant cotton varieties for varying salinity levels (MCRS, CSSRI) 2. On farm testing and Demonstration /FLDs of notified and released varieties (MCRS, CSSRI, RCRS) on 50 farmers' fields @ Rs. 6000/farmer/ha. 3. Seed chain establishment (MCRS, RCRS, ICAR-CSSRI)
5	Total requirement of fund for 3 years (2017-18 to 2019-20)	134.0 Lakhs
6	The amount of subsidy under the scheme	--
7	Implementing agency proposed	<ol style="list-style-type: none"> 1.Main Cotton Research Station (MCRS), NAU, Surat 2.ICAR- Central Soil Salinity Research Institute, RRS, Bharuch 3.Regional Cotton Research Station (RCRS), NAU, Bharuch
8.	Physical targets (for 3 years (2017-18 to 2019-20))	<ol style="list-style-type: none"> 1. Identification of location specific salt tolerant cotton varieties through field experimentation. 2. 1st year On-farm testing/FLDs in collaboration with progressive farmers 3. a) 2nd Year On-farm testing/FLDs in collaboration with progressive farmers b) Seed multiplication and distribution in collaboration with progressive farmers /Agri-Startups.
9	Proposed financial targets	134.0 Lakh.
10.	Requirement of funds under the	

	R.K.V.Y. in 3 year plan	
11	Purpose of budget requirement	Budget is needed for purchasing instruments for field study, FLD kit, demonstration and seed production for a period of three years.

Appendix-I

Table- 6.13 Budgetary Provision for Promoting Cultivation of Salt Tolerant Cotton Varieties in Salt Affected Soils of Gujarat

(Total Financial Break Up)

Sr No	Item	2017-18	2018-19	2019-20	Total
1.	Equipments	74.0	--	--	74.0
2.	Recurring Contingencies	20.0	23.0	17.0	60.0
	Total	91.0	19.5	13.5	134.0

Appendix-II

A. Equipment required : listed below

Sr. No.	Requirements	Nos.	Approx. Cost Rs. In Lakh	Justification
1	Microplots	1	25 lakh	Needed for screening salt tolerant varieties
2	EC meter	3	0.5*3 = 1.5 lakh	Soil Salinity analysis
3	pH meter	3	0.5*3 = 1.5 lakh	Soil Salinity analysis
4	Dilutor	1	1.0 lakh	Soil Salinity analysis
5	GPS	3	1.0 *3 = 3 Lakh	Geo tagging
6	Mechanical shaker	1	1.0 lakh	Soil Salinity and plant analysis
7.	Centrifuge	1	2.0 lakh	Soil and plant analysis
8.	Ginning machine	2	1.5 * 2= 3 lakh	Seed production
9	ERGA	1	20.0	Physiological studies
10	SPAD	1	2.0	Plant studies
11.	Deep freezer	1	1.5	Material storage
12.	Flame photometer	2	5.0 x 2= 10.0 lakh	Sodium and potassium determination
13.	Incubator	1	2.5 lakh	For seed incubation purpose
	Total		74.0 lakh	

E. Break up of annual recurring contingencies

(Rs in Lakh)

Sr No	Item	2017-18	2018-19	2019-20	Total
1	Glassware and plasticware	5.0	5.0	5.0	15.0
2.	Chemicals	6.0	6.0	-	12.0
3.	Seed production cost 5000 per quintal	2.0	2.0	1.0	5.0
4	FLDs/Demonstration kit 50 farmers @6000 per farmer per ha.	-	3.0	3.0	6.0
5	TA/DA	3.0	3.0	3.0	9.0
6	Publication and literature	1.0	1.0	2.0	4.0
7	Farmer meeting (3 meetings @2.0 lakh per meeting)	2.0	2.0	2.0	6.0
8	Miscellaneous	1.0	1.0	1.0	3.0
	Total	20.0	23.0	17.0	60 Lakh

**6.10 Title: Empowerment of Rural Women and Youth Through Cotton
Production and Promotion of Solar Charkha, Spinning and Weaving and Garments Manufacture**

Sr. No.	Description	Particulars/Remarks
1	Name of the project	Empowerment of rural women and youth through cotton production and promotion of solar charkha, spinning and weaving and garments manufacture
2	Brief note of the project	➤ In Gujarat, Textile Industries as its unique position as a self-reliant Industries, from the production of raw materials to fabric and garments and has a major contributions to the economy. Gujarat is a largest producer of cotton, constituting over 32% share of the country's production. It is observed that besides the quality production of cotton, Gujarat is quite strong in Ginning both in terms of Technology and productivity. But due to non-availability of spinning activities, over 90% of Gujarat Cotton goes either for or to other State for further value-addition. Therefore, there is need to transform the State Cotton Industries as the leader in

		<p>manufacturing of Yarn, Fabrics and Garments. Gujarat a leading cotton growing state which growing cotton on about 3.02 million ha producing 11.72 million bales of lint. It stands first for production and productivity amongst cotton growing states of the country. However, 35% of lint is only being utilized by industries for processing into different products.</p> <p>➤ Already, Kadi and Village Industries Commission (KVIC) has been implementing khadi programme through the registered societies. The project involves utilizing technologies developed KVIC by introducing solar power charkha for production of solar spun yarn which is further converted to cloth using handlooms available with the weavers or by setting up new looms. By implementing this project will provide employment opportunities to spinners/ weavers/ local entrepreneurs with remunerative wages.</p>
3	Type of beneficiaries for the schemes	<ul style="list-style-type: none"> - Rural women and youth - Small scale spinners, weavers, local entrepreneurs
4.	Operation modality of the scheme with terms & conditions	<ul style="list-style-type: none"> - Will be operation through registered cooperative societies of cotton in the region. - Preference will be given to unemployed rural youths, weavers and womens. - Modalities of the work plan and its implementations will be based as per KVIC norms (Society registration) Subsidies will be availed for as per norms of KVIC
5	Total requirement of fund for 3 years plan	Rs. 814 lakhs
6	The amount of subsidy under the scheme	
7	Implementing agency proposed	- Registered Cotton Cooperatives societies through KVIC
8.	Physical targets (for 2017-18 to 2019-20)	
9	Proposed financial targets	Appendix A
10.	Requirement of funds under the R.K.V.Y. in (for 2017-18 to 2019-20)	
11	Purpose of budget requirement	Rs. 814 lakhs

Appendix-I

Budgetary provision (Total Financial Break Up)

A. Capital cost required for one village: Rs. In lakhs

Sr. No.	Particulars	Requirements (Nos.)	Approx. Unit Cost (Rs.)	Total cost Rs. In Lakh	Justification
1.	Ginning machine with auto feeder (5 HP motor)	5	400000.00	20.00	For list separation from cotton seed
1	10 Spindle solar charkha	10	15500.00	1.55	For converting cotton fibre to yarn
2	Solar panel system with battery (12v, 40 AH, 5 Hours battery backup)	10	22000.00	2.20	For operating of charkha using solar energy
3	Miscellaneous expenditure	--	--	2.25	Transportation, installation etc. of solar charkha
	Total for equipment			26.00	

No. of approx. villages to be covered : 30

Total capital cost for 30 villages (in lakh Rs.) : 26.00 x 30 = 780.00

B. Break up of annual recurring contingencies (Rs in Lakh)

Sr. No.	Particulars	Quantity per day	Approx. cost (Rs.)	Total cost (Rs.)
1.	Raw materials requirement for spinning cotton to yarn	15 kg	175.00	2625.00
2.	Wages per day for production of 50 Hanks (of 50 counts) in a day @Rs.3.00 per Hank	500 Hanks	3.00	1500.00
3.	Other costs (Charkha maintenance, insurance, depreciation & interest @ Rs.28.00 per charkha)	10	28.00	280.00
	Total			4400.00

Working capital cost for 25 working days in month : 4400.00 x 25 = 110000.00 (11 lakhs)

Table- 6.14 Budgetary Provision for Empowerment of Rural Women and Youth through Cotton Production and Promotion of Solar Charkha, Spinning and Weaving and Garments Manufacture (Total Financial Break Up)

Sr No	Item	2017-18	2018-19	2019-20	Total
1	Equipments	390.00	390.00	0.00	780.00
2	Recurring Contingencies (Foundation for establishment of equipments, renovation, transportation, repair & maintenance, operational cost, energy, fuel charges, etc.)	13.00	11.00	11.00	35.00
	Total	402.00	402.00	11.00	815.00

6.11 Title: Development of Cotton Pickers to Small and Large Holdings (In Partnership with John Deer or Suitable Company)

Sr. No.	Description	Particulars/Remarks
1	Name of the project	Development of cotton pickers to small and large holdings
2	Brief note of the project	<ul style="list-style-type: none"> ➤ At, present cotton in India, whether it is rain fed or irrigated, is entirely handpicked. Manual picking is not only tedious but also costly when compared with other operations in cotton production. Manual picking of cotton requires around 500 labour-hours per hectare. However, in majority of the talukas small holdings are there and urbanization and industrialization leads to severe labour shortage. There is need to develop pneumatic mobile picker machine suited to different kinds of varieties and geometry. ➤ Imported commercial cotton pickers machines have limitations use under the Indian conditions where majority of the farmers are small holders hence alternative designs needs to be develop/ modified which suited to small holdings and varying plant geometry and spacings. ➤ Efforts will be made at Engineering college and private engineering firm.
3	Objectives	<ul style="list-style-type: none"> • Design and develop mobile pickers suited to small holdings • Develop alternative design to varying plant geometry • To develop additional attachment for cleaning trash

	Type of beneficiaries for the schemes	<ul style="list-style-type: none"> Small and large holding cotton growers
4.	Operation modality of the scheme with terms & conditions	Engineering college, JAU, Junagadh in collaboration with private company under the direct supervision of cotton scientists across the state
5	Total requirement of fund for 3 years plan (2017-18 to 2019-20)	As per Appendix I
6	The amount of subsidy under the scheme	Nil
7	Implementing agency proposed	Rastriya Krishi Vikas Yojna
8.	Physical targets (2017-18 to 2019-20)	Development combine cotton pickers and shredder
9	Proposed financial targets	Will be submitted by after approval by engineering college
10.	Requirement of funds under the R.K.V.Y(2017-18 to 2019-20)	Will be submitted by after approval by engineering college
11	Purpose of budget requirement	<ul style="list-style-type: none"> Development of combine cotton pickers and shredder

Table- 6.15 Budget Requirement for Developing Cotton Picker Machine

(Rs. In lakhs)

Particulars	2017-18	2018-19	2019-20	Total
Designing, modification and developing mobile pickers suited to small holdings	25.00	20.00	15.00	60.00
Develop alternative design to varying plant geometry	40.00	25.00	20.00	85.00
Developing additional attachment for cleaning trash	10.00	3.00	2.00	15.00
Other miscellaneous cost (Testing – fuel charges, consultancy charges etc.)	8.00	5.00	3.00	16.00
Total	83.00	53.00	40.00	176.00

6.12 Title: Promotion of Mobile Shredder and Rotavator for Cotton Crop Waste Management in Cotton Fields

Sr. No.	Description	Particulars/Remarks
1	Name of the project	Promotion of mobile shredder and rotavator for cotton crop waste management in cotton fields

2	Brief note of the project	<p>Cotton stalk is treated as an agricultural waste which is available in large quantities. In India about 46 million tones of surplus residue of cotton is generated every year. Most of the stalk produced is treated as waste though a part of it is used as fuel by rural masses. The bulk of the stalk is burnt off in the field after the harvest of the cotton crop which affected the environment through creating pollution. Further, the crop residue harbored pink bollworm infestation lead to carry over in the next season.</p> <p>Looking to the need of cotton growers in Gujarat state, there is dire need to promote use of shredder and rotavator for cotton crop waste/residue management. The use of shredder and rotavator save labour cost and maintain soil health by improving organic content in soil. The promotion should be encouraged through subsidy. We have to start through public private partnership mode i.e. 25% fund contribution from the cotton growers part. The year wise requirement for shredder and rotavator is as under.</p>
3	Objectives	<ul style="list-style-type: none"> • To popularize use of shredder and rotavator among farmers for better cotton crop waste management • Improving the soil health through incorporation of cotton crop waste in field. • To prevent the carryover of the infestation of pest and diseases
	Type of beneficiaries for the schemes	<ul style="list-style-type: none"> • Small and large holding cotton growers
4.	Operation modality of the scheme with terms & conditions	Will be implemented through Rastriya Krishi Vikas Yojna with public private partnership mode i.e. 25% fund contribution from the cotton growers.
5	Total requirement of fund for 3 years plan (2017-18 to 2019-20)	Rs. 900 lakhs (Rs.675 as subsidy) = Rs. 225 lakhs
6	The amount of subsidy under the scheme	@75%
7	Implementing agency proposed	Will be implemented by State Agricultural Departments
8.	Physical targets (2017-18 to 2019-20)	900 cotton growing farmers

9	Proposed financial targets	Rs. 900 lakh /year (Rs.675 as subsidy) = Rs. 225 lakhs/year
10.	Requirement of funds under the R.K.V.Y(2017-18 to 2019-20)	--
11	Purpose of budget requirement	Rs. 675 lakhs (For three year)

Table- 6.16 Budget Requirement for shredder and rotavator

Description	2017-18	2018-19	2019-20	Total
No. of Tractor mounted shredder	300	300	300	900
No. of rotavator required	300	300	300	900
Subsidies@ 75% (Rs. in lakhs)	675	675	675	2025
	225	225	225	675
Total Cost of the Project (Rs. In lakhs for shredder @ 2.0 lakh and rotavator @ 1.0 lakh))				
Subsidized amount (Rs. In lakhs)				2025
Contribution from project (Rs. In lakhs)				675

6.13 Title: Establishment of Value Addition Chain Especially for Small Millets in The Tribal Belt of the Gujarat

Salient features:

1. State level centrally located an apex institute to encourage, monitor and facilitate the research and extension activities in the state for value addition chain especially for small millets.
2. Holistic and multidisciplinary approach for augmenting the value addition chain in small millets under Gujarat State.

Table- 6.17 Strengthening of Infrastructure Facilities under Value Addition Chain of Small Millets.

Sr. No.	Infrastructure	No.	Cost (Rs. in Lakh)
1	Establishment of value addition chain in the Dangs for Nagli / finger millet	15	300
2	Establishment of value addition chain in the Dangs for vari / moreyo /Little Millet	15	600
Total cost			900

Table- 6.18 Physical and Financial Programme Proposed for Infrastructure Development of under Value Addition Chain of Small Millets

Sr. No.	Activity /Projects	2017-18		2018-19		2019-20		Total (Rs. in Lakh)	
		Phy. (units)	Fin	Phy. (units)	Fin	Phy. (units)	Fin	Phy	Fin
1	Establishment of value addition chain in the Dangs for Nagli / finger millet	5	100	5	100	5	100	15	300
2	Establishment of value addition chain in the Dangs for vari / moreyo /Little Millet	5	200	5	200	5	200	15	600
	Total	10	300	10	300	10	300	30	900

6.14 Title: Evaluation of Multipurpose Tree Species under Agroforestry

Systems

The benefits of successful Agroforestry have an economics, environmental and social dimension. In Gujarat, farmers are lacking in information for choosing the suitable combination of agricultural crops and tree species for different agroforestry systems. The tree species viz, *Ardusa (Ailanthus excelsa)*, *Melia* species, eucalyptus, sandal wood, *Acacia mangium*, Teak, etc., and fruit tree species viz., Date Palm (*Phoenix dactylifera*), Citrus, Custard apple, Pomegranate, etc, offer possibilities of providing the timber, food, fodder, and fuel which can cater the basic needs of rural people for their sustenance in the state besides improving and protecting the soil and environment. The tree species can be evaluated under the following heads:-

- (A) Evaluation of Industrial tree species under agroforestry system: - Tree species like *Ardusa*, *Melia*, Teak, *Eucalyptus*, Sandalwood and *Acacia mangium* with different agricultural crops
- (B) Evaluation of fruit tree species under agroforestry system: - fruit trees like Date-palm (*Phoenix dactylifera*), Citrus, Custard apple, Pomegranate with different agricultural crops,

Objective:

- 1.To develops and standardizes the suitable agroforestry systems in the State
2. Multiplication of important tree species under controlled condition (mist chamber) and supply to the farmers
3. Demonstration of technologies and training to the farmers regarding the agroforestry
4. To evaluate the effect of various tree species on soil fertility improvement.

Table- 6.19 Budgetary Requirements Evaluation of Multipurpose Tree Species under Agroforestry Systems (Four projects –each project in South, North, Saurashtra & Kachchh and Madhya Gujarat regions/SAUs Jurisdictions)

Sr. No.	Head	2017-18	2018-19	2019-20	Total Budget (Rs. in Lakh)
A.	Recurring				
1.	Contractual Staff	22.80	22.80	22.80	68.40
2.	POL	8.00	8.00	8.00	24.00
3.	T.A.	4.00	4.00	4.00	12.00
4.	<i>Consumables and contingency</i> (Including operational expenses like procurement of planting materials, labour charges and purchase of Glasswares, chemicals & miscellaneous and Lab maintenance)	36.00	36.00	36.00	108.00
5.	Trainings and demonstrations	-	8.00	8.00	16.00
	Total-A	70.80	78.80	78.80	228.40
B.	Non- recurring				
	NRC	-	258.00	-	258.00
	Total-B	-	258.00	-	258.00
C.	Civil Works				
	Office cum laboratory building	-	400.00	400.00	800.00
	Total-C		400.00	400.00	800.00
	Grand Total	70.80	736.80	478.80	1286.40

Table- 6.20 List of Major Equipments Proposed Evaluation of Multipurpose Tree Species under Agroforestry Systems

Sr. No.	Items	Nos.	Amount (Lakh)
1	Bore well with Pipelines	01	20.00
3	Green House & mist chamber one each	01 + 01	10.00
4	Water tank	01	1.00
5	Jeep with trolley	01	10.00
6	Tractor with accessories	01	10.00
7	Computer desktop with accessories	02	1.50

Sr. No.	Items	Nos.	Amount (Lakh)
8	Micro irrigation system	-	5.00
9	Air conditioner	02	1.00
10	Nursery handling equipments	01	2.00
11	Miscellanies equipments (including laboratory equipments)	-	4.00
Total			64.50

Additional information regarding project

Subject/ component	Forestry/Agroforestry		
Total number of projects proposed in the State	4 (Four projects may be established in South, North, Saurashtra & Kachchh and Madhya Gujarat regions and total outlay of the project is 1286.40 lakhs (Out-lay of individual project is 321.60 lakhs/Scheme)		
Financial split up of each project in the State	Budget details	Grants (Rs. in lakh)	Remarks
	Contractual Services (SRF & Agril. Asstt./ Forest Assistant)	22.80	Per year
	Operational expenses [Recurring contingency including consumable]	36.00	Per year
	Travel and POL	12.00	Per year
	Nonrecurring (Equipment)	64.50	One time or Split into two
	Training/Workshop	8.00	Per year for two financial years
	Civil work-Building	400.00	Per year for two financial years
Working Jurisdictions	Whole Gujarat (each unit may be established at 4 SAUs jurisdiction or South, North, Saurashtra & Kachchh and Madhya Gujarat regions		

6.15 Title: Research and Extension Training Scheme for Development of Forestry/Agroforestry for Food, Nutrition, Environment & Livelihood Security in The State

Objective: To strengthen the forestry activities for creation, conservation, sustainable utilization and management of tree genetic resources in the farmland for food, nutritional, environmental & livelihood security

**Table- 6.21 Budgetary Requirements Research and Extension Training
Scheme for Development of Forestry/Agroforestry**

Sr. No.	Head	1st year (2017-18)	2nd year (2018-19)	3rd year (2019-20)	Total Budget (Rs. in Lakh)
A.	Recurring				
1.	Contractual Services (SRF-1/ Agril. Asst-2 per projects x total 10 projects)	60.00	60.00	60.00	180.00
2.	Recurring contingency including consumable	50.00	50.00	55.00	155.00
3.	Travel and POL	15.00	15.00	15.00	45.00
4.	Training/Workshop	-	-	20.00	20.00
	Total -A	125.00	125.00	150.00	400.00
B.	Non Recurring				
	Non Recurring/ Instrument/ Scientific Equipment	-	100.00	-	100.00
	Total- B	0.00	100.00	0.00	100.00
C.	Grand total (A+B)	125.00	225.00	150.00	500.00

Additional information regarding project

Subject/ component	Forestry/Agroforestry Agroforestry/Silviculture/Tree Improvement/ Tree Genetics & breeding/Forest biotechnology/ Forest Products & Utilization (Timber/NTFP/MAP)/ Forest Resource Economics & Management/Wildlife sciences		
Total number of projects proposed in the State	10 (Ten project and a total outlay of the project is Rs. 500.00 lakhs (Out-lay of individual project is 50 lakhs/Scheme)		
Financial split up of each project in the State	Budget details	Grants (Rs. in lakh)	Remarks
	Contractual Services <ul style="list-style-type: none"> • SRF = 01 • Agril. Asst./ Forest Assistant=02 	6.00	Per year
	Recurring contingency including consumable	5.00	Per year
	Travel and POL	1.50	Per year

	Nonrecurring (Equipment)	10.00	One time
	Training/Workshop	2.00	One time
Working Jurisdictions	Gujarat		

6.16 Title: Establishment of Training Center for Repair and Maintenance of Farm Implements & Machineries in the State

The training center for repair and maintenance of farm implement & machinery and irrigation equipment is proposed to train the local artisans and technicians and maintenance of machineries.

Table- 6.22 Proposal for Establishment of Training Center for Repair and Maintenance of Farm Implement & Machinery and Irrigation Equipment at District Level

Districts	Year-wise Financial Requirement (Phy. - Units Nos., Fin. - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Ahmedabad	1	600	-	100	-	100	1	800
Amreli	1	600	-	100	-	100	1	800
Anand	1	600	-	100	-	100	1	800
Banaskantha	1	600	-	100	-	100	1	800
Bharuch	1	600	-	100	-	100	1	800
Bhavnagar	1	600	-	100	-	100	1	800
Junagadh	1	600	-	100	-	100	1	800
Kachchh	1	600	-	100	-	100	1	800
Mehsana	1	600	-	100	-	100	1	800
Sabarkantha	1	600	-	100	-	100	1	800
Surat	1	600	-	100	-	100	1	800
Vadodara	1	600	-	100	-	100	1	800
Total	12	7200		1200		1200	12	9600

6.17 Title: Vocational Courses Institute for Maintenance and Repairs of Agricultural Implements

At present, mechanization is the prime requirement for agriculture. Various farm implements become popular among the farming communities to challenge the problem of labour crisis. Hence, by providing the training to the rural youth by vocational courses regarding maintenance and repairing of agriculture implements provides employment opportunity and farmers get door step facilities which save the cost & time of farmers.

**Table- 6.23 Financial Requirements for Establishment of Vocational Courses
Institute for Maintenance & Repairing of Farm Implements at District
Level**

Particulars	2017-18	2018-19	2019-20	Total
Office building	400	--	--	400
Hostel building	400	--	--	400
Equipment and furniture	250	120	50	420
Recurring expenditure	40	50	50	140
Total	1090	170	100	1360

(1 unit at district level, Rs. in Lakh)

**6.18 Title: Establishment of Implements / Machinery Testing Centre at
Banaskantha and Vadodara Districts of Gujarat**

**Table- 6.24 Proposal for Establishment of Implements/ Machinery Testing
Centre at Banaskantha and Vadodara Districts of Gujarat**

Description	Year-wise Financial Requirement (Phy. - Units Nos., Fin. - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy	Fin.	Phy.	Fin.
Agricultural implements/ equipments/ machinery Testing centre at district level	2	500	-	100	-	100	2	700

**6.19 Title: Establishment of Special Production Zone for Agricultural
Implements, Equipments, Machinery and Irrigation Equipments at
Porbandar, Banaskantha, Vadodara and Navsari Districts**

It is proposed to establish the special production zone for agricultural implements, equipments, machinery and irrigation equipments at Porbandar district for the production of different machineries, equipments etc. at local level.

**Table- 6.25 Proposal for Establishment of Special Production Zone for
Agricultural Implements, Equipments, Machinery and Irrigation
Equipments at Porbandar, Banaskantha, Vadodara and Navsari
Districts**

Description	Year-wise Financial Requirement (Phy. - Units Nos., Fin. - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Special production zone for agricultural implements, equipments, machinery and irrigation equipments at district level	4	800	4	100	-	100	4	1000

6.20 Title: District Wise Physical and Financial Infrastructure Development**Plan for Soil and Water Management**

The State infrastructure development plan under the Soil and Water Conservation plan consists: Inter linking channels for joining river tail ends along the coastal belt, Minor irrigation schemes in different districts of Gujarat state.

1) Inter linking channels for joining river tail ends along the coastal belt.

The interlinking of rivers to divert the excess runoff running away to sea is proposed through the channels of length of 10 km, width of 5m and depth of 10 m. This will help to prevent the sea water ingress and to improve the groundwater quality. The channel excavation of 10km length is proposed during each year. The excavation charges were taken @273 Rs./cum for the channel excavation to interlink the rivers in the coastal region. Rs. In lakh

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy.	Fin.
1	Ahmedabad	0	0	0	0	0	0	0	0
2	Amreli	1	1365	1	1365	1	1365	3	4095
3	Anand	1	1365	1	1365	1	1365	3	4095
4	Aravalli	0	0	0	0	0	0	0	0
5	Banaskantha	0	0	0	0	0	0	0	0
6	Bharuch	1	1365	1	1365	1	1365	3	4095
7	Bhavnagar	1	1365	1	1365	1	1365	3	4095
8	Botad	1	1365	1	1365	1	1365	3	4095
9	Chhota Udaipur	0	0	0	0	0	0	0	0
10	Dahod	0	0	0	0	0	0	0	0
11	Dang	0	0	0	0	0	0	0	0
12	Devbhoomi Dwarka	1	1365	1	1365	1	1365	3	4095
13	Gandhinagar	0	0	0	0	0	0	0	0
14	Gir Somnath	1	1365	1	1365	1	1365	3	4095
15	Jamnagar	1	1365	1	1365	1	1365	3	4095
16	Junagadh	0	0	0	0	0	0	0	0
17	Kheda	0	0	0	0	0	0	0	0
18	Kutch	2	2730	2	2730	2	2730	6	8190
19	Mahisagar	0	0	0	0	0	0	0	0
20	Mehsana	0	0	0	0	0	0	0	0
21	Morbi	1	1365	1	1365	1	1365	3	4095
22	Narmada	0	0	0	0	0	0	0	0
23	Navsari	1	1365	1	1365	1	1365	3	4095
24	Panchmahal	0	0	0	0	0	0	0	0
25	Patan	0	0	0	0	0	0	0	0
26	Porbandar	1	1365	1	1365	1	1365	3	4095
27	Rajkot	0	0	0	0	0	0	0	0
28	Sabarkantha	0	0	0	0	0	0	0	0
29	Surat	1	1365	1	1365	1	1365	3	4095
30	Surendranagar	0	0	0	0	0	0	0	0
31	Tapi	0	0	0	0	0	0	0	0
32	Vadodara	0	0	0	0	0	0	0	0
33	Valsad	1	1365	1	1365	1	1365	3	4095
		15	20475.00	15	20475.00	15	20475	45	61425

2) Minor irrigation

The minor irrigation projects were proposed for different districts of Gujarat. To harvest the runoff in the river for the irrigation purpose the minor irrigation projects are proposed for the average storage capacity of 3MCM and cost of Rs. 500 lacs per minor project.

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Ph y.	Fin.	Ph y.	Fin.	Ph y.	Fin.	Ph y.	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
1	Ahmedabad	7	3500	7	3500	7	3500	21	10500
2	Amreli	5	2500	5	2500	5	2500	15	7500
3	Anand	3	1500	3	1500	3	1500	9	4500
4	Aravalli	4	2000	4	2000	4	2000	12	6000
5	Banaskantha	14	7000	14	7000	14	7000	42	21000
6	Bharuch	5	2500	5	2500	5	2500	15	7500
7	Bhavnagar	5	2500	5	2500	5	2500	15	7500
8	Botad	2	1000	2	1000	2	1000	6	3000
9	Chhota Udaipur	2	1000	2	1000	2	1000	6	3000
10	Dahod	4	2000	4	2000	4	2000	12	6000
11	Dang	5	2500	5	2500	5	2500	15	7500
12	Devbhoomi Dwarka	3	1500	3	1500	3	1500	9	4500
13	Gandhinagar	2	1000	2	1000	2	1000	6	3000
14	Gir Somnath	4	2000	4	2000	4	2000	12	6000
15	Jamnagar	10	5000	10	5000	10	5000	30	15000
16	Junagadh	5	2500	5	2500	5	2500	15	7500
17	Kheda	4	2000	4	2000	4	2000	12	6000
18	Kutch	21	10500	21	10500	21	10500	63	31500
19	Mahisagar	2	1000	2	1000	2	1000	6	3000
20	Mehsana	4	2000	4	2000	4	2000	12	6000
21	Morbi	5	2500	5	2500	5	2500	15	7500
22	Narmada	4	2000	4	2000	4	2000	12	6000
23	Navsari	6	3000	6	3000	6	3000	18	9000
24	Panchmahal	6	3000	6	3000	6	3000	18	9000
25	Patan	4	2000	4	2000	4	2000	12	6000
26	Porbandar	3	1500	3	1500	3	1500	9	4500
27	Rajkot	9	4500	9	4500	9	4500	27	13500
28	Sabarkantha	4	2000	4	2000	4	2000	12	6000
29	Surat	12	6000	12	6000	12	6000	36	18000
30	Surendranagar	7	3500	7	3500	7	3500	21	10500
31	Tapi	5	2500	5	2500	5	2500	15	7500
32	Vadodara	8	4000	8	4000	8	4000	24	12000
33	Valsad	8	4000	8	4000	8	4000	24	12000
		192	96000	192	96000	192	96000	576	288000

3) Grand total for State Agricultural Infrastructure Development Plan

Sr. No.	District	1 st Year		2 nd Year		3 rd Year		Total	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
		No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh	No.	Rs. In lakh
1	Ahmedabad	7	3500	7	3500	7	3500	21	10500
2	Amreli	6	3865	6	3865	6	3865	18	11595
3	Anand	4	2865	4	2865	4	2865	12	8595
4	Aravalli	4	2000	4	2000	4	2000	12	6000
5	Banaskantha	14	7000	14	7000	14	7000	42	21000
6	Bharuch	6	3865	6	3865	6	3865	18	11595
7	Bhavnagar	6	3865	6	3865	6	3865	18	11595
8	Botad	3	2365	3	2365	3	2365	9	7095
9	Chhota Udaipur	2	1000	2	1000	2	1000	6	3000
10	Dahod	4	2000	4	2000	4	2000	12	6000
11	Dang	5	2500	5	2500	5	2500	15	7500
12	Devbhoomi Dwarka	4	2865	4	2865	4	2865	12	8595
13	Gandhinagar	2	1000	2	1000	2	1000	6	3000
14	Gir Somnath	5	3365	5	3365	5	3365	15	10095
15	Jamnagar	11	6365	11	6365	11	6365	33	19095
16	Junagadh	5	2500	5	2500	5	2500	15	7500
17	Kheda	4	2000	4	2000	4	2000	12	6000
18	Kutch	23	13230	23	13230	23	13230	69	39690
19	Mahisagar	2	1000	2	1000	2	1000	6	3000
20	Mehsana	4	2000	4	2000	4	2000	12	6000
21	Morbi	6	3865	6	3865	6	3865	18	11595
22	Narmada	4	2000	4	2000	4	2000	12	6000
23	Navsari	7	4365	7	4365	7	4365	21	13095
24	Panchmahal	6	3000	6	3000	6	3000	18	9000
25	Patan	4	2000	4	2000	4	2000	12	6000
26	Porbandar	4	2865	4	2865	4	2865	12	8595
27	Rajkot	9	4500	9	4500	9	4500	27	13500
28	Sabarkantha	4	2000	4	2000	4	2000	12	6000
29	Surat	13	7365	13	7365	13	7365	39	22095
30	Surendranagar	7	3500	7	3500	7	3500	21	10500
31	Tapi	5	2500	5	2500	5	2500	15	7500
32	Vadodara	8	4000	8	4000	8	4000	24	12000
33	Valsad	9	5365	9	5365	9	5365	27	16095
		207	11647 5	207	11647 5	207	11647 5	621	34942 5

6.21 Title: Status of Leopard and its Prey Base in Vansda National Park

Background:

Vansda National Park, which was declared as a protected area in April 1979. The National Park covers a small area of 23.99 sq. km. falling in the Vansda taluka of Valsad district of South Gujarat. The terrain is flat to undulating and is drained by the beautiful river

Ambika, which eventually meets the sea near Navsari. As the forest forms continuous tract with the forest of adjoining district of Dangs, the park is managed by South Dangs Forest Division. This forest belongs to the Tropical Moist Deciduous Forests category as per the Champion and Seth's classification of forests and the terrain represents northern and western limits of the Western Ghats. The Vansda National park forms a contiguous tract with the forests of Dangs on its eastern side and those of Valsad district on its southern side. High species diversity of forest birds is the main attraction. 27 species of mammals, 115 species of birds, 49 species of reptiles are recorded in the park. The diversity of flora includes 108 species of trees, 51 shrubs, 64 climbers, 202 herbs and 25 grass species. Important mammals of the park are Leopard (*Panthera pardus*), Rhesus macaque (*Macaca mulatta*), Wild boar (*Sus scrofa*), Hanuman langur (*Cercopithecus entellus*), Common palm civet (*Paradoxurus hermaphrodites*), Small Indian civet (*Viverricula indica*), Indian porcupine (*Hysrix indica*), Four-horned antelope (*Tetracerus quadricornis*), Barking deer (*Muntiacus muntjak*), Hyena (*Hyaena hyaena*), Jungle cat (*Felis chaus*), Flying squirrel (*Funambulus pennantii*) etc.

Objectives:

- (1) To assess the ecological status of the top predator of Vansda National Park (VNP).
- (2) To analyze and extrapolate the population of prey base of the Leopard.
- (3) To estimate the abundance, richness and distribution of ungulates in VNP.
- (4) To study the impact of prey-predator relationship in the surrounding villages of VNP.

Table- 6.26 Budget requirement for Status of Leopard and its Prey Base in Vansda National Park

Sr. No.	Head	1 st Year 2018-19	2 nd year 2019-20	Total (Rs. in Lakh)
A.	Recurring			
1.	Contractual Staff	9.24	9.24	18.48
2.	Travel/POL	3.00	3.00	6.00
3.	Contingency and consumables	2.00	2.00	4.00
5.	Training (if any)	2.00	2.00	4.00
	Total-A	16.24	16.24	32.48
B.	Non- recurring	11.00	0.00	11.00
	Total-B	11.00	0.00	11.00
C.	Grand Total	27.24	16.24	43.48

List of Non-Consumable Items

Sr. No	Item	Rate in INR (Approx)	Quantity	Total in Lakh
1.	Camera trap	30,000	20	6.00
2.	GPS	20,000	5	1.00
3.	Range Finder	25,000	6	1.50
4.	Binoculars	10,000	5	0.50
5.	Computer/Laptop	50,000	1	0.50
6.	SLR Camera	1,50,000	1	1.50
Grand Total				11.00

6.22 Title: Decision Support Systems (DSS) for Agroforestry Systems**Adaptation in South Gujarat****Background Information:**

The state of Gujarat has been the front-runner in the overall economic development of the country. It is fact that, with mere 6% of the geographical area and 5% population of India, it contributes 21% of country's export, 11% of industrial production and 6.42% of the national GDP. Despite of all these, there are tremendous regional disparities exist in the level of socio-economic development. Gujarat has varied agro-ecological regime in the terms of soil, climate, water and rainfall. Agriculture still predominates in the underdeveloped districts of Gujarat. For example, Valsad district is declared as first integrated horticultural districts of India, more than 90% tribal landholders are mainly marginal and small farmers. Similarly, 78% farmers have less than 2 hectares and 22% farmers have 2-4 hectares of landholding in Navsari district. Economic development of the farmers can be achieved through different agricultural interventions. Due to the small and marginal land holding of the region, integrated land use systems *i.e.* *agroforestry* is necessary to increase the production of food, fruits, fodder, fuel and medicines. Different agroforestry systems like Home-garden, Horti – agricultural systems (fruit + agricultural crops), Horti–pastoral system (fruit + pasture) and fast-growing tree plantation on farm bund can be good options for the region. However, the practice of agroforestry systems is not well adopted by the farmers to a satisfactory level. Small and marginal land holding, low economic status and wrong perception about the agroforestry systems are might be the constraints on adoption of agroforestry systems. Hence, it is imperative to prepare a strong database on existing agroforestry systems and promote suitable agroforestry models among the farmers and devised an index for promoting agroforestry systems.

Objectives:

1. To survey and characterise existing agroforestry models through geospatial technology
2. To develop sustainable agricultural production index and its promotion in agroforestry system

4. Budget requirements:

Sr. No.	Head	1 st Year 2018-19	2 nd year 2019-20	Total (Rs. in Lakh)
A.	Recurring			
1.	Contractual Staff (SRF=1 + JRF 1 + Agril. Asst.= 1)	6.20	6.20	12.40
2.	Travel/POL	1.50	1.00	2.50
3.	Contingency and consumables	2.50	3.50	6.00
5.	Training	1.00	1.00	2.00
	Total-A	11.20	11.70	22.90
B.	Non- recurring*			
	Instruments/Software	50.00	0.00	50.00
	Total-B	50.00	0.00	50.00
C.	Grand Total	61.20	11.70	72.90

List of Non-Consumable Items

Sr. No	Item	Rate in INR (Approx)	Quantity	Total in Lakh
1.	Workstation for field documentation and analysis	1.00	01	1.00
2.	Spectro-radiometer for spectral signature	20.00	01	20.00
3.	UAV drone for hyper-spectral image collection	25.00	01	25.00
4.	GIS Software	4.00	01	4.00
Grand Total				50.00

Table- 6.27 Summary table of Development of Forestry and Agroforestry Research and Extension training in Gujarat under SADIP

Projects	2017-18	2018-19	2019-20	Total Budget (Rs. in Lakh)
1. Project for Demonstrations on Agroforestry Technologies in Gujarat State	70.80	736.80	478.80	1286.40

2. Research and extension training scheme for development of Forestry/ Agroforestry for food, nutrition, environment & livelihood security in the State	125.00	225.00	150.00	500.00
3. Status of Leopard and its prey base in Vansda National Park	0.00	27.24	16.24	43.48
4. Decision Support Systems (DSS) for Agroforestry Systems adaptation in South Gujarat	0.00	61.20	11.70	72.90
	195.80	1050.24	656.74	1902.78

6.23 Title: Project for Rain Water Harvesting

Sr. No.	Description	Particulars/Remarks
1	Name of the project	Project for Rain water Harvesting
2	Brief note of the project	<p>Water becomes a very precious resource for sustainable production of rainfed cotton. In Gujarat about 31.4% area is rainfed (unirrigated). Cotton lint yield under unirrigated condition is almost 35% less than yield obtained under irrigated condition. Although, total rainfall in cotton growing regions in the Gujarat is quite favourable, the time of occurrence of rainfall and its distribution play a crucial role in successful rainfed crop production.</p> <p>Scarcity of rainfall could be managed by adopting rain water harvesting technologies. The excess runoff water can be harvested from different toposequences and stored in the water harvesting pond for providing irrigation for cotton and cotton-based crops at critical stages.</p>
3	Objectives	<ul style="list-style-type: none"> To harvest excess rain water runoff for providing critical irrigation for cotton crop. To improve the cotton lint yield under rainfed situation
	Type of beneficiaries for the schemes	<ul style="list-style-type: none"> Small and large holding cotton growers
4.	Operation modality of the scheme with terms & conditions	Will be implemented by State Agricultural Departments
5	Total requirement of fund for 3 years plan (2017-18 to 2019-20)	As per Appendix I
6	The amount of subsidy under the scheme	--
7	Implementing agency proposed	State Agricultural Departments, Government of Gujarat
8.	Physical targets (2017-18 to 2019-20)	600 cotton growing farmers

9	Proposed financial targets	Rs. 600 lakhs
10.	Requirement of funds under the R.K.V.Y (2017-18 to 2019-20)	--
11	Purpose of budget requirement	Rs. 600 lakhs

Table- 6.28 Year wise Budget Required to make Recharging Structures

Component	2017-18	2018-19	2019-20	Total
Structures to be made	100	100	100	300
Budget required (in lakhs)	200	200	200	600

6.24 Title: Vegetable Grafting to Mitigate Abiotic and Biotic Stresses in**Vegetable Crops**

Sr . No	Description	Particulars/ Remarks
1.	a. Project Proposed by	Department of Vegetable Science, ASPEE College of Horticulture & Forestry, Navsari Agricultural University , Navsari- 396 450 (Gujarat)
	b. Name of concern HOD	Dr. B.N Patel , Principal & Dean, ASPEE College of Horticulture & Forestry, Navsari Agricultural University , Navsari
2.	Name of new project	Vegetable grafting to mitigate abiotic and biotic stresses in vegetable crops.
3.	Nature of the project	Agricultural Research Infrastructure Development
4.	Context/ Background of the project	<p>Vegetables are important components of Indian Agriculture in view of their productivity, diversification, nutritive and medicinal values, value addition and export. However, vegetables are highly sensitive to climatic vagaries and sudden irregularities in weather factors at any phase of crop growth can affect the normal growth, flowering, fruit development and subsequently the yield. There is also a great interest in reconciling maximum yield with optimization of resource use efficiency through careful monitoring of environmental parameters and the improvement of cultivation techniques. In view of the globalization of international market, tremendous boost and fillip is being observed for export of agricultural produce, so there has been a spurt in the demand for quality produce.</p> <p>Among various environmental stresses, soil salinity has become a critical problem worldwide due to its dramatic effects on plant physiology and performance of various crops. This is owing to inappropriate management of irrigation and drainage, low precipitation, high evaporation and irrigation with saline waters. It</p>

	<p>has been estimated that Gujarat alone accounts for 2.2 m ha of salt affected soils constituting 32.94% of the country as a whole. Climate has undergone significant changes showing increasing trends in annual temperature with an average of 0.56°C rise over last 100 years. A rise in global temperature causes melting of glacier and ice-cap along with thermal expansion of water. The changing pattern of climatic parameters like rise in temperature, changes in precipitation patterns, excess UV radiation, higher incidence of extreme weather like droughts and floods are posing major threats for successful vegetable production.</p> <p>Under changing climate scenario, drought is one of the most common abiotic stresses that affects plant development and growth and has become the primary cause for reductions in crop productivity. Drought is reported to disturb physiological, biochemical and metabolic processes, leading to alterations in anatomical structures, growth inhibition and consequently yield reduction. Now-a-days, flooding has also emerged as a one of the major threat for vegetable production.</p> <p>Simultaneously, biotic stresses due to soil borne pathogens are also threatening vegetable cultivation not only in open but in protected culture also. Wilt, root rot, nematodes etc. are some of the major soil-borne challenges for successful cultivation of vegetable crops. Chemical methods widely being used to manage such problems are costlier and poses environmental and health hazard.</p> <p>Grafting in vegetable crops has emerged as a promising surgical alternative over relatively slow conventional breeding methods aimed at increasing tolerance to biotic and abiotic stresses, which is also ecofriendly technique to manage these problems. To mitigate the adverse impact of climate change on productivity and quality of vegetables crops, grafting is proposed to serve as a climate resilient technology because of its ability to provide tolerance to salinity, drought, flood, thermal stress, heavy metal toxicity, diseases and pests. There are many important considerations governing the success of grafts <i>viz.</i>, selection of potential rootstocks, compatibility between rootstock and scion, efficient grafting methodology <i>etc.</i> Grafting undergoes five different stages for successful union formation, for which it requires specificity for temperature and humidity conditions. The success of any research activity is largely realized in the adoption pattern and acceptance pattern among beneficiaries. So, commercial accomplishment of any research programme needs more sophisticated environment to transfer it from farm to farmers on large scale.</p>
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5.	a. Problems to be addressed by this project	Soil Salinity, Flooding, Drought, wilt, root rot and nematodes.
	b. Mention baseline data/ survey/ reports etc. pertaining to area of the projects	Under current situation, vegetables are undergoing a major threat of both the extremes of water stress like flooding and drought to its production system owing to climate change. Soil salinity has become a critical problem worldwide due to its dramatic effects on plant physiology and performance of various crops. This is owing to inappropriate management of irrigation and drainage, low precipitation, high evaporation and irrigation with saline waters. It has been estimated that Gujarat alone accounts for 2.2 m ha of salt affected soils constituting 32.94% of the country as a whole. Amongst biotic stresses, wilt, root rot, nematodes etc. have become serious problems causing significant reduction in plant stand and yield. Similarly, most of the farmers are practicing protected cultivation of vegetable crops on soil-media leading to aggravation of soil-borne problems particularly nematodes over the period of time. Owing to such circumstances, farmers are losing interest in protected cultivation in many parts of the state as well as nation. Vegetable grafting is a promising surgical alternative over relatively slow conventional breeding approaches aimed at providing tolerance/ resistance to biotic and abiotic stresses. Identification of potential rootstocks and their utilization to impart resistance/ tolerance against abiotic and biotic stresses through grafting needs concerted research efforts to accomplish the research activity and commercialize this technology.
6.	a. Aims of the project	To commercialize vegetable grafting as potential technique to manage abiotic and biotic stresses.
	b. Objectives of the project	<ol style="list-style-type: none"> 1. To screen and identify potential rootstocks against abiotic and biotic stresses in vegetable crops. 2. To use resistant/tolerant rootstocks for commercial production of vegetable grafts. 3. To impart training and develop entrepreneurship among greenhouse vegetable growers and students as well as youth. 4. To generate an additional income by sale of grafts of important greenhouse vegetable crops.
	c. Outputs/ Deliverables expected for each development objective	<ol style="list-style-type: none"> 1. Collection, screening and identification of resistant / tolerant rootstocks. 2. a. Evaluation of vegetable grafts for resistance/ tolerance to abiotic and biotic stresses. b. Commercial production of potential vegetable grafts.

		<p>3. Skill development in farmers and students on vegetable grafting through training.</p> <p>4. Use of grafting robot/machine for commercial production of vegetable grafts and income generation thereof.</p>
7.	a. Strategy of the Project	<p>Objective-wise Work plan for the proposed project:</p> <p>Objective 1. To screen and identify potential rootstocks against abiotic and biotic stresses in vegetable crops.</p> <p>Work Plan:</p> <p>a) Collection of rootstocks for Solanaceous and Cucurbitaceous Vegetable Crops.</p> <p>b) Establishment of sick plots, mist chamber and other necessary facilities for screening of collected rootstocks.</p> <p>c) Evaluation of collected rootstocks against abiotic and biotic stresses identification of potential rootstocks thereof.</p> <p>Objective 2. To use resistant/tolerant rootstocks for commercial production of vegetable grafts.</p> <p>a) Preparation of vegetable grafts using resistant/tolerant rootstocks.</p> <p>b) Screening of vegetable grafts against abiotic and biotic stresses.</p> <p>c) Commercial production of resistant/tolerant vegetable grafts for distribution among vegetable growers.</p> <p>Objective 3. To impart training and develop entrepreneurship among vegetable growers and students.</p> <p>a) Imparting skill development training to B.Sc. (Hort.) students on various aspects components of vegetable grafting under existing academic curriculum. "HWE 7.2 Protected Cultivation of Hi-Valued Vegetable Crops"</p> <p>b) Organizing training programme for vegetable growers on home scale and commercial production of vegetable grafts.</p> <p>Objective 4. To generate an additional income to the organization by sale of grafts of important vegetable crops.</p> <p>a) The income so generated during the period of execution of project will be credited to 'University Fund', which can further be utilized for running of project after completion of stipulated period of the project.</p>

<p>b. Reasons for selecting the proposed strategy</p>	<p>Vegetables are nutritionally rich, often referred as 'Protective food' and remunerative enough to replace subsistence farming. Vegetable crops are very sensitive to climatic vagaries, so fluctuation in climatic parameters at any phase of crop growth can affect the normal growth, flowering, fruit development and subsequently the yield. Soil salinity has become a critical problem worldwide due to its dramatic effects on plant physiology and performance of various crops. Gujarat alone accounts for 2.2 m ha of salt affected soils constituting 32.94% of the country as a whole. The changing pattern of climatic parameters like rise in temperature, changes in precipitation patterns, excess UV radiation, higher incidence of extreme weather like droughts and floods are posing major threats for successful vegetable production. Wilts, root rots, nematodes etc. are some of the major soil-borne challenges for successful cultivation of vegetable crops. Chemical methods widely being used to manage such problems are costlier and poses environmental hazard. Protected cultivation is one of the new age technologies for the production of high valued vegetable crops almost all the year round with increased productivity by 25-100% as well as irrigation water conservation by 25-50%. Protected cultivation offers itself as alternate farming with much higher carrying capacity. Currently most of the greenhouse growers are cultivating vegetables on soil based media, thus facing lot of problems due to soil borne pathogens.</p> <p>In this regard, it is imperative to find out a valid and effective technology to tackle such problems. "Vegetable Grafting" promises to be an effective alternative tool over slow conventional breeding methods against various biotic and abiotic stresses. Grafting not only provides vigour to the plant but also provides tolerance against adverse environmental conditions and soil-borne pathogens. It also improves resource uptake capacity of plant and increases its resource use efficiency. Grafting is also proposed to serve as a climate resilient technology because of its ability to provide tolerance to salinity, drought, flood, thermal stress, heavy metal toxicity, diseases and pests. Various potential rootstocks in Solanaceous and Cucurbitaceous vegetable crops already governing tolerance/ resistance to soil borne pathogens require region specific assessment for their performance.</p>
<p>c. Basis for prioritization of locations should be indicated</p>	<p>All the seven districts namely Navsari, Surat, Valsad, Bharuch, Tapi, Dangs and Narmada under Navsari Agricultural University, Navsari jurisdiction have been selected as number of protected structures available in these districts at present can easily be covered under the proposed research.</p>

	d. Provide a description of the ongoing initiatives and the manner in Which duplication can be avoided and synergy created with the proposed project	Ongoing research efforts by the Department of Vegetable Science, ASPEEE College of Horticulture & Forestry, NAU, Navsari are being concentrated upon imparting resistance/ tolerance against abiotic stresses particularly flooding/ submerged conditions through vegetable grafting. Only one component of abiotic stress i.e. submerged conditions is being dealt with using few rootstocks in brinjal and tomato only.
8.	a. Target beneficiaries for the projects	Vegetable Growers of all seven districts under NAU Jurisdiction. Depending upon the production of vegetable grafts, these will also be provided to others farmers of state and if possible to the farmers of state also.
	b. Stakeholder analysis including consultation with stakeholders at the time of scheme/ project formulation	NA
	c. Impact of the project on weaker sections of society, positive or negative, should be assessed and remedial steps suggest in case of any adverse impact	Impact of the vegetable grafting will be studied upon supplying of vegetable grafts to such sections of the society.
9.	Area of the project:	Vegetable Cultivation.
10.	Benefit of proposed new technology in the new project	Vegetable Grafting is an emerging trend in vegetable crop production system which has ability to provide benefits over various technologies: 1. It is comparatively fast method of transferring resistance/ tolerance from wild relatives to cultivated ones, which are otherwise cross-incompatible with cultivated types. 2. It is proposed to serve as a climate resilient technology because of its ability to provide tolerance to salinity, drought, flood, thermal stress, heavy metal toxicity, diseases and pests.

		3. It is better alternative over chemical control for soil-borne pathogens.
11.	a. Project management	<p>1. Nodal officer: Dr. S.R. Chaudhary, Director of Research & Dean PG Studies, Navsari Agricultural University, Navsari (Gujarat)- 396 450</p> <p>2. Project Investigator: Dr. Sanjeev Kumar, Assistant Professor, Department of Vegetable Science, ASPEE College of Horticulture & Forestry, NAU, Navsari.</p> <p>3. Project Co- Investigators:</p> <p>a) Dr. P.R. Patel, Associate Professor, Department of Plant Pathology, ASPEE College of Horticulture & Forestry, NAU, Navsari</p> <p>b) Dr. N.B. Patel, Associate Professor, Department of Vegetable Science, ASPEE College of Horticulture & Forestry, NAU, Navsari.</p> <p>c) Mr. Kirti Bardhan, Assistant Professor (Plant Physiology), ASPEE College of Horticulture & Forestry, NAU, Navsari.</p> <p>d) Dr. A.R. Kaswala, Associate Professor (Soil Sci. & Agril. Chemistry), ASPEE College of Horticulture & Forestry, NAU, Navsari.</p>
	b. Responsibilities of different agencies for project management	Collaboration between Department of Vegetable, Department of Plant Pathology, Physiology and Soil Science, ASPEE College of Horticulture & Forestry, NAU, Navsari for implementation of the project.
	c. The organization structure at various levels	<ol style="list-style-type: none"> 1. Vice- Chancellor of the University 2. Director of Research & Dean PG Studies, NAU, Navsari 3. Principal and Dean of the college 4. Head of the Department of Vegetable Science 5. Investigators (PIs & Co-PIs)
	d. Human resource requirements	Senior Research Fellow: 01
	e. Monitoring arrangements	As per the guidelines of RKVY
	f. In case of projects proposed to be taken up under PPP mode, guidelines clearly defining the role of the partners, their financial liabilities and sharing of	NA

	profit/ revenue, generated, management responsibilities , etc. to have to be worked out and to be mentioned here.																												
12.	a. Finance	RKVY																											
	b. Cost estimates, means of financing and phasing of expenditure. Cost of the projects- Investment to be made by entrepreneur in the project. The amount of subsidy under the project, if any. Requirement of fund under RKVY for the year	<table border="1"> <thead> <tr> <th>SN</th> <th>Year</th> <th>Total Cost (Rs. in lakh)</th> <th>Agency share</th> <th>Beneficiaries share</th> <th>RKVY share</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>2018- 19</td> <td>160.51</td> <td rowspan="4">Technical Staff</td> <td>NA</td> <td>100%</td> </tr> <tr> <td>2.</td> <td>2019- 20</td> <td>16.44</td> <td>NA</td> <td>100%</td> </tr> <tr> <td>3.</td> <td>2020- 21</td> <td>19.05</td> <td>NA</td> <td>100%</td> </tr> <tr> <td colspan="2">Total</td> <td>196.00</td> <td></td> <td></td> </tr> </tbody> </table>	SN	Year	Total Cost (Rs. in lakh)	Agency share	Beneficiaries share	RKVY share	1.	2018- 19	160.51	Technical Staff	NA	100%	2.	2019- 20	16.44	NA	100%	3.	2020- 21	19.05	NA	100%	Total		196.00		
SN	Year	Total Cost (Rs. in lakh)	Agency share	Beneficiaries share	RKVY share																								
1.	2018- 19	160.51	Technical Staff	NA	100%																								
2.	2019- 20	16.44		NA	100%																								
3.	2020- 21	19.05		NA	100%																								
Total		196.00																											
	c. Budget for the scheme/ project	196.00 Lakh																											
	d. Source of funding	RKVY																											
	e. Options for cost sharing and cost recovery (user charges) should be explored	NA																											
	f. Issues relating to project sustainability, including stakeholder commitment, operation-	Assets to be created under the project will be maintained by Implementing Agency- Navsari Agricultural University, Navsari.																											

	maintenance of assets after project completion and other related issues should also be addressed			
13.	Physical and financial target (Component wise)	Year	Physical (Nos.)	Financial (Rs. in Lakh)
		2018-19	<ol style="list-style-type: none"> 1. Net house of 1000 m² (Rs. 800/m²): 8.00 Lakh 2. Net house of 500 m² (Rs. 800/m²): 4.00 Lakh 3. Naturally ventilated Polyhouse of 1000 m² (Rs. 1000/m²): 10.00 Lakh 4. Naturally ventilated Polyhouse of 500 m² (Rs. 1000/m²): 5.00 Lakh 5. Naturally ventilated Polyhouse of 1000 m² with sick plots for nematodes (Rs. 2500/m²): 25.00 Lakh 6. Mist chamber (Polycarbonate) of 500 m² (rate Rs. 4000/m²): 20.00 Lakh 7. Planting material, Rootstocks, Manures, fertilizers, pesticides, media, Cocopeat, grafting clips, etc. : 3.00 Lakh 8. Chemicals: 0.50 Lakh 9. Glass Wares: 0.50 Lakh 10. Labour charges: 4.27 Lakh 11. Contractual services (Senior Research Fellow: 01, Agril. Assistant (Skilled Labour: 01 & 	160.51

		<p>Computer Operator: 01 : 4.84 Lakh</p> <p>12. TA/DA for Scientists and contractual staff: 0.50 Lakh</p> <p>13. Miscellaneous: 0.50 Lakh</p> <p>14. RO System (2000 lit/hr capacity): 5.00 Lakh</p> <p>15. Pre Fabricated Cabin for 2000 L capacity RO plant without base (1 No.): 2.00 Lakh</p> <p>16. Computer system with accessories (1No.): 1.00 Lakh</p> <p>17. Grafting Machine: 50.00 Lakh</p> <p>18. Pre Fabricated Cabin for Grafting Machine: 2.00 Lakh</p> <p>19. Handy cam (1No.): 1.00 Lakh</p> <p>20. LCD Projector (1No.): 1.00 Lakh</p> <p>21. Stereo zoom binocular microscope: 1.00 Lakh</p> <p>22. Refrigerator (1No.): 0.50 Lakh</p> <p>23. Neutron Probe instrument : 2.00 Lakh</p> <p>24. Pressure Chamber: 5.00 Lakh</p> <p>25. Oven: 1.0 Lakh</p> <p>26. Autoclave: 1.00 Lakh</p> <p>27. Infra Red Gun for Canopy Temperature: 0.10 Lakh</p> <p>28. EC meter: 0.50 Lakh</p> <p>29. pH meter: 0.50 Lakh</p> <p>30. Flame photometer: 0.80 Lakh</p>	
	2019-20	1. Planting material, Rootstocks, Manures, fertilizers, pesticides,	16.44

			media, Cocopeat, grafting clips, etc: 2.00 Lakh 2. Chemicals: 0.50 Lakh 3. Labour charges: 4.70 Lakh 4. Contractual services (Senior Research Fellow: 01, Agril. Assistant (Skilled Labour: 01 & Computer Operator: 01: 4.99 Lakh 5. Training: 3.00 Lakh 6. TA/DA for Scientists and contractual staff: 0.50 Lakh 7. Miscellaneous: 0.75 Lakh	
		2020-21	1. Planting material, Rootstocks, Manures, fertilizers, pesticides, media, Cocopeat, grafting clips, etc: 2.00 Lakh 2. Chemicals: 0.50 Lakh 3. Labour charges: 5.17 Lakh 4. Contractual services (Senior Research Fellow: 01, Agril. Assistant (Skilled Labour: 01 & Computer Operator: 01: 5.56 Lakh 5. Training: 3.00 Lakh 6. TA/DA for Scientists and contractual staff: 0.50 Lakh 7. Miscellaneous: 2.32 Lakh	19.05
			Total	196.00
14.	a. A time Frame: work plan for implementation of project			
			2018-19	2019-20
			1. Creation of infrastructure facilities.	1. Collection, screening and identification of
				2020-21
			1. Collection, screening and identification of	

		<p>2. Recruitment of Contractual staff</p> <p>3. Collection, screening and identification of resistant/ tolerant rootstocks.</p> <p>4. Evaluation of vegetable grafts.</p> <p>5. Production and supply of Vegetable grafts using potential rootstocks.</p>	<p>resistant/ tolerant rootstocks.</p> <p>2. Evaluation of vegetable grafts.</p> <p>3. Production and supply of Vegetable grafts using potential rootstocks.</p> <p>4. Organizing skill development trainings to farmers as well as students.</p>	<p>resistant/ tolerant rootstocks.</p> <p>2. Evaluation of vegetable grafts.</p> <p>3. Production and supply of Vegetable grafts using potential rootstocks.</p> <p>4. Organizing skill development trainings to farmers as well as students.</p>
	b. Project evaluation Review Technique (PERT)/ Critical Path Method (CPM) for implementation of Project	As per the guidelines of RKVY		
15.	a. Risk analysis of the project	Being an eco-friendly approach to manage abiotic and biotic stresses, vegetable grafting doesn't involve any risk to social, environment etc.		
	b. Legal /Contractual risks	Nil		
	c. Environmental risk	Nil		
	d. Revenue risks	Nil		
	e. Project management risks	The work of proposed project will be managed by a team of PI and Co-PIs. In case of transfer of any of the scientific staff, appropriate arrangements to induct suitable scientist from concerned department will be made.		
	f. Regulatory risks			
16.	a. Outcomes	<p>a) Supply of vegetable grafts resistant/ tolerant to abiotic and biotic stresses amongst vegetable growers will definitely ensure better production.</p> <p>b) Development of domain skill in vegetable growers leading to home scale as well commercial production of vegetable grafts.</p>		

		c) Skill development and hands on training to B.Sc. (Hort.) students with an objective of generation of self-employment and entrepreneurship.																											
	b. Deliverables / outcomes should also be specified in measurable terms	1. Supply of vegetable grafts resistant/tolerant to abiotic and biotic stresses. 2. Skill development in students and vegetable growers (Approx. 25 Nos. per year) from 2 nd year onward i.e. 2019-20.																											
	c. Impact assessment	Impact assessment of the project will be done as per the guidelines.																											
17.	Cost Benefit Analysis: benefit/ Impact of the project for infrastructure or where ever applicable	<table border="1"> <thead> <tr> <th rowspan="2">Particular</th> <th colspan="2">2018-19</th> <th colspan="2">2019-20</th> <th colspan="2">2020-21</th> </tr> <tr> <th>Nos.</th> <th>Income (Rs. in Lakhs)</th> <th>Nos.</th> <th>Income (Rs. in Lakhs)</th> <th>Nos.</th> <th>Income (Rs. in Lakhs)</th> </tr> </thead> <tbody> <tr> <td>Vegetable Grafts</td> <td>0.5 Lakh</td> <td>2.50</td> <td>1.5 lakh</td> <td>7.50</td> <td>2.0 lakh</td> <td>10.0</td> </tr> <tr> <td colspan="7">Generation of Skilled Manpower</td> </tr> </tbody> </table>	Particular	2018-19		2019-20		2020-21		Nos.	Income (Rs. in Lakhs)	Nos.	Income (Rs. in Lakhs)	Nos.	Income (Rs. in Lakhs)	Vegetable Grafts	0.5 Lakh	2.50	1.5 lakh	7.50	2.0 lakh	10.0	Generation of Skilled Manpower						
Particular	2018-19			2019-20		2020-21																							
	Nos.	Income (Rs. in Lakhs)	Nos.	Income (Rs. in Lakhs)	Nos.	Income (Rs. in Lakhs)																							
Vegetable Grafts	0.5 Lakh	2.50	1.5 lakh	7.50	2.0 lakh	10.0																							
Generation of Skilled Manpower																													
18.	Whether the project has been included in DAPs/ SAPs? Yes/ No. Please mention the name of district and Page No.	Yes, It will be discussed in upcoming meetings of DAPs and SAPs at GoG level.																											
19.	Whether the project has been approved in DLPC? Yes/ No. If Yes, Please sent the copy of DLPC approved letter	No																											
20.	a. Evaluation	Objective wise evaluation of the project will be done.																											
	b. Whether concurrent evaluation is part of the project? Mention the details	Yes. Concurrent evaluation of the project will carried as per the guidelines of RKVY.																											
	c. Whether post project evaluation is part of the project?	Yes. Post project evaluation will be done monitoring team of implementing agency (Navsari Agricultural University, Navsari)																											

	Mentioned the details	
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6.25 Title: Strengthening of Existing Goat / Sheep Farms (State Government and University Farms):

Objective:

Strengthening of existing Goat / Sheep Farms (State Government and University Farms). There are three existing Surati and Mehsani goat farms at AAU, Anand, NAU, Navsari and SDAU, S.K.Nagar respectively and five government farm viz., three for goats and two for sheep respectively. It is proposed to give Rs. 10.0 Lakh each farm for three years (Total Rs. 240.0 Lakh) to meet with the increasing expenditure in recurring contingency.

Table- 6.29 Year-wise Physical Requirement for Strengthening of existing Goat /Sheep Farms

Sr. No.	Details	1 st Year	2 nd Year	3 rd Year	Cost (Rs. in Lakh)
1	Strengthening of existing Goat / Sheep Farms @ Rs, 30.0 Lakh per farm x 8 farms 1. AAU, Ram Na Muwada, Surti Goat 2. NAU, Navsari, Surti Goat 3. SDAU, S.K.Nagar Mehasani Goat 4. AH Dept. Naliya, Kutchhi Goat 5. AH Dept. Morbi Gohilwadi Goat 6. AH Dept. Kondh, Bharuch, Surti Goat 7. AH Dept. Morbi, Patanwadi Sheep 8. AH Dept. Morbi, Marwari Sheep	80.0	80.0	80.0	240.0
Total		80.0	80.0	80.0	240.0

6.26 Title: Establishment of Elite Buck / Ram Mother Farms for Various Breeds of Goats / Sheep

Objective:

To establish Elite Buck / Ram Mother Farms for various breeds of goats / sheep. So that pure bred Buck / Ram can be provided for community breeding at rural level for grading up of non-descript goat and sheep. For this purpose it is proposed that Rs. 400 Lakh for each year for each farm (Total Rs. 1200 Lakh.) (viz., Kachchhi, zalavadi, Marwadi and Gohilwadi goat farm) can be given to strengthen breeding activities and supply of elite bucks/rams for community breeding at rural level.

Table- 6.30 Year-wise Physical Requirement for Establishment of Elite Buck / Ram Mother Farm one for each breed

Sr. No.	Details	1 st Year	2 nd Year	3 rd Year	Cost (Rs. in Lakh)
1	Establishment of Elite Buck / Ram Mother Farm one for each breed @ Rs. 300.0 Lakh per farm x 4 farms 1. Kutchhi Goat 2. Zalawadi Goat 3. Marwari Goat 4. Gohilwadi Goat	400.0	400.0	400.0	1200.0
Total		400.0	400.0	400.0	1200.0

6.27 Title: Establishment of New Sheep and Goat Conservation Farms in Gujarat

Objective:

To establish new Sheep and Goat Conservation Farms in Gujarat: To conserve and develop threatened breeds of sheep or goat like Surti, it is proposed to establish new farm. Financial requirements for the same will be as follows:

Table- 6.31 Financial Statement for Establishment of New Sheep and Goat Conservation Farms in Gujarat

Sr. No.	Details	1 st Year	2 nd Year	3 rd Year	Rs. in Lakh.
i	Establishment of new Sheep and Goat conservation farms @ Rs. 300.0 Lakh per farm x 3 farms	300.0	300.0	300.0	900.0
Total		300.0	300.0	300.0	900.0

6.28 Title: Establishment of New Sheep and Goat Feed Manufacturing Factories

Objective:

To establish new Sheep and Goat feed manufacturing factories: For better growth, reproduction and production in sheep and goat, compound concentrate mixture/ ration is very much needed. Therefore it is proposed to establish two feed manufacturing factories initially. Rs. 500.0 lakh for each factory (total 1000.0 lakh) is proposed as an establish expenditure. Later on they will function by their own income and profit.

Table- 6.32 Year-wise Financial Requirement for Establishment of New Sheep

and Goat Feed Manufacturing Factory

Sr. No.	Details	1 st Year	2 nd Year	3 rd Year	Rs. in Lakh.
F	Establishment of new Sheep and Goat feed manufacturing factory @ Rs. 500.0 Lakh per factory x 2 Factory	400.0	400.0	200.0	1000.0
	Total	400.0	400.0	200.0	1000.0

6.29 Title: Strengthening of Existing Market Yards / Ghenta-Bakra Mandies for Small Ruminants**Objective:**

To Strengthen / Renovation of existing market yards / *Ghenta-Bakra Mandies* for small ruminants. For small ruminant owners it is very much necessary to provide marketing facilities for purchase and sale of their animals. In many area traditional existence of *Ghenta-Bakra Mandies* are there but they require improvement in facilities and renovations. Rs. 20.0 lakh for five such *Mandies* in three year (total Rs. 100.0 lakh) are proposed.

Table- 6.33 Financial Requirement for Strengthening / Renovation of Existing Ghenta- Bakra Mandies

Sr. No.	Details	1 st Year	2 nd Year	3 rd Year	Cost (Rs. in Lakh)
1	Strengthening / Renovation of existing <i>Ghenta-Bakra Mandies</i> @ Rs. 20.0 Lakh x 5 <i>Mandies</i>	40.0	40.0	20.0	100.0
	Total	40.0	40.0	20.0	100.0

6.30 Title: Establishment of Sheep and Goat Mobile Clinics (Van)**Objective:**

- Sheep and goat flocks and their owners are nomadic and migratory. To provide better health care and to prevent outbreak of diseases care must be taken. Sheep and Goat Mobile Clinics (van) need to be created especially for regular deworming and vaccination at interior villages where the treatment facilities are lacking. For this purpose at least 10 vans are required at different places. Rs. 20 lakh for each van for three years are proposed (Total Rs. 200.0 lakh).
- For Migratory shepherds on their migratory route, facility for round the clock watering (water troughs) should be provided at gram *panchayat* level.

- Establishment of feed and fodder banks for sheep and goat during scarcity
- Extension work needs to be done intensively by publishing literature in *vernacular* language.

Table- 6.34 Year-wise Financial Requirement for Sheep and Goat Mobile Clinics (Van)

Sr. No.	Details	1 st Year	2 nd Year	3 rd Year	Cost (Rs. in Lakh)
1	Sheep and Goat Mobile Clinics (van) @ Rs. 20. Lakh x 10 Units	75.0	75.0	50.0	200.0
Total		75.0	75.0	50.0	200.0

6.31 Title: To Create Research Facilities for Study of Medicinal (*Aurvedic*) Properties of Goat Milk

Objective:

To carried out research work through *Aurvedic* college or Dairy Sci. College; with regards to find out medicinal properties of Goat milk if any; and its applications to cure certain diseases.

Table- 6.35 Year-wise Financial Requirement for Create Research Facilities for Study of Medicinal (*Aurvedic*) Properties of Goat Milk

Sr. No.	Details	1 st Year	2 nd Year	3 rd Year	Cost (Rs. in Lakh)
1	To create research facilities for study of Medicinal (<i>Aurvedic</i>) properties of Goat milk	40.0	40.0	20.0	100.0
Total		40.0	40.0	20.0	100.0

6.32 Title: Establishment of Feed and Fodder Banks for Sheep and Goat

During scarcity there is shortage of feed and fodder for sheep and goat. However, there is no such provision of *godowns* / fodder depots from where the farmers can get dry feed and fodder. Hence, it is proposed to build *godowns* / fodder depots at certain districts to cater the need

Table- 6.36 District wise proposal for construction of Feed Fodder Depot / Godowns (400 Sq. Mt., @ Rs. 18000 per Sq. M.):

Sr. No.	Distr.	Details	2017-18	2018-19	2019-20	Total	Rs. Lakh.
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A	Total for the JAU region	No. of Godowns	5	--	--	5	--
		Total expense (Lakh)	360				360
B	Total for the NAU region	No. of Godowns	4	--	--	4	--
		Total expense (Lakh)	288				288
C	Total for the SDAU region	No. of Godowns	5	--	--	5	--
		Total expense (Lakh)	360				360
D	Total for the AAU region		4	--	--	4	--
		Total expense (Lakh)	288				288
Overall	TOTAL for Gujarat	Number of Godowns	18	--	--	18	--
		Total expense (Lakh)	1296				1296

6.33 Title: Establishment of Regional Rabbit Farms

Since the rabbit is an important source of animal protein and helpful to prevent malnutrition and also capable to provide source of income for landless labourers and marginal farmers especially in tribal area. It is also important laboratory animal for pharmaceutical and medicinal research purpose. Hence rabbit rearing will be beneficial entrepreneurship for poor farmers. These farms will have 100 female and 20 male rabbits as parent stock. These farms will act as demonstration - cum - training - cum - supply centres for that particular region. Presently Oneday training programs are proposed.

Objective: To establish Regional Rabbit Farms at all four agricultural universities to act as demonstrate - cum - training - cum - supply centres at veterinary college campuses.

Table- 6.37 Establishment of Regional Rabbit Farms

Sr. No.	Regional Rabbit Farms	Number of Animals	Rabbitry Units	Financial Rs. In Lakh @ 0.45 lakh / Rabbitry unit

1	South Gujarat (NAU, Navsari)	100 Female + 20 Male	1	4.5
2	Middle Gujarat (AAU, Anand)	100 Female + 20 Male	1	4.5
3	North Gujarat (SDAU, S.K.Nagar)	100 Female + 20 Male	1	4.5
4	Saurashtra (JAU, Junagadh)	100 Female + 20 Male	1	4.5
Total			4	18.0

6.34 Title: Establishment of Poultry Extension and Research Institute (PERI) in the State

Among various components of agriculture and allied sectors, the poultry sector has the potential to be one among the best avenues to open new vistas for generating opportunities for self entrepreneurship among tribal/rural youth and women. Apart from this, Poultry sector will play a vital role in poverty alleviation and women empowerment besides food security mission of the nation.

Further, the proposed plan will lead to specific human resource development in poultry sector for long term sustainability. Improved bio-security resulting to better disease control in poultry will also address general public health issues too.

Lastly, the synchronized and harmonious linkages of various developmental agencies, accompanied with a very strong infrastructure base in poultry sector will be helpful in exploiting the export potential of eggs and poultry meat in the era of globalization auguring higher contribution to agricultural GDP.

Salient features:

3. State level centrally located an apex institute to encourage, monitor and facilitate the poultry research and extension activities in the state
4. Holistic and multidisciplinary approach for augmenting the poultry production in Gujarat State
5. PERI will comprise of six major wings/ departments viz. Poultry Management, Poultry Nutrition, Poultry Genetics and Breeding, Poultry Health, Poultry Product Technology and Poultry Extension.
6. PERI's working will be on the pattern of Central Avian Research Institute (CARI)

Table- 6.38 Year-wise Physical and Financial Requirement for Establishment of Poultry Extension and Research Institute (PERI) in the State

Sr. No.	Particulars	1 st year (2017-18)		2 nd year (2018-19)		3 rd year (2019-20)		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of building	-	1000	-	3000	-	1000	01	5000
2	Non recurring contingency (Laboratory, Office furniture & Equipments)	-	-	-	1000	-	1000	-	2000
3	Recurring contingency (Chemicals, glass wares & contractual man power)	-	-	-	1000	-	1000	-	2000
4	Pay & allowances: (Director-01, Principal Scientist* -06 Scientist-18)	-	250	-	300	-	350	-	900
5	Miscellaneous	-	-	-	50	-	50	-	100
Total		-	1250	-	5350	-	3400	-	10000

*Principal Scientist of six different discipline viz. Poultry breeding, poultry nutrition, poultry extension, poultry health, poultry management and poultry technology & marketing

6.35 Title: Establishment of Central Poultry Disease Diagnostic Laboratory

Table- 6.39 Year-wise Physical Financial Requirement for Establishment of Central Poultry Disease Diagnostic Laboratory

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of building	-	100	-	300	-	100	01	500
2	Non recurring contingency (Laboratory, Office furniture & Equipments)	-	-	-	100	-	100	-	200
3	Recurring contingency (Chemicals, glass wares & contractual man power)	-	-	-	100	-	100	-	200

4	Pay & allowances: (a).Principal Scientist -01, (b). Senior Scientist-04, (c). Scientist* -15.	-	25	-	30	-	35	-	90
5	Miscellaneous contingency	-	-	-	5	-	5	-	10
Total		-	125	-	535	-	340	-	1000

6.36 Title: Establishment of Mobile Poultry Health Monitoring Units (regional)

Table- 6.40 Physical and Financial Requirement for Establishment of Mobile Poultry Health Monitoring Units (regional)

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1.	Mobile Van (Well Equipped)								
	North Region (Districts under S.D.A.U. Jurisdiction)	01	20	01	20	-	-	02	40
	South Region (Districts under N.A.U. Jurisdiction)	01	20	01	20	-	-	02	40
	Saurashtra Region (Districts under J.A.U. Jurisdiction)	01	20	01	20	-	-	02	40
	Central Region (Districts under A.A.U. Jurisdiction)	01	20	01	20	-	-	02	40
2.	Recurring Expenditures (Fuel & Driver)	-	6		7		7		20
3.	Miscellaneous (Repairing & maintenance of vehicle)		6		7		7		20
Total		-	92	-	94	-	14	-	200

6.37 Title: Establishment of Regional Poultry Farmer's Training Centers

Table- 6.41 Physical and Financial Requirement for Establishment of Regional Poultry Farmer's Training Centers

Sr. No	Particulars	1 st Year		2 nd Year		3 rd Year		Total (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of regional poultry farmer's training center								
	North Region (Districts under S.D.A.U. Jurisdiction)	01	320	-	160	-	-	01	480
	South Region (Districts under N.A.U. Jurisdiction)	01	320	-	160	-	-	01	480
	Saurashtra Region (Districts under J.A.U. Jurisdiction)	01	320	-	160	-	-	01	480
	Central Region (Districts under A.A.U. Jurisdiction)	01	320	-	160	-	-	01	480
2	Recurring contingency	-	20	-	30	-	30	-	80
	Total	-	1300	-	670	-	30	-	2000

6.38 Title: Strengthening of Existing Poultry Breeding Farm and Hatcheries

Table- 6.42 Physical and Financial Requirements for Strengthening of Existing Poultry Breeding Farm and Hatcheries

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Recurring contingency								
	North Region	01	20	-	40	-	40	01	100
	South Region	01	20	-	40	-	40	01	100
	Saurashtra Region	01	20	-	40	-	40	01	100
	Central Region	01	20	-	40	-	40	01	100
	Total	04	80	-	160	-	160	04	400

6.39 Title: Establishment of New Breeding Farm and Hatcheries

Table- 6.43 Physical and Financial Requirements for Establishment of New Breeding Farm and Hatcheries

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of Brooder House:1, Grower House: 1, Breeder House :2, Hatchery Building and other required ancillary structures & equipments								
	North Region (Under S.D.A.U.)	01	200	-	400	-	400	01	1000
	South Region (Under N.A.U.)	01	200	-	400	-	400	01	1000
	Saurashtra Region (Under J.A.U.)	01	200	-	400	-	400	01	1000
	Central Region (Under Kamdhenu)	01	200	-	400	-	400	01	1000
	Total	04	800	-	1600	-	1600	04	4000

6.40 Title: Strengthening of Existing Poultry Feed Production Units

Table- 6.44 Physical and Financial Requirements for Strengthening of Existing Poultry Feed Production Units

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Recurring contingency for strengthening of Seven Poultry Feed Production Units are existing under Department of A.H. Government of Gujarat	07	70		400		230	07	700
	Total	07	70	-	400	-	230	07	700

6.41 Title: Strengthening of Existing Vaccine Production Unit in the Public

Sector

Table- 6.45 Physical and Financial Requirements for Strengthening of Existing Vaccine Production Unit in the Public Sector Department of A.H. Government of Gujarat

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Recurring contingency	01	10	-	60	-	30	-	100
Total		01	10	-	60	-	30	-	100

6.42 Title: Creation of Cold Storage Facilities for Poultry Products

- Objectives:**
1. To monitor and regulate the fluctuation in market of eggs and meat
 2. To regulate the stocks from surplus to deficit regions
 3. Strategic market intervention by monitoring the demand and supply of poultry produce in the market

Table- 6.46 Physical and Financial Requirements for Creation of Cold Storage Facilities for Poultry Products

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Civil work	05	150	-	350	-	200	05	700
2	Recurring	-	00	-	50	-	50	-	100
Total		05	150	-	400	-	250	05	800

6.43 Title: Strengthening of Existing and Establishment of New Poultry Feed Testing Laboratories

Table- 6.47 Physical and Financial Requirements for Strengthening of Existing and Establishment of New Poultry Feed Testing Laboratories

Sr. No.	Particulars	1 st Year		2 nd Year		3 rd Year		Total Cost (Rs. in Lakh)	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of feed testing laboratories (4) and Strengthening of existing Feed testing laboratory (1).	4+1	100	-	200	-	200	4+1	500
2	Recurring contingency	-	50	-	50	-	50	-	150
Total		5	150	-	250	-	250	5	650

6.44 Title: Establishment of “Veterinary Disease Diagnosis and Research

Laboratories (VDDRL) under four Veterinary Colleges of all the four SAU`s of Gujarat State”

Veterinary Disease Diagnosis and Research Laboratories (VDDRL) under all the Veterinary Colleges of the SAU`s will be established with a view to provide health care and diagnosis of domestic animals, pet animals and avian diseases in the state of Gujarat. Veterinary diagnosis presents a truer picture of the nature of disease, status of penetration of the disease, degree of cure and the health of the cellular components of the body. Animal treatment procedures have become highly dependent on diagnostic service to provide measures and accurate input. Each of the Veterinary College routinely receives number of samples from large and small animals including avian spp. and wild animals for laboratory diagnosis. Most of these samples are processed using conventional diagnosis approaches by different departments of the Veterinary Colleges and is time consuming hence there is a dire need to establish separate central laboratory for Animal & Avian Disease diagnosis under all the Veterinary Colleges. There is good scope for setting up new referral diagnostic laboratories and /or modern diagnostic centres with all latest equipments to fulfill the requirement of all the zones of the state. The VDDRL labs will be multidisciplinary approach in diagnosis of Livestock and bird diseases with specialists’ of Veterinary Physiology & Biochemistry, Veterinary Parasitology, Veterinary Microbiology, Veterinary Pathology, Toxicology and Veterinary Public Health & Epidemiology.

Objectives

- To know the Important Livestock, pet animal and Avian diseases prevalent in Gujarat State and to find out suitable prophylactic measures
- To provide latest diagnostic services to Field Veterinarians, Livestock Owners, pet owners, Organized and Private farms, Panjarapoles, Gaushalas and other Grass-roots nomadic animal owners etc.
- To assess various chemotherapeutic drugs against common diseases of Livestock, pet animals and Birds.
- To act as State Referral Laboratories for disease diagnosis work.
- To collect, process, store, and retrieve animal health and disease data and establishment of a data bank for immediate use in planning disease control and forecasting programme.
- To formulate and establish a system of monitoring and surveillance of noticeable and reportable diseases for fulfilling National and International obligations.
- To standardize the diagnostic tests with latest advanced field oriented techniques.
- To provide facilities for expert consultancy services for disease diagnosis and prophylaxis of emerging & re-emerging livestock & avian diseases.

- To provide expert skilled training to Veterinarians & Scientists from the States/ Institutes/ Veterinary Colleges in diagnostic methodology, epidemiology and prevention of animal and avian diseases.

Mandates

The VDDR Labs have the mandates for standardization of diagnostic methods & to provide animal and bird disease diagnosis services.

- Livestock, pet animals and avian disease investigation will provide expertise diagnosis in referred and critical cases.
- To develop appropriate linkage with state and other agencies for disease surveillance, monitoring & forecasting of animal and pet diseases.
- Preparation and compilation of available guidance regarding control of diseases in the form of report/bulletin for the use of beneficiaries like Veterinarians, Farmers and pet owners etc.
- Basic and strategic research on exotic, emerging and re-emerging diseases of livestock, pet animals and birds.

Major activities

- The VDDRL labs have to provide diagnostic services to indoor and outdoor field and farm animals.
- Imparting basic and applied field oriented research on exotic, emerging and re-emerging diseases.
- Develop research programme facilities on economically important animal, pet animal and bird diseases and their diagnosis.
- Application of advanced diagnostic techniques in disease diagnosis.
- To train personnel from the States / Institutes / Veterinary Colleges in diagnostic methodology and to develop competency for diagnosis & control of exotic/emerging diseases of animals.
- Imparting of education to Postgraduate students of Veterinary faculty

Facility required for:

- Requirement for advanced equipped molecular diagnostic lab for diagnosis of diseases.

Veterinary Physiology & Biochemistry:

1. Detailed haemogram of all domestic, pet, wild animals/avian species.
2. Detailed Biochemical analysis of all domestic, pet, wild animals/ avian species.
3. Detailed body Fluids and Urine analysis of all domestic, pet and wild animals/ avian species.

4. Detailed Cardiogram of all domestic, pet animals and wild animal species.
5. Detailed hormonal analysis of all domestic and wild animals species.

veterinary parasitology laboratory

1. Qualitative and Quantitative examination of faecal samples
2. Examination of Blood (Whole blood, Serum, Lymphnode materials etc.)
3. Identification of Parasites up to Species level.
4. Examination of Skin Scrappings.
5. Mounting of Various Parasites.

Veterinary Microbiology Laboratory

1. Requirement of Advanced basic and Molecular and Tissue culture lab. for diagnostic for Bacterial, Viral, Rickettsiales, Chlamydial, Fungal diseases etc.
2. Rapid Bacterial Identification System
3. Rapid Antibiotic Sensitivity System

Veterinary Pathology Laboratory

- Necropsy
- Histopathology
- Clinical Pathology
- Immunohistochemistry
- Molecular Pathology

Toxicology Laboratory

Field veterinarians report mortalities and morbidity in animals due to various factors other than specific diseases, which go undiagnosed. Toxicities / poisoning are often associated with such mortalities and morbidity in animals. Due to indiscriminate use of agrochemicals, increasing industrial/ environmental pollution, poisonous plants, malicious and accidental poisoning as well as poor managemental conditions farm and pet animals suffer from poisoning/ toxicity. These cause enormous economical losses to country's animal industry and exchequer, which can be prevented by proper toxicological investigations based on the history, clinical symptoms, treatment attempted, the post-mortem lesions and toxicological tests/ animal experimentation data confirming the incriminating toxin using the knowledge and experience of toxicological problem. The timely diagnosis of toxicoses in animals based on the laboratory analysis is immensely useful in adapting ameliorative measures by specific antidotes so that animals could be saved. By adapting preventive measures, further toxicoses in animals can be prevented.

- Nitrate/Nitrite Toxicity
- HCN Poisoning
- Mycotoxins
- Strychnine Poisoning
- Pesticide Toxicity
- Antibiotic Residue

Veterinary Public Health and Epidemiology Laboratory

- Diagnosis of Public Health Significance of Important Emerging & Re-emerging Diseases and their Epidemiological aspects.
- Analysis of Data of Zoonotic Diseases.
- Sero-Epidemiology of Public Health Significant Diseases.
- Epidemiology of emergence of drug resistance.

The following infrastructure facility and financial requirement is for one diagnostic laboratory and such facilities will be replicated at all the four Veterinary Colleges of state agricultural universities of the Gujarat State.

Infrastructure & Facilities

1. Building/ Infrastructure
2. Human Resource
3. Equipments and Gadgets
4. Glasswares/ Chemicals & other consumables

Financial Requirement:

I) Land Requirement:

Land requirement: 10,000 sq. meter,

Built up area: 4000 sq. meter (Cost estimation at rate Rs.15000/square meter)

Building requirement: (10 Crores)

Sr. No.	Name of Civil work	Proposed amount (Rs. In Lakhs)	
		Estimated Cost	For year 2018-19
1	Construction	600	600
2	Internal Laboratory furnishing	400	400
	Total Rs	1000	1000

II) Manpower required with Post:

a. *Financial requirement per Post: (Rs in 12.306 Crores)

Name of Post	Pay Scale	No. of Post	Salary amount required per month (Basic+Grade pay +Allowance)	Salary amount required per year
Director	37400-67000	1	1.63	19.56
Research Scientist	37400-67000	2	3.26	39.12
Associate Research Scientist	37400-67000	2	2.98	35.76
Assistant Research Scientist	15000-39000	6	3.93	47.16
Lab Technician	35400-112400	6	2.42	29.04

Research Associate	44000	6	2.64	31.68
Senior Research Fellow	30800	6	1.84	22.08
Junior Clerk	35400- 112400	2	0.81	9.72
Contractuals (for Computer Assistance, Sweeper, Driver and others)	10000	10	1	12
Total Rs				246.12
Total Rs for five years				1230.6

*As per 7th pay commission

III) Recurring Contingency : 5.3 Crores

IV) Non recurring Contingency: Details of equipment/instrument required (8.9 Crores)

Sr.no.	Name of equipment & number	Year			Total (Rs in Lakh)
		I	II	III	
1.	Monopan balance-2	2.0			2.0
2.	B.O.D. incubator-2	3.0			3.0
3.	Advanced blood cell counter-1		10.0		10.0
4.	Advance biochemistry analyzer-1		25.0		25.0
5.	E.C.G. machine-1		5.0		5.0
6.	Computer system with complete accessories-10	8.0			8.0
7.	ultracentrifuge-1		40.0		40.0
8.	Lyophilizer -1			20.0	20.0
9.	Ultralow deep freez-4	32.0			32.0
10.	CO2 incubator-2		16.0		16.0
11.	PAGE assembly-2			6.0	6.0
12.	Water bath-3	2.5			2.5
13.	Ice flaking machine-2		5.0		5.0
14.	Hot air oven-3	4.0			4.0
15.	pH meter-3	2.0			2.0
16.	Laminar air flow-3	12.0			12.0
17.	Water purification systems-1	15.0			15.0
18.	Thermal cycler-4		15.0		15.0
19.	Real time PCR-2			20.0	20.0

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20.	Refrigerated centrifuge-5		40.0		40.0
21.	spectrophotometer-2		10.0		10.0
22.	ELISA reader-2		10		10.0
23.	Analytical balance -1	1.5			1.5
24.	Precision balance-1	1.5			1.5
25.	2D gel electrophoresis syatem-1			10.0	10.0
26.	autoclave-2	4.0			4.0
27.	Automated bacterial identification system-1		35.0		35.0
28.	Automated antibiotic sensitivity testing system-1		30.0		30.0
29.	Binocular microscope-15	7.5			7.5
30.	Fully automatic microtome machine with paraffin embedding station-1		18.0		18.0
31.	Cryostat machine-1			15.0	15.0
32.	Fully automatic tissue processing machine with paraffin embedding system-1		25.0		25.0
33.	Fluorescent microscope-1			4.0	4.0
34.	Dark field illuminated microscope-1			5.0	5.0
35.	Inverted microscope-1			5.0	5.0
36.	Milk analyzer and somatic cell counter-1		20.0		20.0
37.	Advanced digital trinocular microscope with attached camera assembly LCD screen-4	20.0			20.0
38.	Trinocular steriozoom microsope with camera attachment-1	10.0			10.0
39.	Dissection set for entomology-1	1.0			1.0
40.	Advanced dissecting microscope-1	1.0			1.0
41.	Bayer man's apparatus -4		1.0		1.0
42.	Flow cytometry-1			25.0	25.0
43.	Gel Documentation System-1		10.0		10.0
44.	Nano-Drop-1		8.0		8.0
45.	Metal Distillation Plant-1		2.0		2.0
46.	Flame Photometer-1			5.0	5.0
47.	Postmortem Set With Bone Cutter-2	10.0			10.0
48.	Incinerator For Carcass Disposal-1		40.0		40.0
49.	Cold Carcass Storage-1		30.0		30.0

50.	Jeep With Carcass Trolley-1	20.0			20.0
51.	Hydraulic PM Table For Large Animal-2	2.0			2.0
52.	Hydraulic PM Table For Small Animal-2	20.0			20.0
53.	Hydraulic PM Table For Poultry-1	1.0			1.0
54.	Mobile Laboratory Van For Disease Investigation-1		25.0		25.0
55.	Vehicles -3		50.0		50.0
56.	HPTLC			30	30
57.	GCMS			25	25
58.	LCMS			70	70
	Total Rs	180	470	209	890.0

Table- 6.48 Year wise Financial Requirement for Establishment of “Veterinary Disease Diagnosis and Research Laboratories (VDDRL) under four Veterinary Colleges of all the fourSAU`s of Gujarat State”

Sr. No.	Particular	Year			
		I	II	III	Total
1	Staff	246.12	246.12	246.12	738.36
2	Recurring contingency	40	70	120	230
3	Non- Recurring contingency	180	470	240	890
4	Construction	600	250	150	1000
	Total	1066.12	1036.12	675.12	2777.36

Year wise expected output:

- 1st Year: Land procurement design, construction and execution of building with separate advanced post mortem hall with cold storage and incineration facility. Recruitment of man power, human resource development, faculty training, purchase of equipment and consumables.
- 2nd Year : Procuring Equipment, chemicals, Diagnostic kits & other Essentials. Initiation of sample collection.
- 3rd Year : Standardization of various techniques for disease diagnosis along with routine methods for diagnosis.

6.45 Title: District Wise Proposals for Cold Chain of Milk Handling (Bulk Milk Coolers)

Table- 6.49 District Wise Proposals for Cold Chain of Milk Handling (Bulk Milk Coolers)

Sr. No.	Districts	Total No. VDCS in the district*	No. societies having Bulk Milk Coolers	No. societies <u>NOT</u> having Bulk Milk Coolers (i.e Gap)	Targeting 50% of VDCS not having BMC in period of 3 years	Physical target for year 2017-18	cost for year 2017-18	Physical target for year 2018-19	cost for year 2018-19	Physical target for year 2019-20	cost for year 2019-20	Total Physical target for 3 years	Total Project cost (Rs. In lakhs)
1	Ahmedabad	655	46	609	305	102	203	102	203	102	203	305	609
2	Amreli	644	0	644	322	107	215	107	215	107	215	322	644
3	Banaskantha	1525	1281	244	122	41	81	41	81	41	81	122	244
4	Bharuch	669	158	511	256	85	170	85	170	85	170	256	511
5	Bhavnagar	648	0	648	324	108	216	108	216	108	216	324	648
6	Botad	435	0	435	218	73	145	73	145	73	145	218	435
7	Gandhinagar	152	4	148	74	25	49	25	49	25	49	74	148
8	Junagadh	1369	5	1364	682	227	455	227	455	227	455	682	1364
9	Kutch	707	2	705	353	118	235	118	235	118	235	353	705
10	Kheda	1225	1200	25	13	4	8	4	8	4	8	13	25
11	Mehsana	1347	763	584	292	97	195	97	195	97	195	292	584
12	Morbi	130	20	110	55	18	37	18	37	18	37	55	110
13	Panchmahal	2145	275	1870	935	312	623	312	623	312	623	935	1870
14	Porbandar	776	0	776	388	129	259	129	259	129	259	388	776
15	Rajkot	805	80	725	363	121	242	121	242	121	242	363	725
16	Sabarkantha	1920	592	1328	664	221	443	221	443	221	443	664	1328
17	Surat	1220	549	671	336	112	224	112	224	112	224	336	671
18	Surendranagar	778	129	649	325	108	216	108	216	108	216	325	649
19	Vadodara	1454	231	1223	612	204	408	204	408	204	408	612	1223
20	Valsad	1126	100	1026	513	171	342	171	342	171	342	513	1026
	Total	19730	5435	14295	7148	2383	4765	2383	4765	2383	4765	7148	14295
	Rs. In Crores						47.65		47.65		47.65		142.95

Note; (1).*According to data available for the year 2016-17. (2) Capacity 2000 to 5000 litres, Average cost of BMC Rs. 8 lakh per unit, and subsidy 20% i.e Rs. 2 lakhs per unit. (3) All cost is in Rs lakhs

6.46 Title: District Wise Proposal for Automated Milk Collections System (AMCS)

Table- 6.50 District Wise Proposal for Automated Milk Collections System (AMCS)

Sr. No.	Milk Producers' coop union	Total No. of societies	No. societies having automated Milk Collection System (AMCS)*	No. societies NOT having (AMCS) (i.e GAP)	Physical target for year 2017-18	cost for year 2017-18	Physical target for year 2018-19	cost for year 2018-19	Physical target for year 2019-20	cost for year 2019-20	Total Physical target for 3 years	Total Project cost (Rs. In lakhs)
1	Ahmedabad	655	376	279	93	55.8	93	55.8	93	55.8	279	167
2	Amreli	644	558	86	29	17.2	29	17.2	29	17.2	86	52
3	Banaskantha	1525	1439	86	29	17.2	29	17.2	29	17.2	86	52
4	Bharuch	669	431	238	79	47.6	79	47.6	79	47.6	238	143
5	Bhavnagar	648	505	143	48	28.6	48	28.6	48	28.6	143	86
6	Botad	435	0	435	145	87	145	87	145	87	435	261
7	Gandhinagar	152	99	53	18	10.6	18	10.6	18	10.6	53	32
8	Junagadh	1369	292	1077	359	215.4	359	215.4	359	215.4	1077	646
9	Kutch	707	560	147	49	29.4	49	29.4	49	29.4	147	88
10	Kheda	1225	1188	37	12	7.4	12	7.4	12	7.4	37	22
11	Mehsana	1347	1548	0	0	0	0	0	0	0	0	0
12	Morbi	130	0	130	43	26	43	26	43	26	130	78
13	Panchmahal	2145	1389	756	252	151.2	252	151.2	252	151.2	756	454

Sr. No.	Milk Producers' coop union	Total No. of societies	No. societies having automated Milk Collection System (AMCS)*	No. societies NOT having (AMCS) (i.e GAP)	Physical target for year 2017-18	cost for year 2017-18	Physical target for year 2018-19	cost for year 2018-19	Physical target for year 2019-20	cost for year 2019-20	Total Physical target for 3 years	Total Project cost (Rs. In lakhs)
14	Porbandar	776	670	106	35	21.2	35	21.2	35	21.2	106	64
15	Rajkot	805	717	88	29	17.6	29	17.6	29	17.6	88	53
16	Sabarkantha	1920	1681	239	80	47.8	80	47.8	80	47.8	239	143
17	Surat	1220	1547	0	0	0	0	0	0	0	0	0
18	Surendranagar	778	776	2	1	0.4	1	0.4	1	0.4	2	1
19	Vadodara	1454	1025	429	143	85.8	143	85.8	143	85.8	429	257
20	Valsad	1126	749	377	126	75.4	126	75.4	126	75.4	377	226
	Total	19730	15550	4708	1569	942	1569	942	1569	942	4708	2825
	Cost. (Rs. In crores)					9.42		9.42		9.42		28.25
<p>Note: (1) *According to data available for the year 2016-17 (2) The system comprised of an Electronic Milk Weighing Unit, the Electronic Milk Tester and Data Processing Unit.(3) Cost of one set of AMCS ia around Rs. 1,20,000/- .(4) Subsidy 50% , i.e Rs. 60,000/- per unit; i.e Rs. 0.6 Lakhs/unit</p>												

6.47 Title: Establishment of Pack Animal Research Institute (PARI)

Pack animals suffer from several contagious and infectious. Therefore, appropriate control and prevention measures need to be taken in order to minimize the economic loss associated with the problem through establishing modern well equipped an indoor hospital for pack animals, providing mobile pack animal clinic (PAC) facility and organizing health check-up camp.

The donkey of Katchch district is having bigger frame size than donkey of middle Gujarat, hence it is an urgent need to carry out the molecular and phenotypic characterization of donkey breed of Kutch and local breeds of middle Gujarat.

There is no any systematic research work is being carried out uptill now on the nutritional requirement of pack animals during different physiological stages and race horses in India. There is urgent need to work out nutrition requirement and prepare feeding standards by conducting different feeding trials using locally available feeding resources.

Objectives:

- Establish modern pack animals farm and conduct felid oriented research.
- Genetic and Phenotypic characterization of local donkey and horse breed of Gujarat state.
- Create modern Central Analytic Laboratory (CAL) for camel and donkey milk analysis.
- Establishment of complete feed manufacturing unit for pack animals
- Modern well equipped an indoor hospital for pack animals.
- Provide mobile Pack Animal Clinic (PAC) facility in all district of Gujarat state
- Improve nutritional status of pack animals.
- Survey on Managemental system adopted by the pack animals keepers of Gujarat state.
- Organized health check-up camps for pack animals.
- Organize periodic training programmes

Table- 6.51 Financial Assistance for PACK Animal Research Institute (PARI)

Sr. No.	Grant breakup	Total Financial Requirement (Lakh)	Three year Cost (Rs in Lakh)		
			2017-18	2018-19	2019-20
a	Civil work	15000	8000	4000	3000
b	Recurring	7500	2000	3000	2500
c	Non recurring	7500	2000	3000	2500
	Total	30000	12000	10000	8000

6.48 Title: Strengthening of Existing Dairy Industries to Process and Market Camel Milk

The camel milk possesses miracle nutritional and therapeutic values. Camel milk is similar to bovine milk. However, its proteins do not have cross-reactivity with bovine milk. It contains high concentrations of volatile fatty acids, especially linoleic acid and polyunsaturated fatty acids, vitamin C (five times more in camel milk) and high mineral content (Na, K, Cu, Zn and Mn) in the camel's milk. The presence of diametric immunoglobulin repertoire and not the usual tetrameric one, and a large amount of lactoferrin makes it an excellent agent in the treatment of infectious diseases and in spite of containing lactose is well accepted by lactose intolerant patients.

Objectives:

- Make available nutritious milk to human being
- Improve the health status of human being
- Value addition of camel milk
- To improve the socio-economic status of camel keepers.

Table- 6.52 Financial Assistance for Establishment of Marketing Channel, Milk Processing and Distribution Units.

Sr. No.	Grant breakup	Total Financial Requirement (Lacks.)	Three year Cost (Rs in Lakh)		
			2017-18	2018-19	2019-20
A	KACHCHH				
a	Civil work	1400	850	350	200
b	Recurring	400	160	160	80
c	Non recurring	200	80	60	60
	Total	2000	1090	570	340
B	BANSKANTHA				
a	Civil work	Same as above			
b	Recurring				
c	Nonrecurring				
	Total	2000	1090	570	340
Grand Total		4000	2180	1140	680

6.49 Title: Value Addition and Marketing of Camel and Donkey Hair By-Products

The camel and donkey hair are used to prepare the bags, rugs, ropes, carpets and brushes

Objectives:

- Women empowerment and employment generation
- Improve socio-economic status of camel keepers

Table- 6.53 Financial Assistance for marketing and value addition of camel and donkey hair and their By-Products

Sr. No.	Grant breakup	Total Financial Requirement (Lacks.)	Three year Cost (Rs in Lakh)		
			2017-18	2018-19	2019-20
A	KACHCHH				
a	Civil work	300	200	100	-
b	Recurring	200	80	60	60
c	Non recurring	100	40	20	20
	Total	600	300	200	100
B	BANSKANTHA				
a	Civil work	Same as above			
b	Recurring				
c	Non-recurring				
	Total	600	300	200	100
Grand Total		1200	600	400	200

6.50 Title: Improve and Increase Biomass to Enhance Camel Milk Productivity

55% of katchch desert is covered by P J Pods which is not relished by the camel and strong thorn of P J Pods creates the lameness. There are different types of shrubs and herbs especially **LUNO** which is preferred by the camel at most because it contains maximum salt and salt requirement of the camel is highest than other species.

Objective:

- Habitat Improvement in terms of biomass and water availability of Kutch district

Table- 6.54 Financial assistance for Improvement and Increase Biomass and Water Supply of Kachchh District

Sr. No.	Grant breakup	Total Financial Requirement (Lakh)	Three year Cost (Rs in Lakh)		
			2017-18	2018-19	2019-20
KACHCHH					
a	Civil work	100	70	30	-
b	Recurring	300	120	120	60
c	Non recurring	100	40	40	20
	Total	500	230	190	80

6.51 Title: Establishment of State Epidemiology cum Surveillance Center for Animal Diseases

Various infections/diseases of viral, bacterial, haemoprotozoan and other parasitic origin cause colossal losses to livestock and pose serious threat to the animal health and productivity. Diseases viz. Equine Herpes Virus, Equine Infectious Anemia, Equine Viral Arteritis, Equine Influenza, Blue Tongue, Sheep and Goat pox, PPR, Visna-Maedi, brucellosis, glanders, Salmonella abortus equi infection, tuberculosis, paratuberculosis, Pasteurellosis, mastitis and Chlamydiosis affecting equines, cattle, buffaloes, sheep and goats are of significant economic concern. From economic impact, animal welfare and zoonotic view points, health of all animal species including precious wild life of the state is important.

There have been several world-wide outbreaks of new and emerging diseases like Bovine Spongiform Encephalopathy (BSE), Paramyxo virus infection in horses (Hendra) and pigs (Nipah) and Zoonotic H5NI avian influenza. Though our country has largely remained free from these diseases, old diseases can re-emerge in new guises that enable them to evade current control measures. Multi-drug resistant bacteria with a pathogenic potential for human via food chain like Salmonella enterica, Campylobactor, Enterococcus spp etc can pose threat. The recent reports of H5NI avian influenza virus crossing the species barriers and infecting humans, pigs, cats and tigers have caused alarming situation world-wide.

In addition, there has been always a risk of introduction of new diseases/pathogenic organisms into a country causing serious animal health problems in terms of mortality and morbidity. Exotic (non native) pathogens, once introduced into a country, can escalate into an epidemic due to the absence of vaccine or effective drugs, lack of resistance in host animals and limited resources to diagnose and restrict the spread of these pathogens. For diagnosis of exotic diseases using OIE recommended tests and latest molecular techniques like PCR, gene cloning and sequencing a state of the art Disease diagnosis laboratory in the state will take care to monitor these diseases and protect our livestock industry.

Human health is inextricably linked to animal health and production. This link between human and animal populations and with the surrounding environment is particularly close in developing regions where animals provide transportation, draught power, fuel and clothing as well as proteins. Although poorly documented, zoonotic diseases are a major public health problem in India. In recent times, India had to mobilize a sizeable proportion of its precious resources and trained manpower from developmental activities to win the nagging war against Bird Flu (Highly Pathogenic Avian Influenza caused by H5N1 strain). In January 2011, the CCHF disease has been reported in Gujarat, with 4 reported deaths. Leptospirosis was reported from Surat and Navsari Districts, out of which 13 deaths occurred. At present (in

2015) swine flu is causing serious health problem in Gujarat and India. Therefore monitoring animal diseases of human importance is also important for human health.

Keeping track of the changing global disease situation is very important, as climate change increases the risk of zoonoses by expanding the host, reservoir, and vector base. Public health infrastructure for disease surveillance, food and water safety, control of vectors and disease reservoirs, and public health outbreak response needs to be strengthened. In the light of above for the control of animal diseases of zoonotic importance and associated outbreaks, the state Epidemiology cum Surveillance center for animal diseases has been proposed.

Table- 6.55 Financial assistance for Establishment of State Epidemiology Cum Surveillance Center for Animal Diseases

Sr. No.	Place	Total Financial Requirements (Rs. in Lakh)	Three Year Cost (Rs. in Lakh)		
			1 st Year	2 nd Year	3 rd Year
1	Veterinary College, SDAU, Sardarkrushinagar	3750	2000	1000	750
Total		3750	2000	1000	750

6.52 Title: Establishment of Center of Excellence in Ruminant Medicine

Our cattle and buffalo population is respectively around 16% (185.2 million) and 5% (98.00 million) of the world. Gujarat state has 7.9 million cattle and ranks 5th in milk production with 7.6 million tones milk production. The major share of production comes from the North Gujarat which has total cattle population of 2382000 (livestock census, 2007) with 4823.17 tonnes milk production.

High producing dairy animal suffer stress of production and lead to several metabolic disorders viz like hypocalcemia, ketosis, post parturient haemoglobinuria, hypomagnesemia etc. Their mortality rate is low but morbidity and impact on milk production is high. Monitoring area wise soil and body metabolic profile and needs of animals can help proper supplementation to minimise stress and optimise production.

Stomach of Ruminating animals has four compartments hence known as compound stomach. Because of complexity of compound stomach (anatomical and physiological differences) ruminants differ from deglutination to digestion from those to simple stomach animals. Problem like change in rumen ecosystem, chronic indigestions associated with TRP, non penetrating foreign bodies, omasal impaction and abomasitis are on rise with change in husbandry and feeding practices. Affection of compound stomach therefore affects intake and utilisation of feed and inturn affect milk production.

North Gujarat is milkshed area of the state with leading population and production. However, there is no independent research center that can take care of the complex problems of compound stomach animals which differ in their physiology of digestion and milk production. This center will therefore work for the solution of all health problems of compound stomach and will also develop specific package of practices for the prevention in this area. The center will take up training of veterinarian and farmers as well.

Table- 6.56 Financial assistance for Center of excellence in Ruminant Medicine

Sr. No.	District	Total Financial Requirements (Rs. in Lakh)	Three Year Cost (Rs. in Lakh)		
			1 st Year	2 nd Year	3 rd Year
1	North Gujarat	1600	800	600	200
Total		1600	800	600	200

6.53 Title: Establishment of Regional Fisheries Trainers' Training Centres:

At present, there is no training center in the state which can provide refresher training to trainers. The officers working in State Fisheries Department, Krishi Vigyan Kendra and NGOs need to be given periodical refresher training so that they can impart training to the farmers with updated technologies and this way the information of latest technology can reach to the users. It is, therefore, proposed to establish four such Regional Trainers' Training at Anand, Godhara, Rajkot and Bhuj to impart training for trainers to enrich with the advanced technologies of fisheries and aquaculture techniques. The outcome of these trainer's training Centres would be to transfer the latest technical know-how to the farmers and this way the fish production can be enhanced by adopting new technology at the farmer's field/pond.

Table- 6.57 Financial assistance for four Regional Fisheries Trainers' Training Centers

Sr. No.	District	Total Financial Requirements (Rs. in Lakh)	Three Year Cost (Rs. in Lakh)		
			I	II	III
1	Anand	240.00	5	125	110
2	Bhuj	240.00	5	125	110
3	Godhara	240.00	5	125	110
4	Rajkot	240.00	5	125	110
Total		960.00	20	500	440

Table- 6.58 Budget requirement for each Regional Fisheries Trainers' Training Center

Sr. No	Item	Year wise Cost (Rs. in Lakh)			
		I	II	III	Total
1	Recurring *	5	15	15	35
2	Non-Recurring	0	30	25	55
3	Construction	0	80	70	150
Total		5	125	110	240

* Including training cost

Table- 6.59 Training Proposed for Capacity Building of Fisheries sector Staff on different aspects covered under Plan (Rs900/day /person)
(Phy-No., Fin. - Rs in Lakh)

Department	Year wise No. of Staff to be Trained							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Fisheries	100	0.90	100	0.90	100	0.90	300	2.7

6.54 Title: Strengthening of Existing Ornamental Fish Breeding Centres (three) Functioning under the State Fisheries Department, Government of Gujarat

During the last two decades, large numbers of aquaria are being installed in public places. All these people need end-to-end service and for entrepreneurs, it has opened up a new area of aquarium making, sale, the supply of ornamental fish, maintenance and supply of live fish. These areas employ many young people in metropolitan cities such as Gauhati, Kolkata, Mumbai, Chennai and Vizag. The number of ornamental fish units existing in various fish farms Navali, Pratij, Thala etc. There is the good demand for Ornamental fish in local as well as international market. Therefore, immediate attention need to be given to renovate and make it modernized to cater the need for the benefits of fish farmers and rural youth. The approximate cost of four demo unit Rs. 210.00 lakhs.

Table- 6.60 Financial Requirement for Strengthening of Existing Ornamental Fish Breeding Centres (three) Functioning under the State Fisheries Department, GoG.

Sr. No.	Name of Dist/Area	Total Financial Requirements (Rs. in Lakh)	Three Year Cost (Rs. in Lakh)		
			I	II	III
1	Prantij	70.00	10	30.00	30.00
2	Navali	70.00	10	30.00	30.00
3	Thala	70.00	10	30.00	30.00
Total		210.00	30	90.00	90.00

Table- 6.61 Budget (Year wise) Requirement for Each Center Strengthening of Existing Ornamental Fish Breeding Centres (three) Functioning under the State Fisheries Department, Government of Gujarat

Sr. No.	Item	Year wise Cost (Rs. in Lakh)			
		I	II	III	Total
1	Recurring	6	20	20	46
2	Non-Recurring	4	10	10	24
Total		10	30	30	70

6.55 Title: Establishment of Fish Disease Diagnosis Centre in South Gujarat, Central Gujarat and Saurashtra

This will provide services in disease diagnosis in fish, prawn and shrimp for preventive measures and treatment. Centers may be located at Navsari, Anand and Veraval with the approximate financial provision of Rs. 840.00 lakhs

Table- 6.62 Financial Requirements for Establishment of Fish Disease Diagnosis Centre in South Gujarat, Central Gujarat and Saurashtra

Sr. No.	Name of Dist/Area	Total Financial Requirements	Three year Cost (Rs. in Lakh)		
			I	II	III
1	Anand	280.00	10	135	135
2	Navsari	280.00	10	135	135
3	Veraval	280.00	10	135	135
Total		840.00	30	405	405

Table- 6.63 Budget (Year wise) for each center Establishment of Fish Disease Diagnosis Centre in South Gujarat, Central Gujarat and Saurashtra

Sr. No	Item	Year wise Cost (Rs. in Lakh)			
		I	II	III	Total
1.	Recurring	6	20	20	46
2.	Non-Recurring	4	115	115	234
Total		10	135	135	280

(Non Recurring covers building and instruments for disease diagnosis)

6.56 Title: Establishment of Modern Aquaculture Farm Complex

A full fledged well equipped and scientifically prepared and operated fish farm in all agricultural universities for field / practical demonstration for the students and farmers. This modern aquaculture farm complex will use the modern technologies available for a demonstration so that fish farmers can adopt these technologies in their farm. **This will help farmers to double their farm income by reducing the cost of production and enhanced productivity.** The approximate cost of four demo unit Rs 720.00 lakhs.

Sr No	Details of proposals	Budget proposed (Rs. in Lakh)
1	Proposed fund (@ 180 lakh each)	720.00

Table- 6.64 Financial Requirement for Establishment of Modern Aquaculture Farm Complex

Sr. No.	Name of Dist/Area	Total Financial Requirements	Three year Cost (Rs. in Lakh)		
			I	II	III
1	NAU, Navsari	180.00	10	100.00	70.00
2	AAU, Anand	180.00	10	100.00	70.00
3	Kamdhenu University, center	180.00	10	100.00	70.00
4	SDAU Kutchh	180.00	10	100.00	70.00
Total		720.00	40	400.00	280.00

Table- 6.65 Budget requirement for Each Center for Establishment of Modern Aquaculture Farm Complex

Sr. No	Item	Year wise Cost (Rs. in Lakh)			
		I	II	III	TOTAL
1	Recurring	1	10	10	21
2	Non-Recurring	1	20	20	41
3	Construction	8	70	40	118
Total		10	100	70	180

6.57 Title: Establishment of quality control laboratory in Saurashtra and South Gujarat

The fish and shellfish harvested from the sea are generally free from pathogens and contain natural bacterial flora. However, handling and storage onboard, use of insufficient ice, poor sanitation and in hygienic conditions at landing centers, increase the bacterial load. In recent years, rejection of some containers on account of poor microbiological quality has been reported. Gujarat is the largest producer of marine fishes; there are about 100 processing plants, the majority of the processing plants situated in between Veraval and Dwarka. Due to stringent quality check required for the export of processed fishes, it is proposed to established **quality control laboratory at Veraval, Porbandar and Valsad** with the approximate financial provision of Rs. 840.00 lakhs.

Table- 6.66 Financial Requirements for Establishment of Quality Control Laboratory in Saurashtra and South Gujarat

Sr. No.	Name of Dist/Area	Total Financial Requirements (Rs. in Lakh)	Year wise Cost (Rs. in Lakh)		
			I	II	III
1	Veraval	280.00	10.00	135.00	135.00
2	Porbandar	280.00	10.00	135.00	135.00
3	Valsad	280.00	10.00	135.00	135.00
Total		840.00	30.00	405.00	405.00

6.58 Title: Establishment of Research and Training Centre for Seaweed

Gujarat has the longest coastline amongst all the maritime states of India. Rank fifth in seaweed diversity. The coast has a rich wealth of more than 213 seaweed species. Looking at the vast scope of seaweed research and utilization and the possibility of seaweed cultivation on a mass scale for revenue generation this research cum training center is proposed. However, there is no exclusive seaweed research center in India. Therefore, it is proposed to

establish Research and Training Centre for Seaweed in **four districts** of Saurashtra.

Proposed fund for the project is **Rs. 131.00 Lakh**.

Objectives:

- a) To study the seaweed diversity, taxonomy and growth pattern in Saurashtra
- b) Extraction and estimation of biochemical, phycocolloids and nutraceuticals from seaweed.
- c) To initiate seaweed cultivation practices in Saurashtra.
- d) To identify the seaweed species with the DNA barcoding techniques.
- e) To maintain phytoplankton repository.

Table- 6.67 Budget requirement for Establishment of Research and Training Centre for Seaweed

Sr. No	Item	Year wise Cost (Rs. in Lakh)			
		I	II	III	Total
1.	Pay and allowance	10.0	15.0	15.0	40.00
2.	Recurring	7.0	7.0	7.0	21.00
3.	Non-Recurring	30.00	20.00	20.00	70.00
Total		47.00	42.00	42.00	131.00

6.59 Title: Establishment of Plant Health Clinical Laboratories

- ✓ Plant health clinic is a multidisciplinary approach that serves commercial growers, field representatives as well as small and marginal farmers.
- ✓ The primary mission of the plant health clinic is to identify the nature of plant problems, diagnosis and remedial measures. Depending upon the nature of damage, either by pests or nutrient deficiency, the problems can be sorted out so as to make the effective remedial measures.
- ✓ Emphasis should be on the prevention of the problems by management thereby reducing the use of chemicals.
- ✓ The services for insect pests identification, diagnosis of plant diseases and chemical injury, nematode assays, nutrient related problems, soil health management etc can be made available at the possible nearest place.
- ✓ At least one plant health clinic laboratory at each district is advisable.

Table- 6.68 Approximate Cost for Plant Health Clinic Laboratory

Sr. No.	Particulars	Area/No.	Approx. cost for one PHCL* (Rs. in Lakh)	Approx. cost for 33 PHCL (Rs. in Lakh)
1	Staff and Contractual Services			
A	Lab technician Pay scale (5200-20200 + GP 2800)	2	6.40	211.20
	Research Associate @ Rs. 23000 p.m fixed + HRA @ 10%	2	6.10	201.30
	Total	4	12.50	412.50
B	Contingencies for electricity bill, maintenance, labour charges, hiring of vehicles, other contingent charges.	-	25.00	825.00
	Total	-	25.00	825.00
C	Non recurring contingencies			
	Building			
	One Building	1200 sq. ft.	50.00	1650.00
	Furniture & Fixture	-	25.00	825.00
	Instruments/Equipments	-	20.00	660.00
	Two wheeler for local conveyance	1	1.0	33.00
	Total	-	96.00	3168.00
Grand Total (A+B+C)		-	133.50	4405.50

*PCL – Plant Health Clinic Laboratories

Outcome:

- 1) Farmers will be benefited by proper identification of insect pests and diseases for their management.
- 2) Farmers will get advice for adopting proper IPDM strategies.
- 3) The cost of plant protection measures will be reduced by proper identification and adoption of IPDM strategies.
- 4) Knowledge of the farmers can be increased by the proper diagnosis at a time.

Table- 6.69 Budgetary Requirement for Establishment of Plant Health Clinical Laboratories

Sr. No.	Particulars	Year wise Cost (Rs. in Lakh)			
		1 st Year	2 nd Year	3 rd Year	Total Cost (Rs. in Lakh)
1.	Establishment of Plant Health Clinic Laboratories in each district	1497.37	1647.11	1811.82	4956.30
Total		1497.37	1647.11	1811.82	4956.30

6.60 Title: Establishment of Bio-control Laboratory

- ✓ A concomitant increase in the proportion of pests and diseases resulted in the increased use of toxic chemical for their management.
- ✓ The number of species resistant to pesticides and fungicides is ever increasing.
- ✓ In recent years, more emphasis is being given to the use of eco-friendly pesticide for crop production in view of their least toxic nature, low levels of disease/ pest resistance and low residue problems.
- ✓ Biological control is less costly and cheaper than any other methods.
- ✓ Bio-control agents give protection to the crop throughout the crop period.
- ✓ They do not cause toxicity to the plants.
- ✓ Application of bio-control agents is safer to the environment and to the person who applies them.
- ✓ They multiply easily in the soil and leave no residual problem.
- ✓ Bio-control agents not only control the disease but also enhance the root and plant growth by way of encouraging the beneficial soil micro flora. It increases the crop yield also.
- ✓ Bio-control agents are easy to handle and apply to the target.
- ✓ Bio-control agent can be easily combined with bio-fertilizers.
- ✓ It is harmless to human beings and animals (Environmentally safe).
- ✓ In spite of biological controls has be used in agriculture for centuries, as an industry biological control is still in its infancy.

- ✓ Therefore, there is a need to establish a registered bio-agent production unit at District level so that farmer can get required bio-agents from the nearest area with reasonable price.
- ✓ One bio-control laboratory at each district is proposed.

Table- 6.70 Approximate Cost for Bio-Control Laboratory

Sr. No	Particulars	Area/No.	Approx. cost for one BCL (Rs. in Lakh)	Approx. cost for 33 BCL (Rs. in Lakh)
1	Staff and Contractual Services			
A	Lab technician Pay scale 5200-20200 + GP 2800	2	6.40	211.20
	Research Associate @ Rs. 23000 p.m fixed + HRA @ 10%	2	6.10	201.30
	Total	4	12.50	412.50
B	Contingencies for electricity bill, maintenance, labour charges, hiring of vehicle, other contingent charges	-	25.00	825.00
	Total	-	25.00	825.00
C	Non recurring contingencies			
	Building			
	One Building	1200 sq. ft.	50.00	1650.00
	Furniture & Fixture	-	25.00	825.00
	Instruments/Equipments	-	30.00	990.00
	Total	-	105.00	3465.00
Grand Total (A+B+C)			142.50	4702.50

Outcome:

- 1) Farmers can get bio-control agent at nearest place with reasonable price.
- 2) Farmers will get quality bio-products.
- 3) Farmers can increase crop production and by that way get more income with reduction in crop protection expenses.
- 4) Pesticides residue can be minimized and soil, water and air pollution will be reduced.
- 5) By using the bio-agents, natural fauna can be increased.

Table- 6.71 Budget Requirement for Establishment of Bio-control Laboratory

Sr. No.	Particulars	Year wise Cost (Rs. in Lakh)			Total
		1 st Year	2 nd Year	3 rd Year	
1.	Establishment of Bio-control Laboratories in each district	1497.37	1647.11	1811.82	4956.30
Total		1497.37	1647.11	1811.82	4956.30

6.61 Title: Establishment of Pesticide Residue Laboratory

A pesticide as a group includes insecticides, fungicides, herbicides, rodenticides, acaricides, fumigants, plant growth regulators and other miscellaneous compounds. Usage of these chemicals in last five decades, in general, has undoubtedly led to improve human health particularly from malaria and dramatically increased crop yield through reduction of crop loss due to pests such as insects, plant diseases, weeds, etc. It has been estimated that if pesticide were not used in agriculture, the crop loss in the world would have been around 40 per cent. Thus, there is no doubt that chemical pesticides have played a vital role in increasing our agriculture production during the era of green revolution and that they will continue play a major role even in times to come. Unfortunately, indiscriminate use of these chemicals has resulted in reduction in biodiversity of natural enemies, outbreak of secondary pests, development of resistance to pesticides, pesticide induced resurgence and contamination of food and ecosystem. In fact presence of pesticide residues in food is of major concern all over the world, and their entry into the food chain may lead to disastrous consequences. Today, agriculture has become a subject of international multilateral trade under the WTO agreement. Many developed countries, of late, apply phytosanitary standards and environmentally and socially unacceptable cultivation practices as barriers to international trade. Besides, the consumers of the importing countries are rejecting questionable products resulting in heavy losses to the exporters. In this context, presence of toxic residues is a major hurdle in the acceptance of the food commodities by the importing countries. Hence it is important that our farm products are free from toxic pesticide residues.

Objectives of pesticide residue laboratory;

- ✓ To study the degradation pattern of pesticide in or on the soil, plant and water.
- ✓ To determine "Maximum Residue Limit (MRL)" of pesticides by conducting field trials under supervision adopting Good Agricultural Practices (GAP) in conjunction with the data obtained from the toxicological studies.
- ✓ To establish safe waiting periods or pre-harvest intervals (PHI) on the basis of multi-location trials.

- ✓ To screen agricultural produce drawn from farmer's field in order to judge, the pesticide usage pattern, so as to educate and train the farmers and extension workers in proper handling and use of pesticides.
- ✓ To conduct market survey of agricultural produce on the basis of which dietary intake of pesticide can be predicted and thus assess the risk to general public on account of pesticide residues by comparing daily dietary intake of pesticides with Acceptable Daily Intake (ADI).
- ✓ To monitor agricultural produce and environmental samples for pesticide residues.
- ✓ Minimum one laboratory in a cluster of five to six districts is recommended in the state to cater the need of the exporters, domestic consumers and these laboratories can be a part of Food Safety Act. It should be mandatory to adopt NABL-17025:2005 standard with the scope as per the need of the exporters/Food Safety Act.

Table- 6.72 Approximate Cost for Pesticide Residue Laboratory

Sr. No.	Particulars	Area/No.	Approx. cost for one PRL* (Rs. in Lakh)	Approx. cost for 5 PRLs (Rs. in Lakh)
Staff				
1	Head of the Laboratory Pay scale (37,400 – 67,000 + GP 10000)	One	12.00	60.00
	Technical Manager Pay scale (15600-39100 + GP 6600)	One	6.00	30.00
	Quality Manager Pay scale (15600-39100 + GP 6600)	One	6.00	30.00
	Lab Technician Pay scale (5200-20200 + GP 2800)	Two	5.00	25.00
	Research Associate Pay Scale: As per the ICAR	One	3.60	18.00
	Senior Research Fellow Pay Scale: As per the ICAR	Two	7.00	35.00
	Laboratory Attendants Pay Scale: Rs. 10,500/- fix per month	Three	4.00	20.00
	Travelling Allowance	-	2.0	10.0
	Total		45.60	228.00
Contingency				
Recurring				

2	Contingencies for chemicals, glass-wares, gases, AMCs, PT sample charges, electricity bill, maintenance of electricity supply, labour charges, hiring of vehicles, safety requirements and other contingent charges required for NABL set-up and day to day laboratory consumables.	-	30.00	150.0
	Total		30.00	150.00
3	Non recurring contingencies			
	Building			
	One building 2000 sq. ft.	2000 sq. ft.	90.00	450.00
	Furniture & Fixture	-	25.00	125.00
	Instruments/Equipments	-	400.00	2000.00
	Two wheeler for local conveyance	One	1.0	5.00
	Total		516.00	2580.00
Grand Total (1+2+3)			591.60	2958.00

PRL – Pesticide Residue Laboratory*Outcome:**

- 1) It can be useful for estimating residual toxicity of different pesticides.
- 2) Residues of various pesticides can be ascertained.
- 3) Toxicity of pesticides to the human being can be minimized.
- 4) Harvesting time after application of pesticides can be recommended to the farmers.
- 5) Residues on food commodities for export/import can be determined.
- 6) Farmers are educated for judicious use of pesticides.
- 7) Advice can be given to the farmers for regulating pesticidal use.
- 8) Consumers are educated about the precautions required to reduce the risk of pesticides exposure.

Table– 6.73 Budgetary Requirement for Establishment of Pesticide Residue Laboratory

Sr. No.	Particulars	Year wise Cost (Rs. in Lakh)		
		2 nd Year	3 rd Year	Total
1.	Establishment of Pesticide Residue Laboratories in each district	503.12	553.43	1056.55
	Total	503.12	553.43	1056.55

6.62 Title: Establishment of New Soil Testing Laboratories in Newly Formed Districts of State

At present there are 21 soil testing laboratories operating under DAG and their modernization and renovation work is going at present. Beside this 12 new districts have no laboratories. So establishment of 12 new laboratories is necessary for soil analysis.

Objectives

1. To established 12 new laboratories in the newly formed districts of the state

Table- 6.74 Approximate cost for establishment of 12 new soil testing laboratories (in the districts where at present there are no Govt. Lab.) under SIDP (Rs. In lakh)

Sr. No	Particulars	Area	Approx. Cost of one STL	Total cost of 12 STLs
1.	Building	2100 sq ft	50.00	600.00
	1 Lab of 600 sq. ft			
	1 sample room of 300 sq. ft.			
	1 instrument room of 300 sq. ft.			
	1 store room of 300 sq. ft.			
	1 staff room of 300 sq. ft.			
	Passage + toilet block 300 sq ft			
2	Furniture/fixtue for lab/store/office/sample room	-	20.00	240.00
3	Instruments, etc (including AAS)	-	35.00	420.00
4.	glass wares and chemicals		10.00	120.00
	Total	-	115.00	1380.00

6.63 Title: Create Facility of Inductively Coupled Plasma (ICP) in Zone wise Government Laboratories and in SAU's

At present s Soil Health Card programme running in the state. Huge amount of soil samples will be analyzed in stipulated time. So for rapid and accurate analysis of soil samples there is need to create facility of Inductively Coupled Plasma (ICP) instrument in zone wise 1 laboratory in state and 4 laboratories of SAU'S.

Table- 6.75 Approximate cost for Inductively Coupled Plasma (ICP)(Rs. In lacs)

Sr. No	Particulars	Zone wise requirement	Approx. Cost of one ICP	Total cost
1.	Inductively Coupled Plasma (ICP) for Government laboratories	4	50.00	200.00
2	Inductively Coupled Plasma (ICP) for SAU's	4	50.00	200.00
	Total	8	-	400.00

Table- 6.76 Overall Budget required Establishment of New Soil Testing Laboratories in the State and Create Facility of Inductively Coupled Plasma (ICP) (Rs.

In lakh)

Sr. No.	Particulars	Years			
		2017-18	2018-19	2019-20	Total
1.	State Infrastructure Development Plan (SIDP)				
	Establishment of new soil testing laboratories in the state	-	690.00	690.00	1380.00
	Create Facility of Inductively Coupled Plasma (ICP)	-	200.00	200.00	400.00

6.64 Title: Establishment of Advance Research cum Training center on soil health at four SAU's

In the SHC programme huge demand of well trained staff for soil testing laboratories would be required, also it need research to find out rapid techniques of soil analysis. And at the end the farmers need different types of training to improve their soil health.

Objectives

- Trained human resource generation for soil testing laboratories.
- Research on rapid method of farm waste management for improvement of soil health.
- Training to farmers on soil health management.

Table- 6.77 Approximate cost for Advance Research cum Training Centre

Sr. No	Particulars	Area/No	Approx. cost for one SAU (Rs. in Lakh)	Approx. cost for 4 SAU's (Rs. in Lakh)
1	Staff and Contractual Services			
A	Lab technician Pay scale 5200-20200 + GP-2800	1	3.20	12.80

	Research Associate @ Rs.23000 p.m fixed + HRA@10%	2	6.10	24.40
	Training associate @ Rs. 23000 p.m fixed + HRA@10%	2	6.10	24.40
	Total		15.40	61.60
B	Contingencies for Glassware, chemicals, electricity bill, maintenance, labour charges, other contingent charges.	-	10.00	40.00
	Total		10.00	40.00
C	Non recurring contingencies			
	Building			
	1 lab 20x20 ft	400 sq. ft	8.00	32.00
	1 training lab 30 x30 ft	900 sq. ft.	18.00	72.00
	1 Advance training hall 40 x40 ft	3200 sq. ft	64.00	256.00
	1 store room 20x12 ft	240 sq. ft	4.80	19.20
	2 office 20 x 12 ft	480 sq. ft	9.60	38.40
	Furniture & Fixture for lab, office and training hall	-	25.00	100.00
	Instruments	-	20.00	80.00
	Total		149.40	597.60
Grand Total (A+B+C)			174.80	699.20

Table- 6.78 Budgetary Requirements for Advance Research cum Training Centre on Soil Health

Sr. No.	Particulars				Total
		1 st Year	2 nd Year	3 rd Year	
1.	Pay and Contractual Staff	125.5	125.5	125.5	376.5
2.	Recurring contingencies	81.62	81.62	81.62	244.86
3.	Non recurring contingencies	597.6	-	-	597.6
Total		804.72	207.12	207.12	1218.96

6.65 Title: Establishment of training center for repair and maintenance of farm implements & machineries in the state

The training center for repair and maintenance of farm implement & machinery and irrigation equipment is proposed to train the local artisans and technicians and maintenance of machineries.

Table- 6.79 Proposal for Establishment of Training Center for Repair and Maintenance of Farm Implement & Machinery and Irrigation Equipment at District Level

Districts	Year-wise Financial Requirement (Phy. - Units Nos., Fin. - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Ahmedabad	1	600	-	100	-	100	1	800
Amreli	1	600	-	100	-	100	1	800
Anand	1	600	-	100	-	100	1	800
Banaskantha	1	600	-	100	-	100	1	800
Bharuch	1	600	-	100	-	100	1	800
Bhavnagar	1	600	-	100	-	100	1	800
Junagadh	1	600	-	100	-	100	1	800
Kachchh	1	600	-	100	-	100	1	800
Mehsana	1	600	-	100	-	100	1	800
Sabarkantha	1	600	-	100	-	100	1	800
Surat	1	600	-	100	-	100	1	800
Vadodara	1	600	-	100	-	100	1	800
Total	12	7200		1200		1200	12	9600

6.66 Title: Vocational courses institute for maintenance & repairs of agricultural implements

At present, mechanization is the prime requirement for agriculture. Various farm implements become popular among the farming communities to challenge the problem of labour crisis. Hence, by providing the training to the rural youth by vocational courses regarding maintenance and repairing of agriculture implements provides employment opportunity and farmers get door step facilities which save the cost & time of farmers.

Table- 6.80 Financial Requirements for Establishment of Vocational Courses Institute for Maintenance & Repairing of Farm Implements at District Level

Particulars	2017-18	2018-19	2019-20	Total
Office building	400	--	--	400
Hostel building	400	--	--	400
Equipment and furniture	250	120	50	420
Recurring expenditure	40	50	50	140
Total	1090	170	100	1360

(1 unit at district level, Rs. in Lakh)

6.67 Title: Establishment of implements/ machinery testing center at Banaskantha and Vadodara districts of Gujarat:

Table- 6.81 Proposal for Establishment of Implements/ Machinery Testing Centre at Banaskantha and Vadodara Districts of Gujarat

Description	Year-wise Financial Requirement (Phy. - Units Nos., Fin. - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy.	Fin.	Phy.	Fin.	Phy	Fin.	Phy.	Fin.
Agricultural implements/ equipments/ machinery Testing centre at district level	2	500	-	100	-	100	2	700

6.68 Title: Establishment of Special Production Zone for agricultural implements, equipments, machinery and irrigation equipments at Porbandar, Banaskantha, Vadodara and Navsari districts

It is proposed to establish the special production zone for agricultural implements, equipments, machinery and irrigation equipments at Porbandar district for the production of different machineries, equipments etc. at local level.

Table- 6.82 Proposal for Establishment of Special Production Zone for Agricultural Implements, Equipments, Machinery and Irrigation Equipments at Porbandar, Banaskantha, Vadodara and Navsari Districts

Description	Year-wise Financial Requirement (Phy. - Units Nos., Fin. - Rs. in Lakh)							
	2017-18		2018-19		2019-20		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Special production zone for agricultural implements, equipments, machinery and irrigation equipments at district level	4	800	4	100	-	100	4	1000

6.69 Title: Strengthening of training infrastructure facilities at farmers Training Center (district level) and Farm information and Advisory Centers (FIACs - at block level)

Trainings are one of the most important activities conducted by extension and development institution/departments to educate farmers on different aspects of agricultural and allied activities. The changing agriculture economic scenario, fast technology generation and its applications in complex world of today's agriculture necessitated constant trainings for capacity building and skill up gradation of farmers as well as technical staff. The FTCs and

FIACs are established training institution at district and block level, respectively, to cater to the training needs of different clientele. Infrastructural facilities are requiring to be created at both levels for conducting training effectively to increase farm productivity.

Cost for the Strengthening of training infrastructure facilities at FTC (district level) and FIAC (FIACs – at block level) is given below.

Table- 6.83 Cost for the Strengthening of Training Infrastructure Facilities at FTC (District Level) and FIAC (FIACs – at Block Level)

Details	Cost per each Center	26 FTC at District Level (Farmer Training Center)	248 FIAC at Block Level (Farm Information & Advisory Center)	Total Cost (Rs. in Lakh)
Training Hall	50.00	1300.00	12400.00	13700
Information technology Lab	25.00	650.00	6200.00	6850
Automatic Weather Station	8.00	208.00	1984.00	2192
Well equipped training hall	210.00	5460.00	52080.00	57540
E-connected computer lab	70.00	1820.00	17360.00	19180
Soil testing lab	40.00	1040.00	9920.00	10960
Total		10478	99944	110422

Year Wise Outlay for Strengthening of training infrastructure facilities at FTC (district level) and FIAC

Table- 6.84 Year Wise Outlay for Strengthening of Training Infrastructure Facilities at FTC (District Level) and FIAC (FIACs – at Block Level)

Details	Year wise Cost (Rs. in Lakh)			Total
	1 st Year	2 nd Year	3 rd Year	
26 FTC at District Level (Farmer Training Center)	4489	3489	2500	10478
248 FIAC at Block Level (Farm Information & Advisory Center)	42472	32472	25000	99944
Total	46961	35961	27500	110422

6.70 Title: Establishment of Community Radio Station

Realizing the importance of Community Radio in creating awareness at the grassroots level, the Prime Minister of India Shri Narendra Modi has urged agricultural colleges for using this tool for the benefit of farmers. Addressing scientists at the 86th ICAR Foundation Day, Modi talked about thinking out of the box and providing solutions which would ensure implementation for helping the system. Suggesting that scientists should use radio stations effectively, he said “All agricultural colleges should own a radio station because farmers listen to radio a lot.” He further suggested that, “Since agricultural colleges have the facility to apply for permission to set up a Community Radio Station, students can be provided work in house to research and talk on radio. Through this tool farmers’ problems can be addressed by providing solutions which have been offered by the farmers of the same area. ”He stressed on the fact that, “instead of spending crores of money as investment, programs produced by college students for spreading awareness amongst farmers would be more credible and popular.”

According to the current Community Radio situation of operational Community Radio Stations only 12 operational radio stations belong to either Krishi Vigyan Kendras (KVKs) and agricultural colleges or institutes. Out of the 175 operational Community Radio Stations 163 permissions have been issued to NGOs or educational institutes and the remaining few licenses have been granted to agricultural institutes or Krishi Vigyan Kendras. Though around 208 applications received for the grant of setting up a Community Radio Station are through Krishi Vigyan Kendras or agricultural institutes, only 12 operational Community Radio Stations seems like a dot on the map of India. The delay in issuing permissions has also been due to the pendency created by the Ministry of Agriculture in giving clearances to more than 50 applications approximately. This dream also remains unfulfilled because of the delay created by the Wireless Coordination Wing of the Ministry of Communications and Information Technology in issuing frequencies for more than 80 Letter Of Intent (LOI) holders approximately. For starters, the pendency of clearances of applications submitted should be prioritized by the Ministry of Agriculture on an urgent basis. Also, for ensuring the increase in applications made by agricultural colleges and Krishi Vigyan Kendras, the Ministry of Information & Broadcasting could tie hands with the Ministry of Agriculture and organize awareness generation consultations about Community Radio specially designed for KVKs and agricultural institutes.

The objectives of C.R.S are to keep the community informed and to revive, retain and sustain cultural heritage, traditions and norms, empower the community by sharing knowledge.

Financial Requirement:

The funding for setting up CRS would come from ATMA Resources and shall be as per the approved SEWP. For seeking fund support under ATMA, the proposal for setting up of

CRS be reflected in the work plan. For sustenance, the Agency would be required to give an undertaking for continuing the broadcasting of agricultural programmes for two years after the discontinuation of funding support from the Ministry of Agriculture, Govt. of India and for further period of two years after renewal of license.

**Table- 6.85 Essential Components with Cost Required for Setting up of
Community Radio Station (CRS)**

Sr. No.	Component	Cost (Rs)
1.	Hardware	
(i)	Studio facility comprising of 1 on-air cum production studio and 1 discussion studio	
a	Audio mixing console	40000
b	Semi-professional C.D. player/cassettes player/recorder	40000
c	Microphones + microphone stands	19500
d	Stereo Headphone	5000
e	Distributor Amplifier	12000
f	Speakers	10000
g	Phone in Console	20000
h	Audio patch Bay with Patch cords	7000
i	Audio Play Out System + Computer + Sound Cards	70000
j	Editing Software (in local language)/Recorder PB System Software	30000
k	USB MP3 Audio Recorder	15000(3)
l	Near Field Monitor (1 Pair)	12000
SUB TOTAL		2,80,500
(ii)	Transmission Facility	
a	50 W FM Transmitter in 1+1 Configuration With PatchBay	225000
b	Dummy Load 100 W	25000
c	FM Antenna two Bay	40000
d	RF Cable 50 Mtr.	25000
e	Logger Software + PC + FM Receiver/PC Work Station	55000
f	30 Mtr. Guyed Tower	110000
SUB TOTAL		4,80,000
(iii)	Civil/Electrical/Acoustic Work for 400 Sq.Ft.	3,20,000
(iv)	Air-conditioning 2 nos. 1.5 ton split AC units for studio and 1 no. Window type 1.5 ton AC for transmission cum UPS room	60,000
(v)	Un-interrupted Power Supply System 3 KVA – 30 minute backup	60,000

(vi)	Diesel Generator 5 KVA	125000
(vii)	Installation material comprising of audio cables, connectors RF connectors etc.	30000
(viii)	Installation and commissioning /Consultancy and Design	100000
GRAND TOTAL		14,55,500

Table- 6.86 Proposed Cost for Running of CRS

Year	Amount (Rs.)
First Year :	14,55,500/-
(a) Setting up of CRS with (i) Twin Transmitters of 50 watt power with 100 ERP with manual change over, (ii) One onair& one production studio in an area of 400 Sq. ft, (iii) Antenna height of 30 mtrs. above the ground	
(b) Expenditure for Content creation for two hrs. of programme daily i.e. 730 hrs/ year @ Rs. 2,350/- per hr.	17,15,500/-
TOTAL	31,71,000/-
Second Year:	12,87,800/-
(a) Expenditure for Content creation for 1 ½ hrs. of programme daily i.e. 548 hrs/ year @ Rs. 2,350/- per hr.	
Third Year:	4,30,050/-
(a) Expenditure for Content creation for ½ hr. of programme daily, i.e. 183 hrs/year @ Rs.2,350/- per hr.	

The **Community Radio Station (CRS)** should be established in all the districts at KVKs (30) of Gujarat which cost would be as below.

Table- 6.87 Proposed Community Radio Stations (CRS) in Gujarat State

Description	1 st Year	2 nd Year	3 rd Year	Total Cost
Community Radio Station in all districts at KVKs (30)	564.12	564.12	564.12	1692.36

6.71 Title: Strengthening of Krushi Vigyan Kendra

Each district faces situations with shrinking natural resources, vagaries of nature and inefficient management of natural resources and rural communities are exposed to the predicament of drought effects spanning socio-economic and bio-physical parameters, frequent crop failures, economic losses, leading to frustration, abandoning farming and shift to

alternate income earning opportunities. At present, the farmers concentrate mainly on crop production which is subjected to a high degree of risk and uncertainty for income and employment generation. In this contest, it is imperative to evolve suitable strategy for augmenting the income of a farm. Integration of various agricultural enterprises viz., agriculture, animal husbandry, horticulture, poultry, fishery, agro forestry etc. have great potentialities to generate extra income with optimum use of natural and human resource in addition to this solar and biogas should be given due importance so that energy in the form of solar and biogas will reduce the dependence on electricity.

Integrated farming system approach is not only a reliable way of obtaining fairly high productivity with considerable scope for resource recycling, but also concept of ecological soundness leading to sustainable agriculture.

The major objectives of IFS model:

1. Evaluation of IFS model of income for the livelihood security and sustainable development
2. Development and evaluation of synergic effects and their actions associated with established IFS model
3. Imparting training and capacity building of various stakeholders on Integrated Farming systems

Integrated Farming is a combination of different agricultural activities in unit area of land with following aims:

1. Maximizing return from the unit area
2. Maintaining soil status and fertility
3. Utilizing by-products of one component of the farming system as an input in other for ensuring supplementary and complementary enterprise relationship
4. Reducing environment pollution.

KVKs are working as a resource and knowledge center of agricultural technology for supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district. The main aim of KVK is transfer of technology through on and off campus training programmes for farmers and extension functionaries, front line demonstration, on farm trials and other extension activities. Demonstration unit at KVK is an important extension tools for effective transfer of technology as principle seeing is believing is involved. Further skill training programmes is part and partial of KVK activity and some of KVKs have no hostel facilities for the farmers for residential skill training programmes.

Therefore, it is proposed to establish hostel for the farmers and live demonstration unit of Integrated Farming System (IFS) at all KVKs, which will helpful in replication of the projects at farmers' field to secure their livelihood and income generation.

Primary outcome:

- Creation of facilities for agricultural extension education work
- Development of human resource in general and farmers in particular

- Immense possibilities of developing IFS model at farmers' field which will help to minimize risk in farming

Other possible outcomes:

- IFS model in farmers' field will generate employment opportunities in rural area.
- Long duration skill training for farmers will be possible if hostel facilities are available and there are possibilities of entrepreneurship development among the young farmers and them by commercialization of technology
- Promotion of fish farm is possible which will be helpful for the farmer to earn more income.

Type of beneficiaries for the project

Farmers, farm women, rural youth, extension functionaries, agricultural entrepreneur and para extension workers

Table- 6.88 Component wise and Year wise Projection Cost for Strengthening of Krushi Vigyan Kendras (Rs

in lakhs)

Item	Establishment of hostel (A) (₹. in lakhs)	Establishment of IFS model (B) (₹ in lakhs)	Total (A+B) (₹ in lakhs)
Recurring	-	86.00	86.00
Non- recurring	-	-	-
Construction	200.00	257.00	457.00
Total	200.00	343.00	543.00

Work Plan for the implementation of the Project;

Objective wise operation modality	Activities
Establishment of farmer's hostel.	Establishment of farmers hostel at KVKs for residential skill training through office of executive engineer, SAUs
Establishment of IFS model with revamping of farm pond.	Establishment of various components of IFS model with revamping of farm pond through office of executive engineer, AAU, Anand and procurement of tools and instrument will be done within the framework of SAUs rules and regulations.

Appendix – 1 List of non-recurring/recurring instruments/facilities with their justification (APPROXIMATE COST STRUCTURE AT KVKs)

Sr. No.	Component	Approx. Cost (₹in lakhs)		Justification
		Recurring	Construction	
A.	Establishment of farmers' hostel (350 sq.m)	-	200 lakhs	For residential skill training programme hostel facility is extremely needed at KVKs, for organizing long term skill training programme.
B.	Establishment of IFS Model			Serial no. B, item no. 1 to 12 are part and partial of IFS model which is to be developed as a live demonstration unit at KVKs so that farmers can replicate this model in their own farm, based on their need and resources to minimise risk in agriculture.
1	Revamping of farm pond (1.5 ha)	70.00	230.00	
2	Ideal animal shed and grass godown	-	15.00	
3	Two Gir breed milch cow	2.00	-	
4	Two Mehsani buffalo breed	2.00	-	
5	Poultry unit having 25 birds	1.00	2.00	
6	One biogas plant (2 cubic meter)	-	1.00	
7	Different vermi-compost unit	0.5	4.50	
8	One net house (plug nursery for vegetable and fruit crop)	3.00	4.00	
9	Poly House	2.00	-	
10	Solar photo voltaic unit for lighting	1.00	-	
11	One azola unit (3 m x 5 m x 2 m)	0.50	0.50	
12	Solar water pumping system	4.00	-	
Total		86.00	457.00	

Table- 6.89 Budget Requirement for Strengthening of Krushi Vigyan Kendras in Gujarat State

(₹ in lakhs)

Description	1 st Year	2 nd Year	3 rd Year	Total Cost
Strengthening of Krushi Vigyan Kendra (30)	5430	5430	5430	16290

6.72 Title: “Development, Maintenance, Evaluation and Characterization of Male Sterile Lines in Fennel (*Foeniculum vulgare* Mill.)”

Sr. No.	Description	Particulars/ Remarks
1.	2.	3.
1	a. Project Proposed by	S. D. Agricultural University, Sardarkrushinagar
	b. Name of concern HOD (Government Department)	The Vice Chancellor
2	Name of the new project	“Development, maintenance, evaluation and characterization of male sterile lines in fennel (<i>Foeniculum vulgare</i> Mill.)”
3	Nature of the project	Research and Development
4	Context/ Background of the project	<p>Spices occupy an important place in the lives of people. A wide variety of spices are grown in the India of which seed spices is a group. One of them, Fennel (<i>Foeniculum vulgare</i> Mill. 2n=22) belonging to family Apiaceae is an allogamous crop with (82.2 to 95.4%) cross- pollination. Flowers are small, hermaphrodite, complete, regular and pentamerous. Cross pollination in fennel is mostly due to presence of bees. Due to small flower size hand emasculation is tedious job for development of commercial hybrids. So, male sterility makes it easy to develop hybrid in fennel.</p> <p>The volatile oil extracted from seeds is used for scenting and flavoring. Fennel seeds are used in diseases like cholera, bile disturbance, and constipation.</p>

Sr. No.	Description	Particulars/ Remarks
		<p>In Gujarat, it occupies an area of 10909 hectares with an annual production of 87821.66 million tones which shows 2.14 million tones per hectare productivity during 2016-17. Looking to the last ten years data of area and production (Table no.1) which indicates stagnancy in productivity and area.</p> <p>To break down this limit we need to exploit heterosis in fennel. There is a possibility to increase yield potentiality by utilizing availability of sign of male sterility in fennel by developing male sterile lines and subsequently its utilization in hybrid breeding programme to exploit available heterosis commercially in fennel as being a cross pollinated crop.</p>
5	<p>a. Problems to be addressed by this project</p> <p>b. Mention baseline data/ survey/ reports etc. pertaining to area of the projects</p>	<p>Stagnant yield as only varietal improvement carried out. There is a possibility to exploit heterosis through utilizing male sterility observed in fennel for development of male sterile line, its maintenance strategy and subsequently development of hybrids.</p> <p>Rarely male sterility reported in fennel. So developing indigenous male sterile line will help in development of hybrids easily on commercial basis. Hence, present investigation will be carried out for increasing the productivity of fennel. Hence, this project is highly required.</p>
6	<p>a. Aims of the project</p> <p>b. Objectives of the project</p>	<p>Development and characterization of male sterile lines in fennel</p> <ul style="list-style-type: none"> • Development of male sterile lines, its maintenance and confirmation of its stability. • Morphological and molecular characterization of male sterile lines. • Utilization of male sterility for development of hybrids.

Sr. No.	Description	Particulars/ Remarks
	C. Outputs/ Deliverables expected for each development objective	<ul style="list-style-type: none"> • Development of male sterile lines: Sib-mated progenies of male sterile plants will be observed and data on sterile and fertile plants in each progeny will be recorded. • Maintenance of male sterile lines: Maintenance will be carried out as per results on sterility/fertility. • Stability of male sterile lines: Male sterility will be tested across area of university jurisdiction. • Morphological and molecular characterization of male sterile lines: Ancillary observations along with sterility/fertility will be recorded. • Molecular characterization will be carried out using suitable marker technology for finger printing. • Utilization for development of hybrids and conversion of good ergonomically superior lines in to male sterile lines for further utilization in heterosis breeding: Hybrids will be prepared on stable male sterile lines. Further new lines for sterility will be developed by utilizing back cross breeding method. These lines may further utilized for development and commercialization of hybrid vigour.
7	a. Strategy of the Project	Development of indigenous male sterile lines.
	b. Reasons for selecting the proposed strategy	Exploitation of heterosis for enhancement of the productivity of fennel.
	c. Basis for prioritization of locations should be indicated	Jagudan is more suitable for the project where research on seed spices is under way.
	d. Provide a description of the ongoing initiatives, and the manner in which duplication can be avoided and synergy created with the proposed project	Not initiated

Sr. No.	Description	Particulars/ Remarks
8	a. Target beneficiaries for the projects	Increase average state and national productivity of fennel and benefit directly goes to farmers.
	b. Stakeholder analysis including consultation with stakeholders at the time of scheme/ project formulation	NA
	c. Impact of the project on weaker sections of society, positive or negative, should be assessed and remedial steps suggested in case of any adverse impact	Male sterility will help in development of hybrid in fennel which will improve productivity.
9	Area of the project:	Gujarat
10	Benefit of proposed new technology in the new project	Increase average state and national production of fennel.
11	a. Project Management -	Seed Spices Research Station, Jagudan, SDAU will be responsible for carrying out the activities.
	b. Responsibilities of different agencies for project management	SDAU will be responsible for implementation and management of project
	c. The organization structure at various levels	The Vice Chancellor □ The Director of Research □ The Research Scientist
	d. Human resource requirements	As per Appendix I
	e. Monitoring arrangements	-
	f. In case of projects proposed to be taken up under PPP mode, guidelines clearly defining the role of the partners, their financial liabilities and sharing of profit/ revenue, generated, management responsibilities, etc., to have to be worked out and to be mentioned here.	-
12	a. Finance	100 % RKVY Share
	b. Cost estimates means of financing and phasing of expenditure. Cost of the projects – Investment to be made by entrepreneur in the project. The amount of subsidy under the project, if any. Requirement of fund under RKVY for the year	As per Appendix II

Sr. No.	Description	Particulars/ Remarks
	c. Budget for the scheme/ project	Rs. 78.10 lakhs
	d. Source of funding	RKVY
	e. Options for cost sharing and cost recovery (user charges) should be explored	-----
	f. Issues relating to project sustainability, including stakeholder commitment, operation – maintenance of assets after project completion and other related issues should also be addressed	The developed infrastructures and assets will be utilized by the university for further research on related issues
13	Physical and financial target (Component wise)	As per Appendix III
14	a. Time Frame: Work plan for implementation of project	<p>First Year :</p> <ul style="list-style-type: none"> • Development of male sterile lines: Sib-mated progenies of male sterile plants will be sown. • Observations on sterile and fertile plants in each progeny will be recorded and will be further maintained by sib matting. • Fertile plants will be selfed and further utilization in next year for sterility maintenance through sib matting. <p>Second Year :</p> <ul style="list-style-type: none"> • First year activities to be carried out. • Distinct male sterile progenies will be sib mated and large quantity of seeds will be produced to evaluate next year in station trial for sterility. <p>Third Year :</p> <ul style="list-style-type: none"> • Second year activities to be carried out. • Station trial will be conducted for sterility. • Ancillary observations will be recorded along with sterile and fertile plants in distinct progenies. <p>Fourth Year :</p> <ul style="list-style-type: none"> • Third year activities to be carried out.

Sr. No.	Description	Particulars/ Remarks
		<ul style="list-style-type: none"> • Multi location trial will be conducted for stability of male sterile lines: Male sterility will be tested across area of university jurisdiction. <p>Fifth Year :</p> <ul style="list-style-type: none"> • Fourth year activities to be carried out. • Morphological and molecular characterization of male sterile lines: Ancillary observations along with sterility/fertility will be recorded. • Molecular characterization will be carried out using suitable marker technology for finger printing. • Maintenance of male sterile line will be standardized. • These lines in future will be utilized for development of hybrids and conversion of good agronomically superior lines in to male sterile lines for further utilization in heterosis breeding: Hybrids will be prepared on stable male sterile lines. Further new lines for sterility will be developed by utilizing back cross breeding method. These new male sterile lines may further utilized for development of hybrids. • After completion of the project report writing will be carried out as per the results obtained.
14	b. Project Evaluation Review Technique (PERT)/ Critical Path Method (CPM) for implementation of Project	-----
15	a. Risk analysis of the project	NA
	b. Legal/ Contractual risks	NA
	c. Environmental risks	Environmental friendly
	d. Revenue risks	NA
	e. Project management risks	Expression of male sterility and establishment of maintenance system may depends on genotype x

Sr. No.	Description	Particulars/ Remarks
		environment interaction, so some time it may take some more time to establish system.
	f. Regulatory risks	-
16	a. Outcomes	To boost the productivity of fennel through hybrid development which ultimately increase the farmer's income and also export potential of fennel which brings more foreign exchange.
	b. Deliverables/ outcomes should also be specified in measurable terms	Reduce low yield potential and generate more income and export quantity.
	c. Impact assessment	Hybrid development will ultimately increase area and productivity of fennel.
17	Cost Benefit Analysis: Benefit/ Impact of the project for infrastructure or where ever applicable	Being R & D project, Not applicable
18	Whether the project has been included in DAPs/SAPs? Yes/ No. Please mention the name of district and Page No.	No
19	Whether the project has been approved in DLPC? Yes/ No. If Yes, Please send the copy of DLPC approved letter	No
20	a. Evaluation	-
	b. Whether concurrent evaluation is part of the project? Mention the details	No
	c. Whether post project evaluation is part of the project? Mentioned the details.	No

Table- 6.90 Fennel Area, Production and Productivity data of last ten years of Gujarat

(Area= Ha., Production= MT, Productivity= M.T/ Ha)

Sr. No.	Year	Area	Production	Productivity
1	2016-17	40909	87821.66	2.14
2	2015-16	45400	96773.87	2.13
3	2014-15	30200	63845	2.11
4	2013-14	22100	45020	2.04
5	2012-13	39801	78733	1.98

6	2011-12	39500	57941	1.47
7	2010-11	52809	97504	1.85
8	2009-10	42833	76128	1.77
9	2008-09	64867	106528	1.64
10	2007-08	74468	126828	1.70

Appendix- I**Staff requirement**

Sr. No.	Name of Post	No. of Post	Pay scale (Rs.)
1.	Senior Research Fellow (M.Sc.(Agri.) in Plant Breeding)	01	16,000/-
2.	Field Assistant (Polytechnic in Agriculture / Horticulture)	02	13,500/-

Appendix- II**Recurring contingency**

Sr. No.	Name of Items	Year -wise financial requirement (Rs. In lakhs)			Total Amount (Rs. In lakhs)
		1 st	2 nd	3 rd	
1.	Seeds and fertilizer-pesticides	3.00	3.50	4.00	10.50
2.	Labour charges	4.00	4.50	5.00	13.50
3.	Electricity	0.70	0.80	0.90	2.40
4.	Fuel charges	0.70	0.75	0.80	2.25
5.	Breeding kit (selfing bag, cloth bag etc.)	0.75	0.80	0.90	2.45
6.	Miscellaneous	1.30	1.40	1.50	4.20
	Total	10.45	11.75	13.1	35.30

Appendix- III

Table- 6.91 Estimated Cost of the Project of Three Years for Development, Maintenance, Evaluation and Characterization of Male Sterile Lines in Fennel

Sr. No.	Name of item	Year-wise approximate expenditure (Rs. In lakhs)			
		I	II	III	Total
1.	Staff requirement	5.16	5.16	5.16	15.48
2.	Recurring contingency	10.45	11.75	13.1	35.30
	TOTAL	15.61	16.91	18.26	50.78

6.73 Title: Value Enhancement of Cumin through Organic Cultivation

Sr. No.	Description	Particulars/ Remarks
1.	2.	3.
1	a. Project Proposed by	Research Scientist, Seed Spices Research station,
1	b. Name of concern HOD (Government Department)	--
2	Name of the new project	VALUE ENHANCEMENT OF CUMIN THROUGH ORGANIC CULTIVATION
3	Nature of the project	Flexible
4	<p>Context/ Background of the project</p> <p>India has been holding an enviable reputation in seed spices and has always been incredibly recognized as a "Home of spices" since yore. The seed spices constitute an important group of agricultural commodities and play a pivotal role in our national economy. At present India is the largest producer, consumer and exporter of spices and their products. Gujarat and Rajasthan together comprise over 80 per cent of total national seed spices production. Among the seed spices, cumin is highly remunerative crop of arid and semi arid regions. It is low volume but high value crops and are grown with fewer inputs. The drier regions of Gujarat and Rajasthan perforce use lesser fertilizers and pesticides thereby making these regions as organic by default. Awareness in health conscious increased the demand of organic products at national as well as international market.</p> <p>Organic farming in the production of cumin is an important segment for increasing the value of cumin for domestic and export purposes. Injudicious use of fertilizers and pesticides cause harmful effect on soil health and produced due to presence of chemical residues alter the export potential of cumin. To overcome the problems and present health conscious in human being as well as soils, organic and hazardous chemicals residue free production is a major aim. Cultivation of organic cumin improves the quality i.e. volatile oil, protein and cuminol content and reduce microbial load.</p> <p>Cumin has low nutritional requirements that can be easily fulfilled through organic sources. The organic sources like empowered compost, micro organisms for enhancing nutritional availability (<i>Azospirillum</i>, PSB etc), root security (<i>Trichoderma</i> etc), predators and parasites, VAM for extracting nutrition and water from aquifer, castor cake for nutrition and combating biotic problems can be exploited to raise healthy crop of cumin. These interventions can take care of chemical residue problems that are often reasons for rejection of lots meant for export. Cumin is very sensitive to moisture and light intensity. Slight change in climatic condition may lead to crop failure due to incidences of pest and diseases among which aphid, blight and</p>	

Sr. No.	Description	Particulars/ Remarks
	powdery mildew are the major concern. This can be countered by use of non-voilent control measures entailing biocontrol and manipualtion of agro-techniques.	
5	a. Problems to be addressed by this project	Injudiceous use of fertilizers and pesticides cause harmful effect on soil health and cumin seed yield due to presence of chemical residues alter the export potential of cumin.
	b. Mention baseline data/ survey/ reports etc. pertaining to area of the projects	The drier regions of Gujarat and Rajasthan perforce use lesser fertilizers and pesticides thereby making these regions as organic by default.
6	a. Aims of the project	<ul style="list-style-type: none"> • To promote organic cultivation of cumin in default area of cumin growers.
	b. Objectives of the project	<ul style="list-style-type: none"> i. To study the comparative yield and quality of produce of cumin in organic and conventional modules. ii. To study comparative incidences of diseases and pests in organic and conventional modules and their impact on quality and yield of cumin. iii. To ascertain the comparative residues of chemical in the produce of cumin obtained in organic and conventional modules. iv. To study the comparative alteration in chemical properties of soil by employing organic and conventional modules v. To create awareness among the farmers for organic cultivation of cumin.
	C. Outputs/ Deliverables expected for each development objective	<ul style="list-style-type: none"> i. To produce quality cumin seed yield. ii. To test control measures for diseases and pest under organic production. iii. To determine lethal levels of residues in conventional and organic cumin production. iv. To determine alteration of chemical properties under different modules v. To make awareness among farmers about organic cultivation of cumin
7	a. Strategy of the Project	Seed Spices Research Station, SDAU, Jagudan is the key institution for research on seed spices. Therefore execution of the

Sr. No.	Description	Particulars/ Remarks
		project will be done by this centre. Training and research cum demonstrations on organic cultivation on and off farm will be conducted on different modules.
	b. Reasons for selecting the proposed strategy	For easy handling and management of the project
	c. Basis for prioritization of locations should be indicated	Cumin cultivated in areas where chemical inputs required very less or in nil amount i.e. Certain areas of Radhanpur taluka.
	d. Provide a description of the ongoing initiatives, and the manner in which duplication can be avoided and synergy created with the proposed project	In this pocket good agricultural practices are adopted by farmers under the direct guidance of scientist from SSRS.
8	a. Target beneficiaries for the projects	Farmers
	b. Stakeholder analysis including consultation with stakeholders at the time of scheme/ project formulation	NA
	c. Impact of the project on weaker sections of society, positive or negative, should be assessed and remedial steps suggested in case of any adverse impact	Positive
9	Area of the project:	Patan and Mahesana district
10	Benefit of proposed new technology in the new project	<ul style="list-style-type: none"> • Maintai soil health • Chemical residue free cumin seed yield • Quality produce
11	a. Project Management –	Managed by S.D.Agricultural University,
	b. Responsibilities of different agencies for project management	<ul style="list-style-type: none"> • Plant protection :Develop and implement organic plant protection practices • Soil Science : Soil health study • Agronomy : Implement Oragnic manure and crop husbandary technologies • Biochemistry : Insecticide – pesticide residues in seeds of cumin
	c. The organization structure at various levels	Facilitate by S.D.Agricultural Uniersity,
	d. Human resource requirements	Contractual services (Annexure – I)
	e. Monitoring arrangements	As per requirement

Sr. No.	Description	Particulars/ Remarks
	f. In case of projects proposed to be taken up under PPP mode, guidelines clearly defining the role of the partners, their financial liabilities and sharing of profit/ revenue, generated, management responsibilities, etc., to have to be worked out and to be mentioned here.	--NA--
12	a. Finance	
	b. Cost estimates, means of financing and phasing of expenditure. Cost of the projects – Investment to be made by entrepreneur in the project. The amount of subsidy under the project, if any. Requirement of fund under RKVY for the year	--NA--
	c. Budget for the scheme/ project	Annexture – II
	d. Source of funding	RKVY
	e. Options for cost sharing and cost recovery (user charges) should be explored	-- NA --
	f. Issues relating to project sustainability, including stakeholder commitment, operation – maintenance of assets after project completion and other related issues should also be addressed	--NA--
13	Physical and financial target (Component wise)	Annexture - III
14	a. Time Frame: Work plan for implementation of project	Five year
	b. Project Evaluation Review Technique (PERT)/ Critical Path Method (CPM) for implementation of Project	-- NA --
15	a. Risk analysis of the project	-- NA --
	b. Legal/ Contractual risks	-- NA --
	c. Environmental risks	Cumin is highly risky crop and slight change

Sr. No.	Description	Particulars/ Remarks
		in climatic condition ruined the crop by infestation of blight.
	d. Revenue risks	-- NA --
	e. Project management risks	-- NA --
	f. Regulatory risks	-- NA --
16	a. Outcomes	North Gujarat has very suitable environment condition for cultivation of organic cumin. Thus, production of residue free cumin increases the health avenues for both domestic and export purposes culminating in earning much needed foreign exchange for improvement of GDP of the nation. Increase in livelihood through more earning from sell of organic cumin and sustain the soil health.
	b. Deliverables/ outcomes should also be specified in measurable terms	Revenue through domestic and export purposes concluded in earning much needed foreign exchange for improvement of GDP of the nation.
	c. Impact assessment	The yield of cumin crop may be affected and production potential is reduced up to certain initial period of time.
17	Cost Benefit Analysis: Benefit/ Impact of the project for infrastructure or where ever applicable	--NA--
18	Whether the project has been included in DAPs/SAPs? Yes/ No. Please mention the name of district and Page No.	-- NA --
19	Whether the project has been approved in DLPC? Yes/ No. If Yes, Please send the copy of DLPC approved letter	-- NA --
20	a. Evaluation	
	b. Whether concurrent evaluation is part of the project? Mention the details	-- NA --
	c. Whether post project evaluation is part of the project? Mentioned the details.	-- NA --

APPENDIX-I

Contractual Services

Staff Requirement		No.	Year - wise requirement (Rs.in lakhs)			Total (Rs.)
Designation	Pay (Rs)		I	II	III	
Senior Research Fellow	Rs.16,000/- per month	03	5.76	5.76	5.76	17.28
Agricultural Assistant	13,500/- per month	03	4.86	4.86	4.86	14.58
TOTAL			10.62	10.62	10.62	31.86

APPENDIX-I-A

Operational Expenses requirement

Sr. No.	Requirement	Year - wise requirement (Rs.in lakh)			Total (Rs.in lakh)
		I	II	III	
1	FYM, biofertilizers, organic sources of fertilizers and bio pesticides, (Neem oil and <i>L. lecanii</i>) and bio fungicides (<i>Trichoderma viridae</i> and <i>Pseudomonas florescence</i> and <i>Garlic extract</i>) pesticides residues chemicals/consumables	4.25	5.00	5.00	14.25
2.	Labour Charges	2.50	2.50	3.00	8.00
3.	Training	0.70	0.80	0.90	2.40
4.	Vehicle Hiring	0.30	0.30	0.30	0.90
Sub- Total (A)		7.75	8.60	9.20	25.55

APPENDIX- II

Table- 6.92 Year - wise Budget Requirement for Value Enhancement of Cumin through Organic Cultivation

Sr. No.	Item	Year - wise requirement (Rs.in lakh)			Total (Rs.in lakh)
		III	IV	V	
1	Recurring Contingency				
	(i) Operational Cost	7.75	8.60	9.20	25.55
	(ii) Contractual Services (Appendix-I)	10.62	10.62	10.62	31.86
Total		18.37	19.22	19.82	57.41

APPENDIX – III Physical and financial target (Component wise)

Sr. No	Activities	Year - wise distribution				
		I st	II nd	III rd	IV th	V th
A.	CROP HEALTH					
1	Adoption of different organic module and comparison of the same with conventional modules for soil properties, crop health, grain quality and chemical residues in produce.	□	□	□	□	□
2	Deployment of different resource management of organic sources of nutrients, predators / parasites in organic module	□	□	□	□	□
B.	TRANSFER OF TECHNOLOGY					
1	Technology dissemination through FLD's	-	-	□	□	□
2	Awareness training and interaction seminar for stake holder	□	□	□	□	□

Details of programme :

<p>A.1 : Adoption of different organic module and comparison of the same with conventional modules for soil properties, crop health, grain quality and chemical residues in produce Module 1 : Conventional module Module 2 : Organic module</p>
<p>A.2 : Grain quality and chemical residues in produce : Grain samples from Module-1, Module -2 and surveillance samples from farmer's fields will be evaluated for grain quality viz., volatile Oil, Oleoresin, Cuminaldehyde content and chemical residues. Soil properties viz., physical, chemical and biological will be studied.</p>
<p>B.1 : Technology dissemination through FLD's : After three years of evaluation of different modules, the front line demonstrations on effective technologies will be taken up in large scale areas of organic cultivation on farmers fields.</p>
<p>B.2 : Awareness training and interaction seminar for stake holder : Farmers training programmes will be organized prior to sowing of cumin in each respective years. Trainings will be imparted to FLD farmers and others too. Besides this, interaction seminar for farmers, traders, exporters and processors of Gujarat will be organized every year. In this seminar the deliberation on various issues of quality assurance and export standards will be made.</p>

6.74 Title: Capacity Building / Farmers Awareness Programme for adapting Climate Change

Gujarat state receives about 95% of its annual rainfall through the South West monsoon during June to September period. The annual average rainfall of the Gujarat state is 821 mm. However its rainfall distribution is erratic so this average rainfall not representative as a whole

state. Much of the southern portion of the state experiences excess rainfall frequently. The northern and northwestern parts of Gujarat receive less precipitation and experience frequent failures of monsoon. The subdivision wise rainfall analysis revealed that Saurashtra and Kutch subdivision have mean annual rainfall of 428 mm with coefficient of variation of 44% and decreasing trend of -5% per 100 years while Gujarat sub division has mean annual rainfall of 863 mm with coefficient of variation of 32% and decreasing trend of -5% per 100 years.

Some research in Climate change indicates that warmer temperatures lengthen growing seasons and increased CO₂ in the air results in higher yields from some crops. A warming climate and decreasing soil moisture can also result in shifting of production patterns and in increasing need of irrigation.

Geography of a location plays a specific role on how agriculture might benefit from climate change. Due to global warming the potential of increased climate variability and extremes are also changes. The frequency and intensity of climate variability influence the agriculture. The heat waves, cold waves, drought, severe thunderstorms and cyclones affect the agriculture and human life. An increase in climate variability makes adaptation difficult for farmers.

The effects of climate change on agriculture, specifically on cropping systems, pattern and grazing lands and animal management. With increased CO₂ and higher temperatures, the life cycle of grain crops and oil seed crops may progress more rapidly. The marketable yield of many horticultural crops such as tomatoes, onions and fruits, is likely to be more sensitive to climate change than grain and oilseed crops. Many weeds respond more positively to increasing CO₂ than most case crops. Disease pressure on crops and animals will increase with early summer and warmer winters. Higher temperatures will likely to reduce livestock production during the summer season and warmer temperatures during the winter season. The physiology and phenology of crops are also affected due to changes in temperature and rainfall patterns.

Keeping in view of this change in climate there is a requirement of training to the farmers, scientists, government officials and students for all the four Department/centers of Agricultural Meteorology, in each agricultural university.

The resource persons will be invited from national institutes on different aspects related to climate. The off and on campus awareness programme duration may be of one day. A group of 30-35 participants will be selected from each taluka of the state for the single awareness programme.

Objectives:

1. To aware the farmers about agricultural management practices as a climate change mitigation and adaptation.
2. To impart training to scientists /govt. officials/ progressive farmers and agricultural students.
3. To explore farmers perception about changing climatic conditions by feedback.

Table- 6.93 The Taluka wise list of trainee for Capacity Building / Farmers Awareness Programme for adapting Climate Change

Sr.	District	No. of Talukas	No.of trainee/taluka	Total trainees per Taluka
1	Ahmedabad	10	30	300
2	Amreli	11	30	330
3	Anand	8	30	240
4	Aravalli	6	30	180
5	Banaskantha	14	30	420
6	Bharuch	9	30	270
7	Bhavnagar	10	30	300
8	Botad	4	30	120
9	ChhotaUdepur	6	30	180
10	Dangs	3	30	90
11	DevbhumiDwarka	4	30	120
12	Dohad	8	30	240
13	Gandhinagar	4	30	120
14	GirSomnath	6	30	180
15	Jamnagar	6	30	180
16	Junagadh	10	30	300
Sr.	District	No. of Talukas	No.of trainee/taluka	Total trainees per Taluka
17	Kachchh	10	30	300
18	Kheda	10	30	300
19	Mahisagar	6	30	180
20	Mehsana	11	30	330
21	Morbi	5	30	150
22	Narmada	5	30	150
23	Navsari	6	30	180
24	PanchMahals	7	30	210
25	Patan	9	30	270
26	Porbandar	3	30	90
27	Raikot	11	30	330
28	Sabarkantha	8	30	240
29	Surat	10	30	300
30	Surendranagar	10	30	300
31	Tapi	6	30	180
32	Vadodara	8	30	240
33	Valsad	6	30	180
	Total	250		7500

(Source: https://en.wikipedia.org/wiki/List_of_districts_of_Gujarat)

Financial outlay (Rs. in lakh)

Item	I st Year	II nd year	III rd year	Total
Recurring contingency*	38.65	42.54	46.80	127.99
TOTAL	38.65	42.54	46.80	127.99

- (Recurring contingency includes contractual staff/remuneration to Experts/literature and creation of awareness media.)

Total outlay Rs. 127.99 X 4= 511.96 lakh

Table- 6.94 Detailed financial outlay for conducting Capacity Building/Farmers Awareness Programme for adapting Climate Change

Item	1 st Year	2 nd Year	3 rd Year	Total Cost (Rs. in Lakh)
Recurring contingency				
(a) For farmers	10.00	11.00	12.10	33.10
(b) SRF and JRF	26.40	29.04	31.95	87.39
(c) Remuneration for Expert	2.25	2.50	2.75	7.50
TOTAL	38.65	42.54	46.80	127.99

Total outlay Rs. 127.99 X 4= 511.96 lakh

(a) Expenditure per farmer per year: Rs.600/- (1500x600 = 9, 00,000/-)

(a) Literature and creation of awareness media= 1, 00,000/-

(b) Expenditure per SRF per month = Rs. 30,000 *4 = 1, 20,000/- *12 =14, 40,000/-

(b) Expenditure per JRF per month = Rs. 25,000 *4 = 1, 00,000/- *12 =12, 00,000/-

(c) Five Experts per one FAP = 50 x5x900 = Rs. 2,25,000/-

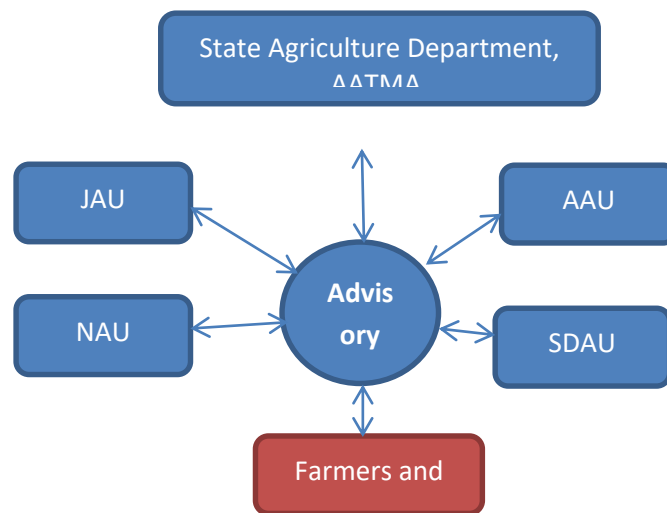
6.75 Title: Development of an ICT Tools for Awareness and Dissemination of Advisory Services for Farmers

Objective:

- To develop a single mobile based app as tool for farmers to integrate agro advisory from various extension functionaries including Gujarat SAUs.
- To develop a web based portal as tool for farmers to integrate agro advisory.
- To provide onsite training to farmers and stack holder of agriculture for effective use of ICT tools.
- To provide an interactive platform for farmers and experts for effective catering of agro advisory.

Introduction:

Agriculture is highly dependent on the climate. Climate change affects agriculture in a number of ways, including changes in average temperature, rainfall, and climate extremes (e.g., heat waves), changes in pests and diseases. It is necessary to provide immediate advisory services by Information and Communication Technologies (ICTs) tools with agriculture stake holder regarding any advisory, recommendation and forecasting. Now-a-days ICTs have the potential to transform agriculture in rural area. To provide immediate and better advisory of climate change is necessary with proposed handheld advisory tool.

**Technical functionalities of proposed tools:**

A farmer will be able to get all relevant advisory on specific subjects around his village/block/district. Subject and contents should be dynamically updatable from the authenticated users which include Gujarat SAUs. Farmers are always confused to ask any query related to farming. Farmers can ask query in their own language/images/voice/video and expert will advise them using proposed tool. Application user will be verified first time by OTP. There will be manual or partially automated consult expert forwarding system for requested query, which will help farmers to get immediate solutions of their query at their doorstep.

A provision will be made that farmer can obtain advice from multiple experts, depending on his query. Developed ICT tool will have the separate frequently asked question (FAQs) segment, which is updated time to time by authenticated users. Expert can also answer the query using hand held device. Multilanguage option will be there such as to obtain information in English/Hindi/Gujarati.

Development and other core functionaries of proposed project will be at Junagadh Agricultural University. Integration of various agro based advisory services will be done by all the SAUs. Agricultural extension functionaries like KVKs, ATMA, NGOs, KCC etc. may also become part of this project.

Table- 6.95 Year – wise Budget Requirement for Development of an ICT Tools for Awareness and Dissemination of Advisory Services for Farmers
(Rupees in Lakhs)

	1 st Year	2 nd Year	3 rd Year	Total
Recurring	33.00	37.88	41.06	111.94
Non-recurring	12.00	2.00	1.00	15.00
Total	45.00	39.88	42.06	126.94

The total amount required for the smooth functioning of the project for the duration of three years will be **Rs. 126.94 Lakhs**

6.76 Title: Establishment of National Institute of Renewable Energy Technology at Rajkot (gujarat)

1.	Background information / justification of the scheme Energy is fundamental to all human activities, and its ready availability in agriculture industry, transportation and commerce is crucial to the Gujarat state, India and World economics. In Gujarat and India, the per capita consumption of energy is continuously increasing with population growth and development with consequent concern over environmental impact, energy supply and cost. The limited source of conventional energy and its continuous rise in cost provides new opportunities for unconventional energy sources and technologies. New energy resources, improved energy technologies, energy conservation techniques and consumption strategies are the today's need to meet the increasing demand for energy and quality. Skilled and trained manpower is highly required who have got the required technical knowhow and expertise to deal with the problems of Energy and Environment. This requirement of technical manpower can be fulfilled if the Research (Doctoral and Master), under graduate (B.Tech.) Diploma (D.Tech) and training courses (Vocational Training certificate trainings) in the above mentioned aspects and imparted the degrees and training to generate skilled manpower		
2.	Objectives	:	

	<ol style="list-style-type: none"> 1. To provide trained man power with strong foundation in energy and environmental areas for different sectors 2. To provide energy efficient technologies and provide help in implementing energy conservation measures to the agriculture and industry sectors 3. To undertake and provide manpower for R & D and consultancy work in the energy and environmental related field 4. To carry out extension activities in the above areas keeping the liaison with the relevant industries, State departments for effective training and first line transfer of technologies. 5. To collaborate with National and International Institutions in the relevant areas. 		
3.	Requirement	:	
	a. Land required	:	No
	b. Building required	:	Rs. 2500 lakhs (3000 sq.m.)
	c. Equipment required (Non recurring contingency)	:	Rs. 4000 lakhs

c. Equipment required (Non recurring contingency)

Sr. No.	Item (Equipments for laboratory, office and vehicles)	Approximate cost (Rs. in lakh)
1	Solar Energy Engineering	250
2	Bio-Energy Engineering	350
3	Wind Power Engineering	500
4	Energy Conservation Technology and Management	150
5	Heat Transfer Technology	150
6	Energy & Power Systems Engineering	300
7	Energy & Environment Information Technology	250
8	Soil, Water and Air Pollution Control Engineering (Ecological Systems Engineering)	250
9	Industry Environmental Safety Engineering	300
10	Food Pollution Control Engineering	350
11	Sensor and Control Engineering	500
12	Controlled Environmental Engineering	300
13	Office Equipment and Furniture	250
14	Vehicles	100
	Total	4000

d. Manpower required with post and justification

Sr. No.	Name of post	No of post	Year (Rs. in lakhs)			Total
			I	II	III	
1	Professor	12	18.00	20.7	23.8	62.5
2	Associate Professor	24	30.00	34.5	39.7	104.2
3	Assistant Professor	48	24.00	27.6	31.75	83.35

4	Technical staff	72	36.00	41.4	47.6	125
5	Library	8	5.00	5.75	6.6	17.35
6	Computer Programmer	12	4.80	5.52	6.35	16.67
7	Office Staff	16	4.00	4.6	5.3	13.9
12	Laboratory Technician	24	6.00	6.9	9	21.9
13	Mechanics	24	6.00	6.9	8	20.9
19	Store Keeper	4	1.00	1.15	1.35	3.5
20	Purchase Assistant	2	1.00	1.15	1.35	3.5
21	Driver	6	1.00	1.15	1.35	3.5
23	Hostel Assistants	4	1.00	1.15	1.35	3.5
	Total	256	137.8	158.47	183.5	479.77

e. Civil works

Facilities	Approximate cost (Rs in lakhs)
Administrative block and class rooms	1000
Laboratory	1000
Hostels (boys and girls)	500

Table- 6.96 Budget Requirement for Establishment of National Institute of Renewable Energy Technology at Rajkot

(Rs. in

lakhs)

Component	Year			Total
	I	II	III	
Staff	137.8	158.47	183.5	479.77
Recurring contingencies	100	125	150	375
Non Recurring contingencies	1500	1000	750	3250
Building	2500	0	0	2500
Total	4237.8	1283.47	1083.5	6604.77

6.77 Title: Establishment of Postgraduate Institute of Veterinary Education & Research at Kamdhenu University

Livestock is an integral part of India's agricultural economy and plays significant role in providing livelihood support to the rural population. It is essential that about 70 million rural household on livestock of spices or other. Sustainable development of livestock sector would lead to more intrinsic development and employment of rural population especially women.

Gujarat is blessed with diverse livestock population with well-known breeds. The growth of co-operative dairies has placed Gujarat and India in the international forefront. The livestock sector in the state can be placed on the high momentum through cutting edge research in various aspects of veterinary and allied sciences.

Kamdhenu University has been established in the state with the objective of providing strong back bone in the area of research, education and extension in the field of veterinary and allied science. The vision of the university is to be a national leader in these key areas.

To fulfill the objectives, there is a need to establish a premium institute of research and education in veterinary science and animal husbandry. The establishment of such institute of national or international repute would not only generate well trained professionals to cater the needs of the sector but also generate excellent research outcome necessary for the advancement of science in this fields. The cutting edge technologies developed in the institute might propel the growth of livestock industry at high pace and would invite international reputation and accelerate in future.

The postgraduate institute of research and education in veterinary would provide strong platform to the scientific community to deliver the output to improve livestock productivity, enhance economy, improve health of livestock and pets, ensure reduction in communicable diseases, reduce public health hazard and advance "one health one world" approach for the betterment of all living beings including human population.

Objectives:

1. Establishment of multi-disciplinary and multi-tasking Postgraduate Institute of Veterinary Education & Research
2. To develop and establish core facility for postgraduate studies
3. To set up advance research facility for postgraduate studies
4. To establish state-of-art research institution

Table- 6.97 Budget Requirement for Establishment of Postgraduate Institute of Veterinary Education & Research at Kamdhenu University

(Rs. In Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	1115.44	400	400	1915.44
Nonrecurring	836.58	300	300	1436.58

Construction	836.58	300	300	1436.58
Total	2788.6	1000	1000	4788.6

6.78 Title: Strengthening of Vice Chancellor's Office at Kamdhenu University

Education is the engine of development-human, social and economic. Considering contribution of 26% GDP to the total Agriculture sector and future potential of Animal husbandry education, coupled with research and extension Gujarat government has established the Kamdhenu University under Kamdhenu University Act, 2009. The vision of this University is to be National Leader in Education and Research in the fields of Veterinary and Allied Sciences. The missions of University are to 1. Excel in Education and Research and make advancement in all the fields of learning to welfare of all living beings, 2. Shape the students into compassionate professionals and 3. Promote productivity of Animals, Livestock and Aquaculture through dissemination of knowledge empowering their owners. To accomplish set vision and mission statements and for effective monitoring of Administrative, Academic, Research and Extension Education related activities, it is required to have head quarter. This facility will be a place for office of Honorable Vice-Chancellor with adjacent branches of Registrar, Comptroller, Account Officer, Director of Research and Dean PG studies, Director of Extension Education, Director of Information Technology, Director Student Welfare, and University Engineer.

Objectives:

1. Establishment of Vice Chancellor's Office.
2. Monitor and management of Veterinary, Dairy, Fisheries and Allied Sciences under Kamdhenu University.
3. Regulation of administrative, academic, research and extension activities of Kamdhenu University.

Table- 6.98 Budget Requirement for Strengthening of Vice Chancellor's Office at Kamdhenu University (Rs. In

Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	80	40	51.6	171.6
Nonrecurring	60	30	38.7	128.7
Construction	60	30	38.7	128.7
Total	200	100	129	429

6.79 Title: Establishment of Veterinary Hospital at Kamdhenu University

The Kamdhenu University is to establish and grow a research driven university. One of the aspiring project to cater the needs of state referral hospital for diagnosis, treatment and control of animal disease of various categories by establishing of multidisciplinary, multitasking Veterinary Hospital. This will become essential part and backbone of postgraduate education and research in Veterinary Science. It covers multi species, involving treatment of large, small, pet, wild as well as domestic animals. State-of-the-art Veterinary Hospital is required under Kamdhenu University for the treatment and control of animal diseases, for advance education and; training of postgraduate students and also to undertake clinical research for refining the diagnostic and treatment protocols.

This facility will open a door to the advance diagnostic and treatment capabilities for the pet and large animals. It will allow intellectual access to the clinicians and young researchers and better health support to the animals as well as its owners. This facility will also provide a platform to learn, develop and practice new diagnostic aids, tools and treatment protocols for betterment of animals.

This veterinary hospital facility will be equipped with advanced diagnostic tools, and clinical laboratory. Additionally, this project includes provision of veterinary ambulatory clinics to give access to the field/village level Veterinary services to the animal owners. It will also be a great field level exposure to the postgraduate students.

Objectives

1. Establishment of multi-disciplinary and multi-tasking referral state-of-the-art Veterinary Hospital
2. Creation of core Veterinary health service facilities for better diagnosis, treatment and control of animal diseases.
3. Setting up of advance diagnostic and treatment facilities for Large and Small Animals.
4. Establishment of advanced training and research facilities to prepare the veterinarians for serving the society in critical roles involving clinical ad diagnostic services.

Table- 6.99 Budget Requirement for Establishment of Veterinary Hospital at Kamdhenu University (Rs. In Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	465.8	451.84	465.8	1383.44
Nonrecurring	349.35	338.88	349.35	1037.58
Construction	349.35	338.88	349.35	1037.58
Total	1164.5	1129.6	1164.5	3458.6

6.80 Title: Establishment of Instructional Farm for Veterinary Science at Kamdhenu University

The Instructional Livestock Farm Complex (ILFC) is the basic requirement for imparting practical knowledge in breeding, feeding, housing and management of livestock and poultry for the students of Veterinary Science and Animal Husbandry. The instructional farm also caters to the need of conducting short-term need-based experiments for solving the problems of animal owners. The instructional farm also provides for in-house research facilities for postgraduate students in various disciplines of Veterinary Science and Animal Husbandry. The farm can also be a model demonstration unit for practical demonstration to visiting livestock owners and poultry farmers for adoption of recent technologies developed by scientists for easy and effective transfer of technology. Hence, the Instructional Farm maintaining different species and breeds of livestock and poultry for teaching, training and research purpose is needed in Kamdhenu University. It will provide for the facilities of teaching in rearing of livestock species including poultry with the facilities of housing, feeding, breeding and management of large and small ruminant units, rabbits, poultry and animals of regional interest. The Fodder unit functioning at instructional farm will serve as a model farm to produce different high yielding varieties of green fodder for farm animals for the benefit of livestock farming community.

Objectives

1. Establishment of instructional farm of livestock and poultry.
2. Imparting practical knowledge of breeding, feeding, housing and management of livestock and poultry to the students and trainees of vocational training programmes.
3. Serving as a model farm for practical demonstration and training to livestock and poultry farmers.

Table- 6.100 Budget Requirement for Establishment of Instructional Farm for Veterinary Science at Kamdhenu University (Rs in Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	88.59	26.39	88.59	203.57
Nonrecurring	66.4425	19.7925	66.4425	152.678
Construction	66.4425	19.7925	66.4425	152.678
Total	221.5	66	221.5	508.925

6.81 Title: Establishment of Farmers Training Center for Animal Husbandry, Dairy and Fisheries at Kamdhenu University

Animal Husbandry, Dairy and Fishery sectors provides livelihood security to rural as well as peri-urban population in the state. Especially during the advance agro-climatic conditions, these sectors provide alternative sources of income which in turn is available to the

producers on a regular basis. These sectors can be further strengthened on scientific lines by providing latest technological inputs to the stakeholders and by providing on-farm or on-site situations to the farmers through real-time problem-solving interactions. Incorporating a dynamic and integrated component of training to the farmers on various aspects of scientific husbandry practices, modern concepts of dairying and inland as well as brackish water fisheries and turning the traditional farmers and fisherman in to entrepreneurs is the need of the day.

There is a palpable gap between the technological advancement in these sectors at the institutional level and the practices followed by the farmers and entrepreneurs at the field level. To bridge this gap, there is need of a sustained effort to create a tangible linkage between the scientists on one hand and the farmers on the other through various extension mechanisms such as interactive sessions, talks, demonstrations, on-hand trainings, visits etc. There is a specific need to provide vocational training to rural youths, school dropouts, illiterates or partly literate farm workers, farm women, Gaushala workers and managers, tribal youth and women as well as prospective livestock entrepreneurs, dairy business men, fisherman and fish processing entrepreneurs.

Keeping this in view, it is important to disseminate information to farmers to make them aware of the latest technological developments. A demand driven extension is the future goal which needs a constant thinking, experimenting for future sustenance and growth of Animal Husbandry, Dairy and Fisheries. Therefore, University based Farmers training center for onsite training is needed with the following main objectives.

Objectives

1. Transfer of technology of animal husbandry, dairying and fisheries to farmers.
2. Knowledge sharing and practical training to stakeholders for making animal husbandry, dairying and fisheries sectors more productive and sustainable.
3. Providing platform for gathering feedback from farmers on problems and constraints in animal husbandry, dairy and fisheries.
4. Enhance professional competence of extension functionaries by trainers training.
5. Vocational training to rural youth, farm women and tribal population for sustainable livelihood based on animal husbandry, dairying and fishery entrepreneurship.

Table- 6.101 Budget Requirement for Establishment of Farmers Training Center for Animal Husbandry, Dairy and Fisheries at Kamdhenu

University	(Rs. In Lakhs)			
Head	I yr	II yr	III yr	Total
Recurring	80.318	39.754	80.318	200.39
Nonrecurring	60.2385	29.8155	60.2385	150.293
Construction	60.2385	29.8155	60.2385	150.293
Total	200.8	99.4	200.8	500.975

6.82 Title: Development of Animal Forage Farm at Kamdhenu University

Fodder production technology, efficient and maximum use of irrigation water and other inputs and land use intensity would lead to the maximum harvest in the form of herbage per unit area and time, which is the primary objective of an intensive forage production system. Green and dry fodder of different varieties possessing key quality nutrients from an important input in livestock keeping. There is significant effect of quality and quantity of green and dry fodder feeding on growth, production and reproduction of livestock. The multicut, inherited ability and flexibility in manipulating the duration of several forage species are desirable traits for intensive cropping/harvesting frequency to minimize fodder production.

However, all the above approaches would be differed with respect to professional dairy men and farmers, who have adapted dairy farming as subsidiary task. For marginal farmers, mixed farming is only the way to sustain their livelihood. A combination of forage legumes, fresh or store/conserved grasses, crop residues/by product, concentrated feeds and bund cultivation of seasonal/annual/perennial grasses would make efficient and economic dairy farming to marginal farmers.

Fodders as a group of crops differ from food and commercial crops in several aspects, the principles and practices of their cultivation vary accordingly, and for which biomass is the economic yield component, which is likely to response intensive irrigation and application of excess nitrogenous fertilizers. Thereby, biotic stress management would also be important aspect.

Among the fodder/forage crops, grasses are characteristically determinate and dwarf in growth habit, are poor yielder, have short life span/duration and start deterioration for their quality after flowering.

Therefore, it is pertinent to establish the facility which will cater to the need of development of suitable varieties of fodders/forages which provide higher yield under agro-climatic conditions of the state. The outcome of research in fodder production would improve animal productivity.

Objectives

1. Development of animal forage farm to fulfill the need of nutritional requirement of the dairy animals.
2. A research to maximize fodder production per unit land
3. To develop a model fodder/forage production farm for demonstration of package of practices.

4. To develop suitable varieties of fodder for Gochar development.

Table- 6.102 Budget Requirement for Development of Animal Forage Farm at

Kamdhenu University

(Rs. In Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	57.2	40.4	57.2	154.8
Nonrecurring	42.9	30.3	42.9	116.1
Construction	42.9	30.3	42.9	116.1
Total	143	101	143	387

6.83 Title: Establishment of Information and Communication Technology Center in Animal Science at Kamdhenu University

In the era of globalization, there is immense potential for information and communication technology in the world. Global village concept is getting momentum in the country. Information and communication technology center has wide application in the field of Animal Agriculture, Policy, Education, Research, Extension and Development. Therefore Kamdhenu University would like to be a specialized university in the areas of Veterinary and Animal Sciences and plans to implement ICT HUBS AND LIVESTOCK DELIVERY SYSTEM COMPLEXES' at future campuses of Kamdhenu University to improve IT connectivity.

Objective:

1. To develop new avenues of extension education programme in dairy processing, fish farming, mixed farming, organic farming and promotion of panchgavya products.
2. To provide new and scientific technologies to the farming community engaged in agriculture, livestock, poultry, dairy and fisheries.
3. Direct delivery of information on all aspects of Veterinary/Animal Science, Dairy and Fisheries in the form of Government to Citizen (G2C) services.
4. Online scientific guidance to pashupalak/farmers about all the care and management practices of animals, livestock improvement of indigenous cattle breeds through selection programme, disease prevention and control, on 24 X 7 basis for better health status, yield and profitability.
5. All the villages of the state to be networked with Main Hub Station.
6. To make the Department fully Citizen Centric by offering all services in e-Governance form.
7. Narrowing knowledge gap existing between pashupalak/farmers and the concerned scientific community as well as government machinery.

Table- 6.103 Budget Requirement for Establishment of Information and Communication Technology Center in Animal Science at Kamdhenu University (Rs. In Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	40	40	40	120
Nonrecurring	30	30	30	90
Construction	30	30	30	90
Total	100	100	100	300

6.84 Title: Establishment of Students' Training Dairy

The College of Dairy Science, Amreli (established in 2010) is a constituent college of Kamdhenu University, Gandhinagar. The college is actively engaged in fulfilling the demand of technical manpower for the Indian Dairy Industries. The college is imparting education to the undergraduate students of Dairy Technology. The B. Tech. (Dairy Technology) is a 4 year degree programme, during which intensive knowledge and training in the aspects of processing and quality control of milk and products, business skills and engineering aspects of dairy processing equipments is given to the students. All courses are given under semester system, and one academic year consists of two Semesters. As per the academic curriculum B. Tech. (Dairy Technology) students undergo In-plant Training on Dairy Plant Operations and Management (Courses I & II) during 7th and 8th semester.

Till now, undergraduate students of the College are undergoing in-plant training in dairies scattered all over the Gujarat. This has made it difficult for the college authorities to closely monitor the students' progress during entire training programme, leaving them woefully short of 'hands-on-experience'. Because of this the students did not take opportunity to learn more effectively. As per the recommendations of Education Division of Indian Council of Agricultural Research for minimum standards of higher education in Dairy Technology a Dairy Unit (10,000 l/ day) with total production line needs to be developed for the establishment of College of Dairy Science in SAUs.

Therefore, the establishment of Student Training Dairy will be an innovative approach to inculcate professional skills in the graduating students of College of Dairy Science, Amreli (Kamdhenu University). The student training dairy will offer rigorous training to the students in Dairy Processing and Business Operations, Quality Assurance, Commercial Functions and Environmental Protection. This need-based organization will be established with objective of imparting one year full 'hands-on-experience' in a commercially viable business environment to the B. Tech (Dairy Technology) students of College of Dairy Science, Amreli, KU, to sharpen their technical as well as managerial skills thereby enhancing the professional confidence and to develop a set of skills such as leadership, teamwork, interpersonal

communication, analytical problem solving, business skills. The student training dairy shall also promote Industry Academia Interface through organizing short term training programmes in association with Faculty of Dairy Science, Kamdhenu University.

Objectives:

- i. To provide one year hands-on experience to the graduating students of College of Dairy Science (Kamdhenu University), Amreli.
- ii. To conduct short term training programmes for the training of workforce for Dairy Industries.
- iii. To assist in the R & D activities of Faculty of Dairy Science for new product / plant process development.
- iv. To manufacture and marketing of a variety of milk and milk products such as flavoured milk, ice-cream, ghee and traditional dairy products in Amreli district of Gujarat.

Table- 6.104 Budget Requirement for Establishment of Students' Training Dairy

(Rs in Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	185.752	63.534	185.752	435.038
Nonrecurring	139.314	47.6505	139.314	326.2785
Construction	139.314	47.6505	139.314	326.2785
Total	464.4	158.8	464.4	1087.595

6.85 Title: Establishment of Postgraduate Institute of Dairy Education & Research at Kamdhenu University

Indian Dairy Sector is the most important agricultural activity which contributes a large share in the agricultural GDP (gross domestic product), and plays an important role in the national economy and socioeconomic development of millions of rural households. The Indian dairy sector has achieved a dramatic growth in the last few decades. Population growth, rapid urbanization, increased purchasing power and changes in food habits have further fueled the increase in consumption of milk and milk products. The rapid increase in demand of dairy products has also led to the growth of milk-production activities in rural and peri-urban areas resulting major implications in the poverty alleviation and increased sustainability of dairy farmers. Dairying in the recent decades has been considered a vital component in the diversification of Indian agriculture into non-crop enterprises. Dairy education plays an important role in the dairy development activities such as development of new technologies, delineation of developed technologies to the industries, producing trained dairy personnel for dairy plants, dairy related extension activities and training to dairy farmers.

Rapid expansion of dairy industries required more trained personnel for organized dairy plants. At present, 18 Dairy Science Colleges in India are producing more than 800 graduates per year. In the Gujarat state there are 4 Dairy Science Colleges situated at Anand, Mehsana, Dantiwada and Amreli districts, out of which only SMC College of Dairy Science of Anand Agricultural University, Anand offers postgraduate courses in Dairy Science. Nationwide newly developed colleges and R & D organizations require qualified faculty personnel to take up the responsibilities of imparting instructions to the undergraduate as well as postgraduate students, and conducting research associated activities. To meet the growing demand of educational and research institutions for teaching and conducting research in various specialized fields of dairy science the new college with upgraded infrastructure and recruited with competent faculties are required to take up the responsibilities to turn out highly trained personnel. Therefore, there is a need to establish a new Postgraduate College of Dairy Science with upgraded infrastructure and competent qualified personnel.

Objectives

1. To impart quality postgraduate education in Dairy Science.
2. To provide skilled human resources to the Dairy Industry.
3. To develop state-of-the-art research facility in Dairy Science.
4. To serve as incubation center for entrepreneurs industry in Dairy industry.

Table- 6.105 Budget Requirement for Establishment of Postgraduate Institute of Dairy Education & Research at Kamdhenu University (Rs. In Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	440.96	314.084	440.96	1196
Nonrecurring	330.72	235.563	330.72	897.00
Construction	330.72	235.563	330.72	897.00
Total	1102.4	785.2	1102.4	2990.0

6.86 Title: Establishment of Dairy Animal Farm at Kamdhenu University

The Animal Genetic Resources of India are greatly diverse with many unique traits harboured in the indigenous livestock which have added advantage in the face of tremendous challenges posed by various factors such as increased commercialization of dairying, increased use of crossbred cattle in dairy production, reduction in available land, feeds and other natural resources, mechanization of farm works and transportation and serious impacts of climate change. The rich livestock biodiversity is required to be conserved for exploitation of the unique qualities such as disease resistance, heat tolerance, tick resistance, draft power, ability to thrive on scarce resources, milk quality traits etc. which may find value in the international breeding programmes. There is also need for conservation of this breed for

exploitation of such traits and other unknown virtues of these animals by future generations of human race. Kankrej cattle are one such important dual purpose cattle breed of north and central Gujarat which is also found in southern parts of Rajasthan and possess excellent draft power and milk yields besides disease and heat tolerance due to adaptation to harsh local climatic conditions. Therefore, there is need for establishment of an in situ conservation unit of Kankrej cattle in Gujarat to mitigate the risk of any threat to this important cattle genetic resource of Gujarat.

Objectives

1. Establishment of a unit for *in situ* conservation of Kankrej cattle
2. Genetic improvement of Kankrej cattle for important economic traits
3. Training Farmers and Scientific personnel for improved breeding and management practices, fertility improvement etc.

Table- 6.106 Budget Requirement for Establishment of Dairy Animal Farm at Kamdhenu University (Rs. In Lakhs)

Head	I yr	II yr	III yr	Total
Recurring	165.5	57.72	165.5	388.72
Nonrecurring	124.125	43.29	124.125	291.54
Construction	124.125	43.29	124.125	291.54
Total	413.8	144.3	413.8	971.8

6.87 Title: Establishment of Camel Research Station at Kamdhenu University

The camel is an important animal component of the fragile desert eco-system. With its unique bio-physiological characteristics, the camel has become an icon of adaptation to challenging ways of living in arid and semi-arid regions. The camel has played a significant role in civil law and order, defense and battles from the ancient times till date. The Ship of Desert earned its importance on indispensability as a mode of transportation and draught power in desert even in urban areas and is subject to continuous social and economic changes. Presently, the camel corps constitutes an important wing of Border Security Force of Indian Para-Military Services.

Albeit considering second largest population of Camel in Gujarat state and importance of each product of Camel, no state level dedicated research station available. Furthermore from camel milk to blood and from skin to bone each anatomical and physio- bio chemical fluids have value for human society. Therefore Kamdhenu University would like to take the initiative to establish Camel research station in Gujarat with below mentioned objectives.

Objectives

1. To established state-of-the-art Camel Research Station in Gujarat
2. Genetic Improvement of Kachhi Camels through conventional and molecular means

3. Improvement of Reproductive efficiency in Camel
4. To study adaptation of Camel to Climate Changes with research on stress physiology

Table- 6.107 Budget Requirement for Establishment of Camel Research Station at Kamdhenu University (Rs. In Lakh)

Head	I yr	II yr	III yr	Total
Recurring	80	80	80	240
Nonrecurring	60	60	60	180
Construction	60	60	60	180
Total	200	200	200	600

6.88 Title: Establishment of Mobile Veterinary Ambulatory Clinic at Kamdhenu University

The Kamdhenu University is committed to the “Welfare of All Living Beings”. For betterment of the animal and public health and to address the needs of animal owners Kamdhenu University would like to initiate the Veterinary Ambulatory Clinical Services at Gandhinagar.

Due to urbanization, it is very difficult and uncomfortable for most livestock owners to take their sick livestock to veterinary hospitals. Furthermore, veterinary emergencies such as dystocia, torsion, lameness and other conditions need the door step facility for animal treatment. Hence, there is urgent need to establish the Veterinary Ambulatory Clinical Services. This service will be provided to the emergency clinical cases and for the diagnosis and treatment of reproductive disorders, surgical interventions and preventive healthcare facilities for livestock.

This service will also give bilateral and intellectual approach for teachers and postgraduate students to learn village level management of veterinary emergencies. This will also create practically viable platform for veterinary postgraduate students to learn, develop and polish their clinical skills. Hence, the project is proposed with following objectives.

Objectives

1. To establish mobile veterinary services.
2. To provide village level veterinary clinical services.
3. To establish mobile veterinary diagnostic facility to support clinical services.

Table- 6.108 Budget Requirement for Establishment of Mobile Veterinary Ambulatory Clinic at Kamdhenu University (Rs. In Lakh)

Head	I yr	II yr	III yr	Total
Recurring	10	6.5	18.4	34.9
Nonrecurring	22.2	4.9	13.8	40.9
Construction	13.8	4.9	13.8	32.5
Total	46	16.2	46	108.3

6.89 Title: Establishment of Kamdhenu University Central Library

Kamdhenu University has been established by Government of Gujarat vide Gujarat Act 9 of 2009. The mandate of the university is to undertake education, research and extension education in the field of veterinary, animal, dairy and fisheries sciences and allied sectors in the state of Gujarat. Therefore, it is utmost important to establish a well planned and well-equipped University Library with most recent text books, reference books, encyclopedias, research journals, abstracting journals and all other kinds of printed as well as electronic publications.

The library is supposed to be a knowledge backbone of the University for the use of all undergraduates and postgraduate students, research scholars, teachers and scientists of the University. The University Library is also envisaged to be a hub of knowledge resources for the scholars and researchers of the state interested and involved with veterinary and allied sciences.

Therefore, it is justified to establish excellent University Library in Kamdhenu University at its proposed Head Quarters.

Objectives

1. Establishment of Central repository of text books, reference books, encyclopedias, journals, abstracting journals etc. catering to needs of students and staff of the University.
2. Establishment of electronic resource bank and establishing e-library.
3. Provision of e-references and e-resources in support of external and intense research.
4. Networking with libraries of repute at the state, national and international level.
5. Meet/exceed accreditation standards set for University Libraries.
6. Educate and assist students, researchers and staff in the identification and effective use of information resources.
7. Conforming to the consortia standards and status, developing cooperation with other libraries and information centers in veterinary, dairy and fisheries sciences for creating network of academic library resources to share information.
8. Adopt new approaches to user education and user survey by implementing new IT innovations.

Table- 6.109 Budget Requirement for Establishment of Kamdhenu University

Central Library		(Rs. in Lakhs)		
Head	I yr	II yr	III yr	Total
Recurring	2	12	2	16
Nonrecurring	1.5	9	1.5	12
Construction	1.5	9	1.5	12
Total	5	30	5	40

Table- 6.110 Total Financial Requirements for Various Projects Proposed under SIDP**(Rs. in Lakh)**

Sr. No.	Project	1 year	2 year	3 year	Total
1	Establishment of Liquid Biofertilizer Mass Production Units (Biofertilizer Plants) for Fertigation and Soil Health Improvement				7260.00
2	Establishment of Agrisnet for Gujarat State				359.06
3	Use of Sweet Sorghum as Bio-Fuel Production and Source of Second Generation Ethanol		1800	1800	3600.00
4	Value Addition in Sorghum		343.12	255.12	598.24
5	Discrimination of white spot of grain in wheat	16.33	16.33	16.34	50.00
6	Strengthening of Infrastructure Facilities Proposal for Infrastructural strengthening for research on wheat at Main Wheat research station, SDAU, Vijapur	566.0	11.9	10.9	610.8
7	Climate Change Impact Assessment, Adaptation and Mitigation Strategies for wheat in Gujarat	550.00	353.00	256.30	1159.30
8	Modernizing Existing Infrastructure for Quality Testing of Cotton at Main Cotton Research Station, NAU, Surat and Cotton Research Station, JAU, Junagadh	1056.00	23.80	21.80	1101.60
9	Promoting Cultivation of Salt Tolerant Cotton Varieties in Salt Affected Soils of Gujarat	91.0	19.5	13.5	134.0
10	Empowerment of Rural Women and Youth Through Cotton Production and Promotion of Solar Charkha, Spinning and Weaving and Garments Manufacture	402.00	402.00	11.00	815.00
11	Development of Cotton Pickers to Small and Large Holdings (In Partnership with John Deer or Suitable Company)	83.00	53.00	40.00	176.00
12	Promotion of Mobile Shredder and Rotavator for Cotton Crop Waste Management in Cotton Fields	225	225	225	675
13	Establishment of Value Addition Chain Especially for Small Millets in The Tribal Belt of the Gujarat.	300	300	300	900
14	Evaluation of Multipurpose Tree Species under Agroforestry Systems	70.80	736.80	478.80	1286.40

STATE INFRASTRUCTURE DEVELOPMENT PLAN

Sr. No.	Project	1 year	2 year	3 year	Total
15	Research and Extension Training Scheme for Development of Forestry/Agroforestry for Food, Nutrition, Environment & Livelihood Security in The State	125.00	225.00	150.00	500.00
16	Establishment of Training Center for Repair and Maintenance of Farm Implements & Machineries in the State	7200	1200	1200	9600
17	Vocational Courses Institute for Maintenance and Repairs of Agricultural Implements	1090	170	100	1360
18	Establishment of Implements / Machinery Testing Centre at Banaskantha and Vadodara Districts of Gujarat	500	100	100	700
19	Establishment of Special Production Zone for Agricultural Implements, Equipments, Machinery and Irrigation Equipments at Porbandar, Banaskantha, Vadodara and Navsari Districts	800	100	100	1000
20	District Wise Physical and Financial Infrastructure Development Plan for Soil and Water Management	116475	116475	116475	349425
21	Status of Leopard and its Prey Base in Vansda National Park		27.24	16.24	43.48
22	Decision Support Systems (DSS) for Agroforestry Systems Adaptation in South Gujarat	195.80	1050.24	656.74	1902.78
23	Project for Rain Water Harvesting	200	200	200	600
24	Vegetable Grafting to Mitigate Abiotic and Biotic Stresses in Vegetable Crops	160.51	16.44	19.05	196.00
25	Strengthening of Existing Goat / Sheep Farms (State Government and University Farms)	80.0	80.0	80.0	240.0
26	Establishment of Elite Buck / Ram Mother Farms for Various Breeds of Goats / Sheep	400.0	400.0	400.0	1200.0
27	Establishment of New Sheep and Goat Conservation Farms in Gujarat	300.0	300.0	300.0	900.0
28	Establishment of New Sheep and Goat Feed Manufacturing Factories	400.0	400.0	200.0	1000.0
29	Strengthening of Existing Market Yards / <i>Ghenta-Bakra Mandies</i> for Small Ruminants	40.0	40.0	20.0	100.0
30	Establishment of Sheep and Goat Mobile Clinics (Van)	75.0	75.0	50.0	200.0
31	To Create Research Facilities for Study of Medicinal (<i>Aurvedic</i>) Properties of Goat Milk	40.0	40.0	20.0	100.0

STATE INFRASTRUCTURE DEVELOPMENT PLAN

Sr. No.	Project	1 year	2 year	3 year	Total
32	Establishment of Feed and Fodder Banks for Sheep and Goat	1296			1296
33	Establishment of Regional Rabbit Farms			18.0	18.0
34	Establishment of Poultry Extension and Research Institute (PERI) in the State	1250	5350	3400	10000
35	Establishment of Central Poultry Disease Diagnostic Laboratory	125	535	340	1000
36	Establishment of Mobile Poultry Health Monitoring Units (regional)	92	94	14	200
37	Establishment of Regional Poultry Farmer's Training Centers	1300	670	30	2000
38	Strengthening of Existing Poultry Breeding Farm and Hatcheries	80	160	160	400
39	Establishment of New Breeding Farm and Hatcheries	800	1600	1600	4000
40	Strengthening of Existing Poultry Feed Production Units	70	400	230	700
41	Strengthening of Existing Vaccine Production Unit in the Public Sector	10	60	30	100
42	Creation of Cold Storage Facilities for Poultry Products	150	400	250	800
43	Strengthening of Existing and Establishment of New Poultry Testing Laboratories	150	250	250	650
44	Establishment of "Veterinary Disease Diagnosis and Research Laboratories (VDDRL) under four Veterinary Colleges of all the four SAU's of Gujarat State"	1066.12	1036.12	675.12	2777.36
45	District Wise Proposals for Cold Chain of Milk Handling (Bulk Milk Coolers)	47.65	47.65	47.65	142.95
46	District Wise Proposal for Automated Milk Collections System (AMCS)	942	942	942	2825
47	Establishment of Pack Animal Research Institute (PARI)	12000	10000	8000	30000
48	Strengthening of Existing Dairy Industries to Process and Market Camel Milk	2180	1140	680	4000
49	Value Addition and Marketing of Camel and Donkey Hair By-Products	600	400	200	1200
50	Improve and Increase Biomass to Enhance Camel Milk Productivity	230	190	80	500
51	Establishment of State Epidemiology cum Surveillance Center for Animal diseases	2000	1000	750	3750
52	Establishment of Center of Excellence in Ruminant Medicine	800	600	200	1600
53	Establishment of Regional Fisheries Trainers' Training Centres	20	500	440	960

Sr. No.	Project	1 year	2 year	3 year	Total
54	Strengthening of existing ornamental fish breeding centres (three) functioning under the State fisheries department, Government of Gujarat	30	90	90	210
55	Establishment of Fish Disease Diagnosis Centre in South Gujarat, Central Gujarat and Saurashtra	30	405	405	840
56	Establishment of modern aquaculture farm complex	40	400	280	720
57	Establishment of quality control laboratory in Saurashtra and South Gujarat	30	405	405	840
58	Establishment of Research and Training Centre for Seaweed	47	42	42	131
59	Establishment of plant health clinical laboratories	1497.37	1647.11	1811.82	4956.30
60	Establishment of Bio-control Laboratory	1497.37	1647.11	1811.82	4956.30
61	Establishment of Pesticide Residue Laboratory		503.12	553.43	1056.55
62	Establishment of new soil testing laboratories in newly for districts of state		690.00	690.00	1380.00
63	Create Facility of Inductively Coupled Plasma (ICP) in zone wise government laboratories and in SAU's.		200.00	200.00	400.00
64	Establishment of Advance Research cum Training center on soil health at four SAU's	804.72	207.12	207.12	1218.96
65	Establishment of training center for repair and maintenance of farm implements & machineries in the state	7200	1200	1200	9600
66	Vocational courses institute for maintenance & repairs of agricultural implements	1090	170	100	1360
67	Establishment of implements/ machinery testing center at Banaskantha and Vadodara districts of Gujarat	500	100	100	700
68	Establishment of Special Production Zone for agricultural implements, equipments, machinery and irrigation equipments at Porbandar, Banaskantha, Vadodara and Navsari districts	800	100	100	1000
69	Strengthening of training infrastructure facilities at farmers Training Center (district level) and Farm information and Advisory Centers (FIACs – at block level)	46961	35961	27500	110422

STATE INFRASTRUCTURE DEVELOPMENT PLAN

Sr. No.	Project	1 year	2 year	3 year	Total
70	Establishment of Community Radio Station	564.12	564.12	564.12	1692.36
71	Strengthening of Krushi Vigyan Kendra	5430	5430	5430	16290
72	“Development, maintenance, evaluation and characterization of male sterile lines in fennel (<i>Foeniculum vulgare</i> Mill.)”	15.61	16.91	18.26	50.78
73	Value Enhancement of Cumin through Organic Cultivation	18.37	19.22	19.82	57.41
74	Capacity Building / Farmers Awareness Programme for adapting Climate Change	38.65	42.54	46.80	127.99
75	Development of an ICT tools for awareness and dissemination of advisory services for farmers.	45.00	39.88	42.06	126.94
76	Establishment of National Institute of Renewable Energy Technology at Rajkot (gujarat)	4237.8	1283.47	1083.5	6604.77
77	Establishment of Postgraduate Institute of Veterinary Education & Research at Kamdhenu University	2788.6	1000	1000	4788.6
78	Strengthening of Vice Chancellor’s Office at Kamdhenu University	200	100	129	429
79	Establishment of Veterinary Hospital at Kamdhenu University	1164.5	1129.6	1164.5	3458.6
80	Establishment of Instructional Farm for Veterinary Science at Kamdhenu University	221.5	66	221.5	508.925
81	Establishment of Farmers Training Center for Animal Husbandry, Dairy and Fisheries at Kamdhenu University	200.8	99.4	200.8	500.975
82	Development of Animal Forage Farm at Kamdhenu University	143	101	143	387
83	Establishment of Information and Communication Technology Center in Animal Science at Kamdhenu University	100	100	100	300
84	Establishment of Students’ Training Dairy	464.4	158.8	464.4	1087.595
85	Establishment of Postgraduate Institute of Dairy Education & Research at Kamdhenu University	1102.4	785.2	1102.4	2990.0
86	Establishment of Dairy Animal Farm at kamdhenu university	413.8	144.3	413.8	971.8

STATE INFRASTRUCTURE DEVELOPMENT PLAN

Sr. No.	Project	1 year	2 year	3 year	Total
87	Establishment of Camel Research Station at Kamdhenu University	200	200	200	600
88	Establishment of Mobile Veterinary Ambulatory Clinic at Kamdhenu University	46	16.2	46	108.3
89	Establishment of Kamdhenu University Central Library	5	30	5	40
	Total	242196	205652	189744	637624