STATE AGRICULTURE PLAN FOR WEST BENGAL

NABARD CONSULTANCY SERVICES PVT LTD

(NABCONS), WEST BENGAL

NABARD WEST BENGAL REGIONAL OFFICE

6, ROYD STREET KOLKATA

Tel NO: 033-2255-2228, FAX: 033-2249-4507

DISCLAIMER

This document has been prepared by NABARD Consultancy Services (NABCONS) on behalf of **Agriculture Department, Govt of West Bengal** based on the information furnished in C-DAPs and also several rounds of discussion held with the various agencies during preparation of the report. The views expressed in this report are advisory in nature. It does not represent or reflect the policy or views of NABARD. NABARD/NABCONS does not accept any financial liability to any one using this report for any purpose.

Overall Guidance

Shri P. Mohanaiah, Chief General Manager, NABARD

Team

Shri B. Suri Babu, Assistant General Manager, NABARD

Shri S. K. Nanda, Assistant General Manager, NABARD

Ms. Arpita Bhattacharjee, Manager, NABARD

Social Organisation for Integrated Living (SOIL), the outsourced Consultant

Review

Shri P. V. S Surya Kumar, General Manager, NABARD

Shri D. D. Behera, Deputy General Manager, NABARD

Acknowledgements

At the outset, we express our sincere thanks to ***Shri Sanjeev Chopra, Principal Secretary, Agriculture Department****, Govt of West Bengal for giving us an opportunity to prepare the prestigious State Agriculture Plan. We also gratefully acknowledge the excellent cooperation received, especially from Shri Subir Choudhury, Consultant, State RKVY Cell and his team in providing all basic information, and meaningful discussion during execution of the assignment. We are also thankful to various line Departments who co operated with us in providing deep insight into the developmental agenda, data, information etc,.*

We have refered all CDAPs, while preparing the report and gratefully acknowledge the agencies like AFC and PRADAN, who have prepared some CDAPs. We also extend our heartfelt thanks to functionaries in districts for the valuable inputs & suggestions given for preparation of CDAPs which led to preparation of State Agriculture Plan.

We also offer special thanks to ***Social Organisation for Integrated Living (SOIL),*** *the outsourced consultant for painstakingly preparing the preliminary report.*

Index

Chapters	Pages	
	From	To
Executive Summary	i	xii
Chapter – I	1	6
Chapter – II	7	21
Chapter – III	22	34
Chapter – IV	35	77
Chapter – V	78	145
Chapter – VI	146	172

Appendix

Appendix	Plan Projections	Page No.
I	Agriculture	173
II	Soil Conservation	174
III	Horticulture	175
IV	Animal Resource Development	176
V	Fisheries	177
VI	Agriculture Marketing	178
VII	Agri Irrigation & Water Resources	179
VIII	Social Forestry	180
IX	Sericulture	181
X	Co operation	182
XI	Others-KVK	183
XII	Others- Khadi, Cottage industries	184
XIII	Panchayat	185
XIV	Others- Miscellaneous	186-187
XV	Others- NFS & Service Sector	188
XVI	Consolidation of CDAPs	189-190

Annexure	Items	Page
1	Population in West Bengal & India	192
2	Age/Group-wise % of population in West Bengal	192
3	Growth of population, density, literacy in West Bengal & India	193
4	Total main workers and its % distribution in West Bengal	194
5	Important Demographic features of West Bengal	195
6	Basic Economic Indicators in West Bengal & India	196-197
7	Annual growth in NSDP of West Bengal	198
8	% of share of Sectors in total NSDP	199
9	Estimates of NSDP of West Bengal	200-201
10A	Agro-climatic Regions in West Bengal	202-203
10B	Soil & climate of Agro-climatic Regions in West Bengal	204
11	Utilisation of land in West Bengal	205
12	Estimate Number & area of operational holdings in West Bengal	206
13	Distribution of operational holdings in West Bengal & India	207
14	Index No.of Agril. Area, population & productivity in West Bengal	208
15	Index No. of Agril. Area, production, productivity, cropping pattern, cropping intensity in West Bengal.	209
16	Area under principal crops in West Bengal	210-211
17	Yield Rates of some selected crops in West Bengal and India	212

18	Net cropped Area, Gross Cropped Area, cropping intensity in West Bengal	213
18(a)	Contribution of West Bengal to All-India production of select crops	214
19	Area under HYV in West Bengal	215
20	Growth in area coverage, production of fruits, vegetables, flowers etc.	216
21	Area & production of fruits and vegetables in West Bengal	217
22	Area & production of flowers in West Bengal	218
23	Area & production of spices in West Bengal	219
24	Area & production of plantation crops in West Bengal	220
25	Consumption of fertilisers & pesticides in West Bengal	221
26	Creation and utilization of irrigation potential in West Bengal	222
27	Production of milk, eggs in West Bengal	223
28	Production of meat in West Bengal	224
29	Production of fish in West Bengal	225
30	Production of fish in West Bengal & India	226
31	Output of timber, firewood & revenue from forest in West Bengal	227
32	Other forest produce harvested	228
33	Agency-wise/Sector-wise flow of ground level credit in West Bengal	229-230

State Agriculture Plan – West Bengal

Executive Summary

The State of West Bengal

- Lying between 21° 25' 24" and 27°13' 15" north latitudes and 85°48' 20" and 89°53' 04" east longitudes, the State shares its borders with three different nations – Bangladesh, Bhutan and Nepal – and four other Indian States, viz. Orissa, Jharkhand, Assam and Sikkim.
- The climate of the State is tropical and humid except in the northern hilly region which is close to the Himalayans. The average rainfall in the State is about 1750 mm with considerable variation among the districts ranging between 1234 mm in Birbhum to 4136 mm in Jalpaiguri. The temperature in the mainland normally varies between 24°C to 40°C during summer and 7°C to 26°C during the winter.
- Spread over an area of 88752 sq km, the State accounts for 2.7% of the total geographical area of the country while its population of 801.76 lakh accounts for nearly 8 per cent of the entire population of the country thus making West Bengal the most densely populated State as per 2001 census (903 persons per sq km as against the national average of 325 persons per sq km).
- The total scheduled caste population in the State at 184.53 lakh and the total scheduled tribe population at 44.07 lakh constitute 23.01 per cent (all India: 16.20 per cent) and 5.50 per cent (all India: 8.20 per cent) of the entire population of the State respectively.
- The average literacy rate in the State is 68.64 per cent (female literacy: 59.60 per cent) which is higher than the national average of 65.38 per cent (female literacy: 53.70 per cent).
- Of the total rural workers, 19.53% and 19.30% are cultivators and agricultural labourers, respectively, while 4.72 percent are engaged in household industries According to the Planning Commission, 31.85 percent of the total population lived below poverty line in 1999-2000.
- The estimated Gross State Domestic Product in the State at constant prices (Base Year: 1999-00) was Rs.2,20,197.70 crore, which grew by 7.74 per cent over 2006-07. The per capita income in the State at constant prices (Base Year: 1999-00) stood at Rs.23,228.71 (growth by 6.78% over 2006-07) while the national per capita income stood marginally higher at Rs.24,295 (7.6 % growth).
- The primary sector contributed 24.16 per cent to the State's GDP at constant prices (Base Year: 1999-00) during 2007-08 while it was 24.82 per cent during 2006-07 and which has declined over the years from 31.45 per cent during 1999-2000. In the

agricultural sector, the State recorded a growth of 5.14 per cent while the national growth rate was 4.90 per cent.

Scenario of Agriculture and Allied Sectors in West Bengal

- With nearly 72 per cent of the population living in the rural areas, agriculture is the predominant occupation in the State. The index number of agricultural area, production and productivity during 2007-08 with 1981-82 as the base year was 116, 252 and 218 respectively.
- The total reporting area of the State is 86.84 lakh ha, of which 52.96 lakh ha is the Net Sown Area (61 per cent of the total reporting area). The Gross Cropped Area is 97.52 lakh ha with a cropping intensity of 184 per cent.
- Agriculture in the State is small farmer centric with 90 per cent of the cultivators being small and marginal farmers. Small and marginal farming communities hold 84% of the State's agricultural lands.
- Marginal operational holding (less than 1 ha) accounts for 88.8 percent of the total operational holdings as against 69.8 percent at all India level.
- Cropping pattern in the State is dominated by food crops which account for about 78 per cent of the area under principal crops.
- Rice is cultivated in 58.48 lakh hectares (production of 161.48 lakh MT) followed by cereals (all combined) in 63.49 lakh hectares and oilseeds in 7.14 lakh hectares, jute in 6.09 lakh hectares and potato in 3.67 lakh hectares. The state is second largest producer of potato after Uttar Pradesh and one of the highest producers of vegetable in the country. Traditionally, West Bengal has been the highest producer of jute. The State also accounts for 25 per cent of tea production in the country, next only to Assam.
- Against the ultimate irrigation potential of 67.43 lakh hectares, the gross irrigation potential created through major, medium and minor irrigation in the State till the end of March 2009 was 55.01 lakh hectares. The percentage utilisation of potential created is 81.73 percent in major and medium irrigation structures and 81.64 percent in minor irrigation.
- The share of livestock sector in total State Domestic Product (SDP) is 4.41% and that in Agricultural SDP is 18.6%.
- Despite significant increase in production of various livestock products during the past three decades, the State still faces a number of challenges in augmenting productivity of livestock and poultry birds for bridging the ever increasing demand – supply gap.
- The State is one of the leading producers of fresh water fish and the largest producer of fish seeds in the country. In the inland fishery sector, West Bengal accounts for 30% of the total fish production of the country
- The export earnings from the fisheries sector grew from Rs. 50 crore in 1987-88 to Rs.725 crore in 2008-09 with shrimps being the major commodity. The State is the fourth largest exporter in the country despite having a small coastline of 150 km.

SWOT Analysis of Agriculture & Allied Sectors

Strengths

- The State is endowed with favourable 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 with potential for further development especially of ground water resources.
- Strong production base for horticulture crops especially fruits and vegetables with scope for further development, processing and value addition.
- Excellent potential for production of high value cut flowers like dendrobium / cymbidium orchids, liliums, gladiolus, anthurium in the Darjeeling hills, gerbera rose in the plains under green houses
- Strong consumption base with huge localized demand for dairy, poultry, meat and fish and proximity to major consuming centers widening market opportunities
- Excellent scope for commercial ventures under poultry and dairy sectors including processing and value addition
- Specialized line departments with good network of animal health care facilities addressing sub – specific extension needs including door-step delivery of AI services through “Pranibandhus”.
- Per capita consumption of fish is highest in world and hence high demand for production of fish
- Functional Fisherman’s cooperative societies, Fish Production Groups and a large number of Self Help Groups (SHG) all over the State contributing well for the growth of the fishery sector
- Major producer & supplier of fish seed in the country (65% of country’s seed is sourced from West Bengal) due to availability of good quality of spawn/seed from natural as well as commercial hatcheries
- Existence of several water bodies including riverine areas, beel, boar, canal and tanks with a total water spread area 2.76 lakh ha.

Weakness

- 88 percent of the total land holdings belong to marginal and small farmers with average holding size is 0.82 ha, limiting the scope for introduction of technology innovations and interventions.
- Predominance of rice based mono-cropping and or with potato /jute in sequence and less preference for crop rotation and diversification.
- Several parts of the states are flood prone with persisting drainage problem.

- 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
- Low level of awareness among farmers on the significance of soil testing
- Inadequacies in availability of quality seed/plant material for all the major crops grown in the State resulting in low levels of seed replacement.
- 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.
- 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. This is also necessitating dependence on other states like Haryana, Bihar contributing to increased cost of animals.
- Predominance of middle-men in procurement of milk and milk products and absence of well organized and functional milk cooperatives limiting the scope for promotion of small dairy units
- Potential for commercial ventures in poultry farming is not fully exploited
- Under fisheries sector, predominance of extensive farming system marked with relatively low productivity levels.
- Large water bodies especially are under derelict and semi-derelict conditions.
- Lack of organized fish culture at village level resulting in wide gap in potential and actual productivity.
- Shortcomings in marketing, absence of adequate ice plant and cold storage facilities at the production point.
- Inadequate bank financing in the fishery sector.
- Low productivity under beels (100 to 300 kg/ha) and ponds (3000 kg/ha) due to underutilization and poor management

Opportunities

- Good scope for improving cropping intensity with better exploitation and management of surface and ground water resources; crop diversification with less water intensive and remunerative crops like pulses and oil seeds and vegetables.
- Soil health management through comprehensive survey and introduction of ***Soil Health Cards***
- 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 especially in red laterite zones 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.
- Development of location specific technologies for potato seed multiplication and establishment of exclusive cold storage facilities for potato seed
- Strengthening extension mechanism with focus on active involvement of informal channels for technology dissemination through Farmers' Clubs promoted by NABARD, farmers' SHGs and pro-active NGOs.
- Policy interventions favouring contract farming would facilitate exclusive production of varieties suitable for processing with user industry tie-up for buyback
- Wide opportunities for export of horticulture produce especially tropical and exotic vegetables, mango pineapple, litchi, potato in fresh and processed forms
- 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.
- Promotion of Rain water harvesting especially in high/intense rainfall regions and utilizing the same for supplemental/life saving irrigation. This technology option is more applicable to areas like the Sunderbans, red laterite zones covering Purulia, Bankura, parts of West Medinipur, Birbhum, etc.
- Scope for promoting commercial dairy ventures with institutional credit support. Breed improvement through strong net work of Prani Bandhus and calf rearing scheme
- Strengthening the cooperative milk societies and development of milk routes
- Good scope for introduction of low input technology poultry farming with breeds like Rhode Island Red, piggery and goat farming as supplementary livelihood activity among marginal/landless rural poor/ tribal habitations and also to meet the increasing local demand.
- The State has 2.10 lakh ha of impounded brackish water resources (highest in country) of which only 0.48 lakh ha have been developed signifying the opportunity for further development.
- Wide opportunities for increasing the seed production base through setting up of more number of hatcheries to meet the increasing demand.
- Under fisheries sector, good scope to improve yield potential to 1000kg/ha under beels and up to 7500 kg/ha under ponds
- Introduction of new concepts like cage & pen culture in earthen canals, beels, reservoirs and diversification into fresh water prawn farming

- People's participation in planning and implementation of wasteland development program ,through definitive institutional arrangement involving sharing of benefits can bring about significant improvement in the status of land and forest cover.
- Identifying potential zones for establishing multipurpose cold storage facilities and food processing units either through private sector investment or PPP mode with government providing basic infrastructure.
- Awareness creation among farmers and processors on quality aspects and requirements with respect to Sanitary & Phyto- sanitary measures (SPS), CODEX, HACCP and modernization of existing processing units.

Threats

- Occurrence of natural calamities like floods and consequent production, transport and storage losses.
- Indiscriminate exploitation of ground water may lead to several blocks falling under overexploited category limiting the scope for further development of irrigation facilities
- Lesser share of certified seed and use of poor quality seed may affect crop productivity and overall production
- 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
- Excessive use of chemical fertilisers & pesticides limiting the scope for adherence to quality standards with special reference to exports
- Dominance of middlemen in milk and milk products procurement operations
- Recurrence of disease epidemics like bird flu adversely affecting investments in poultry sector
- Drying of natural water bodies due to extensive use of water for irrigation coupled with high siltation restricting fish production.
- Over exploitation of fisheries resources in sea, especially through juvenile fishing
- Floods, natural calamities and water pollution from indiscriminate use of pesticides in the agricultural field are big threats to pisciculture.
- Other major producing states have competitive advantage and continue to dominate the markets especially for milk and poultry products
- Changes in socio-economic conditions, with younger generation from farming community preferring urban employment in place of agriculture

RKVY – State Agriculture Plan

The National Agricultural Development Program or Rashtriya Krishi Vikas Yojana (RKVY) aims at holistic development of agriculture and allied sectors through all the eligible States of India. As per the scheme, the Government of West Bengal has to prepare Comprehensive District Agriculture Plans (CDAPs) covering agriculture and allied sectors based on guide lines issued by the Planning Commission. The State Agriculture Plan (SAP) is the aggregation of physical and financial projections under respective CDAPs covering all the districts and with prioritization of strategies to be adopted and the policy interventions that are necessary. The basic objective of the RKVY is to provide incentives to the State for increasing public investment in agriculture and allied sectors, convergence of related development programmes, facilitating private investment in agriculture infrastructure and sustainable exploitation of available natural resources. The ultimate Goal is to achieve 4% growth rate under the sector.

Vision of State Agriculture Plan

Vision

To achieve sustainable livelihood opportunities for the people through eco friendly, clean and value added Agriculture and related activities

The vision would primarily be articulated to address five important aspects of development namely ***production, infrastructure, marketing, environment and human for*** **better** ***productivity, environmental sustainability and employability*****.**

The broad objectives behind the development of vision are:

- To generate a common development perspective of the state that reflects the thinking of diverse stakeholders
- To work out inspiring goal for overall development of the broad agriculture sector
- To ensure a defined role for women and other disadvantaged groups in the main stream development process
- To foresee human and infrastructural development needs as it emerges from collective wisdom for achieving the goal
- To facilitate evolving of more realistic, objective oriented and executable Five Year and Annual Plans
- To provide specific directions for enhancement of Agriculture and allied sector productivity in sustainable manner and restoration of ecological balance.
- Creation of sustained employment opportunity for the rural people, including the landless

- To encourage the concept of development with peoples' participation which will help in generating the feeling of ownership

State Plan at a glance

Sectors	2009 - 10 (S)		2010 - 11 (P)		2011 - 12 (P)	
	Project Outlay	Share (%)	Project Outlay	Share (%)	Project Outlay	Share (%)
Agriculture	5266.90	36.10	48569.86	18.65	53185.02	21.50
Animal Resource Development	3617.47	24.79	11014.64	4.23	11374.23	4.60
Fisheries	1134.31	7.77	21599.73	8.29	22596.54	9.13
FPI & Horticulture	1112.94	7.63	17889.26	6.87	21711.17	8.78
Agril. Marketing	1121.00	7.68	4893.85	1.88	5241.61	
Co-operation	1328.00	9.10	7273.06	2.79	8335.26	3.37
Panchayat & Rural Development	533.00	3.65	105956.00	40.66	79513.00	32.14
Forest	477.00	3.27	2234.87	0.85	2598.29	1.05
Water Res. Invg. & Development	0	0	21903.75	8.40	23331.83	9.42
Others	0	0	19226.94	7.38	19538.63	7.89
SAU / ARS	0	0		0.00	0	0.00
Admin. Cost	0	0	0	0.00	0	0.00
Grand Total	14590.62	100.00	260561.96	100.00	247425.58	100.00

The projections made under SAP for the year 2010-11 and 2011-12 stood at Rs. 260561.96 lakh and Rs. 247425.58 lakh respectively. The district-wise/activity-wise projections are indicated in Appendices 1-18.

Plan Outcome

The expected outcome through various interventions contemplated under SAP has been analyzed and presented under respective sectors in chapters 4 & 5. The overall outcome at

macro level and also at the ultimate beneficiary i.e., the farmer level is summarized here under:

a. At macro level

The annual growth rate at the end of XI Plan period for major crops/ activities is estimated as under:

- 19% in respect of paddy production due to productivity improvement and marginal increase in area coverage. The expected rice production shall be to the tune of 184.39 lakh Ha. The productivity (Kg/ Ha) is expected to rise by 17% over the base year of 2007-08.
- 29% increase in production of pulses from 1.86 lakh MT in 2007-08 to 2.40 lakh MT by the end of 11th FYP. This will be made possible through improving the yield from 791 kg/ ha to 961 kg/ ha during the corresponding period.
- 48% increase in production under potato from 80.18 lakh MT in 2007-08 to 118.47 lakh MT by the end of 11th FYP. The productivity during the corresponding period is expected to increase by 22% (from 22,900 kg/ ha to 27,860 kg/ ha).
- The production of oilseeds also needs to be pushed up. With better farming practice and more area under it, the production is expected to be increased from 6.65 lakh MT to 8.42 lakh MT.
- 36% increase in production of vegetables from the base level of 128.80 lakh MT to 174.60 lakh MT by the end of 11th FYP.
- 19% increase in milk production
- 15% increase in poultry broiler meat production
- 16% increase in fish production

b. At micro level (farmer level)

The total annual income under different cropping seasons from a unit area of 2 acres or 0.66 ha (average land holding) has been quantified at the prevailing stage and also through various interventions contemplated under RKVY. The comparative analysis is presented in the following table which is self explanatory.

Comparative Analysis of Pre & Post SAP income at farmer level

Cropping sequence	*Present Net income (pre-SAP)*	*Income after SAP inter-ventions*	*Incre-mental income after SAP imple-mentation*	*% increase in net income*
Rice+Potato	12450	15576	3126	25%
Rice+Potato+Sesamum	13972	21021	7049	**50%**
Rice+Ptato+groundnut	13372	18092	4720	35%
Rice+Ptato+Jute	14898	21055	6157	41%
Rice+vegetables	14760	17655	2895	**20%**

Rice+Rice+vegetables	20418	29783	9365	46%
Rice+Wheat+Jute	11659	17121	5462	47%
Rice+Potato+vegetables	20700	26301	5601	27%

Strategies and Prioritization of Government interventions

Agriculture

- Strengthening Soil testing infrastructure facilities at district and block level for comprehensive soil analysis and introduction of ***soil health card*** based Integrated Nutrient Management
- Promotion of ***organic input*** production
- Research priorities on standardization of location specific ***seed production*** technologies for rice and potato and alternate cropping patterns and crop diversification
- Certified seed production infrastructure through public-private partnership and development of ***seed villages*** involving progressive farmers' societies
- Crop diversification with emphasis on ***oil seeds, pulses and vegetables*** especially in areas where upland rice cultivation is predominant.

Farm Mechanisation

- Promotion of the concept of ***"Farm Machinery Hub"*** *k*eeping in view the presence of large % of small agricultural holdings.

Horticulture

- Attaining self sufficiency in production of ***quality planting materials*** through the programmes of National Horticulture Mission
- Development of at least one ***progeny orchard*** in each district
- Promotion of ***private nurseries*** through incentive scheme and ensuring quality control through Nursery Registration
- Standardization of location specific ***potato seed production technologies*** in the state to ensure timely availability of quality seed on long term basis.

Animal Husbandry

- ***Breed Improvement*** through AI, introduction/supply of quality animals
- ***Calf rearing*** as part of animal quality upgradation
- Promotion of ***green fodder cultivation*** on common lands, preservation of grazing land, through crop diversification. Simultaneous strengthening of fodder seed production facilities.
- Milk processing and ***marketing through dairy cooperatives*** and supply chain management through milk societies and milk routes

- Promotion of ***low input technology poultry / duckery*** for the benefit of marginal farmers /landless rural poor/ tribal habitations and also to meet the increasing local demand.
- ***Pranibandhus*** have done pioneering work in providing doorstep AI services in rural areas. Promotion of more number of Pranibandhus (at least one in every gram panchayat)
- Awareness among farmers, especially in North Bengal to ***grow maize*** to meet ever increasing demand for feed.

Fisheries

- ***Development of derelict tanks, beels*** through interventions like de-silting, biological and manual control measures for weed infested ponds/ tanks, possibly through NREGS program
- Priority for ***increasing the productivity of fish ponds*** in state from the present level of 3500 Kg/ Ha / year to 7500 Kg/ Ha / year through training and capacity building of fish farmers on scientific farming.
- Diversification of fish farming to fresh water prawn, ornamental fish, crab, air breathing fishes
- Setting up **hatcheries for** fresh water prawn, mud crab, ornamental fishes under both public/ or private sector
- Adequate awareness creation among hatchery operators to follow **breeding protocol**
- Establishment of **diagnostic centres** for detection of fish & shrimp diseases
- Availability of adequate & timely credit through formal models. Alternate credit delivery mechanisms like **SHGs, JLGs for facilitating small fish farmers** to avail credit, to be promoted
- Coordinated development of crop, animal husbandry and fisheries through ***integrated farming*** for sustainable farming leading to higher production, particularly in the drought prone areas.
- Promotion of **attractive insurance** scheme

Agri Extension

- Extension infrastructure with atleast one Agriculture /Horticulture Development Officer at block level and one Krishi Prajukta Sahayak (KPS) at GP level with simultaneous focus on training and capacity building of all the stake holders
- Promote ***Informal extension channel*** like Farmers' Clubs, Farmers' Interest Groups and educated/ progressive youth and training them as technology transfer agents.
- Innovations like Prani Bandhu scheme, which is a proven success, to be replicated in other sectors as well – like ***Krishi Bandhu, Matsya Bandhu***.

Watershed Development

- Promotion of Rain water harvesting especially in high/intense rainfall regions, especially in areas like the Sunderbans, red laterite zones covering Purulia, Bankura, parts of West Medinipur, Birbhum, etc.

Forestry

- Protection of forest by empowering local community through ***Joint forest management***
- Encourage farmers to grow ***forestry species in waste lands***/ farm lands.

Agri Marketing

- Strengthening of storage infrastructure for perishable and non-perishable agricultural commodities through private or PPP mode to prevent distress sales
- More and more organized marketing infrastructure facilities to mitigate the influence of market intermediaries. Replication of ***"Producer – Consumer Markets" like Raithu Bazars in AP*** which were a proven success in serving the interests of farmers (producers) and consumers through minimizing the role of market intermediaries.
- **Policy interventions** (Amendments to APMC Act) to facilitate private sector participation in strengthening market infrastructure and also facilitate producer-user industry tie-up for contract farming.

Abbreviation

AES	Agri Ecological Situation
AH	Animal Husbandry
AI	Artificial Insemination
APMC	Agriculture Produce Marketing Committee
ATMA	Agriculture Technology Management Agency
BAPU	Block agricultural Planning Unit
BPL	Below Poverty Line
BRGF	Backward Region Grant Fund
CB	Cross Bred
CCA	Culturable Command Area
C-DAP	Comprehensive District Agricultural Plan
CIG	Commodity Interest Group
CPR	Common Property Resource
DAC	Department Of Agriculture and Cooperation
DDP	District Development Planning
DIC	District Industry Centre
DPC	District Planning Committee
DAPU	District Agricultural Planning Unit
DRDA	District Rural Development Agency
FM	Farm Mechanizations
FOs	Farmer's Organizations
FYP	Five Year Plan
FFDA	Fish Farmers Development Agency
FFS	Farmer Field School
FLD	Front Line Demonstration
GOI	Government of India
GP	Gram Panchayat
GW	Ground Water
Ha	Hectare
HDTW	Heavy Duty Capacity Deep Tubewell
HRD	Human Resource Development
HY	High Yielding
Hyb	Hybrid
ICAR	Indian Council of Agriculture Research
ICT	Information and Communication Technology
INM	Integrated Nutrient Management

IP	Intermediate (block/talika/mandol) Panchayat
IPM	Integrated Pest Management
IPNS	Integrated Plant Nutrient Supply System
ITDA	Integrated Tribal Development Agency
ISOPOM	Integrated Scheme for Oilseeds, Pulses, Maize and Oilpalm
IWDP	Integrated Wasteland Development Project
JFM	Joint Forest Management
KVK	Krishi Vigyan Kendra
LBO	Lead Bank Officer
LD	Land Development
LDTW	Light Duty Tube Well
LI	Lift Irrigation
LN	Liquid Nitrogen
MDTW	Middle Duty Capacity Deep Tube Well
M & E	Monitoring and Evaluation
MOU	Memorandum of Understanding
MFP	Minor Forest Product
MI	Minor Irrigation
MIP	Minor Irrigation Project
MMA	Macro Mode Management of Agriculture
MSL	Mean Sea Level
MSP	Minimum Support Price
MT	Metric Tonne
NABARD	National Bank for Agriculture and Rural Development
NADP	National Agricultural Development Plan
NDC	National Development Council
NFSM	National Food Security Mission
NFDB	National Food Security Mission
NGO	Non Government Organisation
NHM	National Horticulture Mission
NREGS	National rural Employment Guarantee Scheme
NRHM	National Rural Health Mission
NRM	National Resource Management
NTFP	Non Timber Forest Product
NWDPRA	National Watershed Development Programme for Rainfed Areas
NYK	Nehru Yuvak Kendra
PACS	Primary Agriculture Cooperative Society
PC	Planning Committee
PFM	Participatory Forest Management
PHM	Post Harvest Management
PIM	Participatory Irrigation Management

PLP	Potential Linked Credit Plan
PMGSY	Pradhan Mantra Gram Sadak Yojana
PMRY	Prime Minister Rozgar Yojana
PPP	Public Private Partnership
PRIs	Panchayat Raj Institutions
RBI	Rural Bank of India
RGGVY	Rajiv Gandhi Gramin Vidyutkaran Yojana
RH	Relative Humidity
RIDF	Rural Infrastructure Development Fund
RKVY	Rastriya Krishi Vikas Yojana
RLI	River Lift Irrigation
RMC	Regulated Market Committee
RRTTS	Regional Research and Technology Transfer Station
SAHC	State Animal Health Centre
SAP	State Agricultural Plan
SC	Scheduled Caste
SGSY	Swarnajayanti Gram Swarozgar Yojana
SHG	Self Help Group
SIRD	State Institute of Rural Development
SREP	Strategic Research and Extension Plan
SRR	Seed Replacement Rate
ST	Scheduled Tribe
STW	Shallow Tube Well
SWOT	Strength, Weakness, Opportunity, Threat
TAC	Technical Appraisal Committee
TSF	Taluka Seed Farm
TSG	Technical Support Group
TFP	Total Factor Productivity
TSI	Technical Support Institute
ULB	Urban and Local Body
UT	Union Territory
WUA	Water User Association
ZP	Zilla Parishad

Chapter-I

Introduction

INTRODUCTION

The National Agricultural Development Program or Rashtriya Krishi Vikas Yojana (RKVY) aims at achieving 4% annual growth in the agricultural sector during the XI Plan period, by ensuring a holistic development of agriculture and allied sectors through all the eligible States of India. As per the scheme, the Government of West Bengal has to prepare the State and district level plans in the field of agriculture and allied sectors based on guide lines issued by the Planning Commission, for availing of financial assistance from the Government of India. The objectives of the scheme are to provide incentives to the State for increasing public investment in agriculture and allied sectors, and in particular,

1. to ensure that agriculture for the State and districts are prepared based on agro-climatic conditions, availability of technology and natural resources;
2. to make sure that local needs in the field of agriculture & allied sectors are better reflected in the agricultural plan of the State;
3. to reduce yield gaps in major activities under agriculture & allied sectors through focused interventions;
4. maximization of returns to farmers in agriculture and allied sectors;
5. to bring about quantifiable changes in production and productivity of various components of agriculture and allied sectors by addressing them in a holistic manner both in the short and long term period for a perspective plan.

RKVY is being carried out as State Plan with 100% grant from the Government of India. Areas of focus under the RKVY are: integrated development of major food crops such as wheat, paddy, cereals, pulses, oilseeds, millets, etc.; agriculture mechanization, activities related to soil health, development of rain fed farming systems as also integrated development of watershed areas, wastelands and river valleys; support to State Seed Farms; Integrated Pest Management Schemes; encouraging nonfarm activities; strengthening of market infrastructure and marketing development; strengthening of infrastructure to promote extension services; activities relating to enhancement of horticultural production and popularization of micro irrigation schemes; animal husbandry and fishery development activities; special schemes for beneficiaries of land reforms; grant support to the State Government Institutions that promote agriculture/ horticulture; study tour for farmers; organic and biofertiliser and other innovative schemes.

1.2 OBJECTIVES OF STATE AGRICULTURE PLAN

The major objective of State Agriculture Plan (SAP) is to consolidate and integrate all Comprehensive–District Agriculture Plans (C-DAP). It has also taken into consideration the recommendations of State Agriculture Commission. C-DAPs have been prepared based on participatory action plan for the development of local area in general and agricultural and allied sector in particulars. The planning process, while preparing C-DAPs has been initiated at grass root level i.e. at village / GP level. As State Agriculture Plan (SAP) is the consolidated form of all C-DAPs, an integrated and participatory mode of approach is the key success factor (KSF) of the State Agriculture Plan (SAP). As the planning process has been started at grassroots level i.e. at village / Gram Panchayat level obviously the participation of

grassroots level people is confirmed out here. The main objectives of State Agriculture Plan are -

- To prepare a State Agriculture Plan (SAP), considering the views of different Comprehensive District Agriculture Plan (C-DAP), State Agriculture Commission and State Planning Board and different line departments of Govt. of West Bengal.
- To prepare a State Agriculture Plan (SAP) for achieving 4% growth sustainable agriculture growth to maintain food security.
- To judiciously and sustainably utilize the natural, financial, physical and human resources to get maximum output.
- To partly convert our food production system from high energy consuming (fossil fuel dependence) to low natural / bio energy consuming system.
- To create entrepreneurship and employment opportunities among the rural masses especially within the small and marginal farmers and land less families.
- To transform our food production system as par the international standards fully abiding the CODEX Alimentarius rules by 2015.

1.3 VISION OF STATE AGRICULTURE PLAN

The vision would primarily be articulated to address four important aspects of development namely *environment, human, infrastructure and production* leading to better *productivity, environmental sustainability and employability*. Considering the high population growth, degradation of natural resources and climate change that would lead to food and nutritional insecurity jeopardizing in particular the livelihood of future generations, urgent mitigatory steps should be formulated and duly implemented. It is not possible to achieve that overnight; as such. Step-by-step approach would be required to reach our goal where Food security and environmental sustainability is the Prime Focus Factor (PFF).

The broad objectives behind the development of vision are:

- To generate a common development perspective of the state that reflects the thinking of diverse stakeholders
- To work out inspiring goal for overall development of the area
- To envisage and incorporate role of women and disadvantaged groups in the main stream development
- To foresee needs and level of human and infrastructural development as it emerges from collective wisdom for achieving the goal
- To motivate the people of the state and gear up all segments of population for facing challenges, difficulties and bottlenecks to realize their cherished common goals
- To act as a goalpost towards which the entire planning process should be oriented
- To help people of the state in developing more realistic, objective oriented and executable Five Year and Annual Plans
- Enhancement of Agriculture and allied sector productivity in sustainable manner

- Restoration of ecological balance of degraded and fragile rain fed ecosystem
- Reduction of disparity between irrigated and rain fed areas
- Creation of sustained employment opportunity for the rural people, including the landless
- Development and sustainable management of natural resources including land reforms
- To encourage peoples' participation which will help in generating the feeling of ownership in the participatory development of the district / Block/ Gram Panchayat
- To draw specific guideline offering flexibility for the choice of technology to enable the farmers for adoption of location specific and low cost technology

Accordingly, following is the vision statement of State Agriculture Plan;

Vision: To achieve sustainable livelihood opportunities for the people through eco friendly, clean and value added Agriculture and related activities

1.4 METHODOLOGY

The methodology of SAP has focused on understanding the latent potential of the state for development and identifying initiatives required. These potentials are treated as goals to be achieved with the available and additional resources. In order to prepare the plan, attempt has been made to prepare a statistical profile of the state which led to the understanding of the development perspective of the state. Due consultation process has been done with all line departments, State Agriculture Commission, Agricultural Technology Management Agency (ATMA) and above all going through all C-DAPs.

1.5 ISSUES IN DEVELOPMENT OF AGRICULTURE SECTOR

Increase in the production of cereals and non-cereal agricultural commodities will have to be essentially achieved through increased productivity, by increasing cropping intensity / increase productivity, introduction of high yielding variety to highbred varieties in different crops, as the possibilities of expansion of area is rather limited.

The issues are as follows –

1. Increase in population
2. High pressure on Agricultural lands
3. Environment degradation
4. Degradation of Soil Health
5. Resource based degradation and water scarcity
6. Loss of bio-diversity
7. Inadequate investment in agricultural sector

8. Lack of adequate infrastructure
9. Lack of co-coordinated approach
10. Rapid urbanization, migration of village folks
11. Gender related issues
12. Rural employment generation

With increase in population and inadequate employment generation, the pressure on land has increased considerably leading to fragmentation of holding. The number of small and marginal farmers increased considerably over the years.

As the pressure on land increased, the farmers are forced to exploit their land for livelihood support which again leads to environmental degradation and degradation of soil health and such related issues. These clearly indicate that all these issues are inter-related and solving one of these will be of no use. An integrated approach involving policy decision, adoption of new emerging technologies, infrastructural support and development of human resource base is the key to address these issues in an effective manner. A more focused, coordinated and determined approach is needed to get an "ever green revolution".

1.6 STRATEGIES TO ADDRESS ISSUES

- Conservation of natural resources and protection of environment
- Vast untapped potential of our soil and water resources, and farming system
- Technology revolution especially in the areas of molecular biology, Biotechnology, space technology, ecology and management
- Revolution in informatics and communication and the opportunity of linking farmers, extension workers and scientists with the national and international database

Keeping these in mind, the strengthening of the following strategies may be addressed for all round development of this sector.

1. Public investment in infrastructure
2. Human resource development
3. Introduction of modern technology in agriculture
4. Introduction of environment friendly technology
5. Participatory action in developing mutually agreed upon solution
6. Empowerment of farm woman
7. Use of information technology
8. Coordinated approach in extension
9. Conservation of natural resources and indigenous farmer's practice
10. Revamping existing extension system.

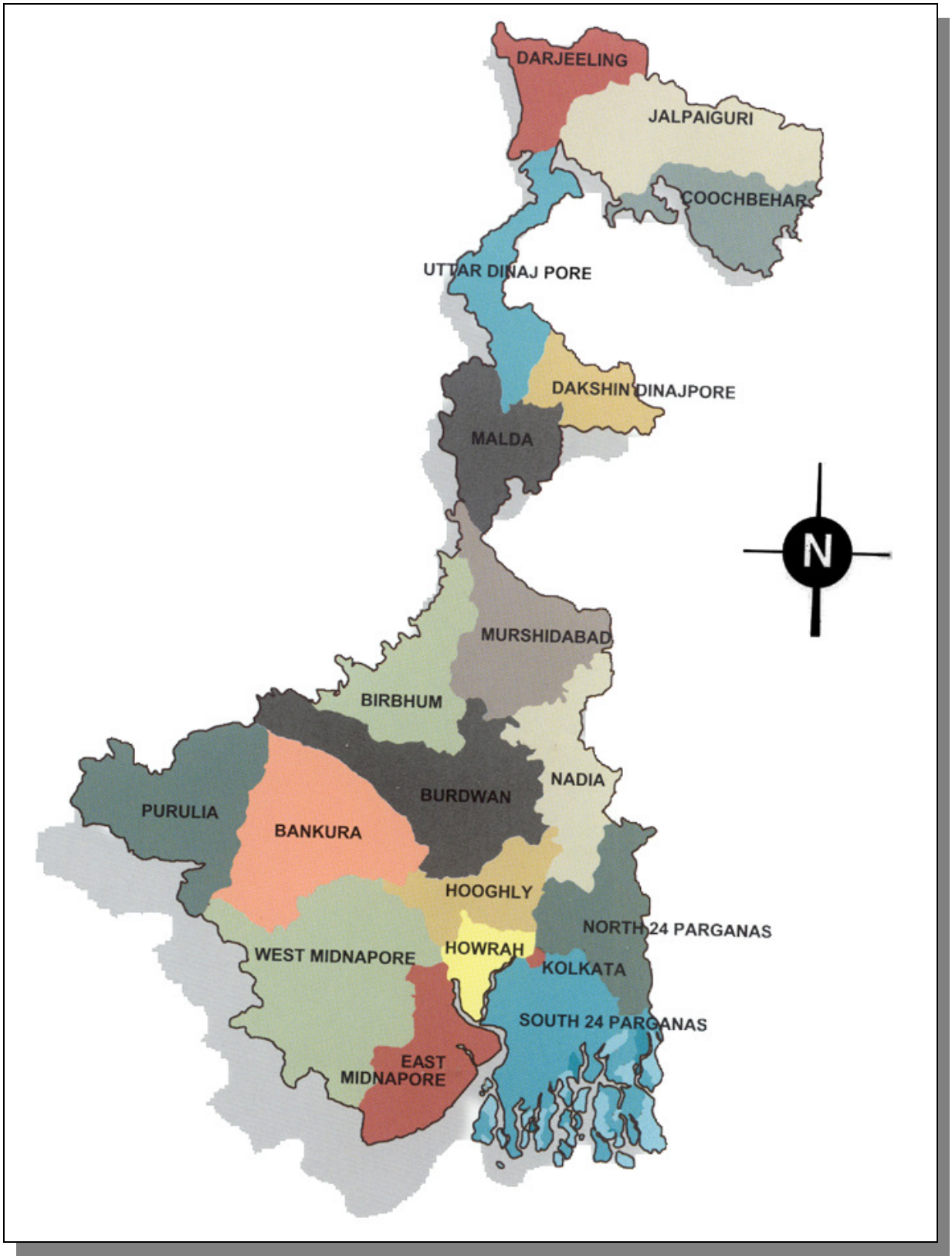
1.7 RKVY AS A SOLUTION PROVIDER

RKVY is being carried out as State Plan with 100% grant from the Government of India. Areas of focus under the RKVY are: integrated development of major food crops such as wheat, paddy, cereals, pulses, oilseeds, millets, etc.; agriculture mechanization, activities related to soil health, development of rain fed farming systems as also integrated development of watershed areas, wastelands and river valleys; support to State Seed Farms; Integrated Pest Management Schemes; encouraging non farm activities; strengthening of market infrastructure and marketing development; strengthening of infrastructure to promote extension services; activities relating to enhancement of horticultural production and popularization of micro irrigation schemes; animal husbandry and fishery development activities; special schemes for beneficiaries of land reforms; grant support to the State Government Institutions that promote agriculture/ horticulture; study tour for farmers; organic and biofertiliser and other innovative schemes.

Chapter-II

General Description of the State

West Bengal - State Map



2.1 GENERAL ASPECTS

The State borders with Bangladesh in the east, Nepal in the West, Bhutan in the north-east and Sikkim on North. On the West are the States of Bihar, Jharkhand, while in the south lies Orissa and Bay of Bengal.

According to the 2001 census, the total population of the State is 8.18 core which accounts for 7.95 percent of the country's total population, while it accounts for only 2.7 per cent of the country's total geographical area. **The rural urban ratio of the total population is under the age of 39 (Table 1 & 2).**

As regards the population density, the state tops the list with 903 people per square kilometer against only 325 people per square kilometer at all Indian level. Literacy percentage is higher in West Bengal around 69 percent as against 65 percent at all Indian level. The number of females per 1000 population is 934 (table 3).

Of the total rural workers, 19.53 and 19.30 per cents are cultivators and agricultural labourers, respectively, while 4.72 percent are engaged in household industries and the rest are grouped as other workers (table 4). According to the Planning Commission, 31.85 percent of the total population lived below poverty line in 1999-2000.

The scheduled castes and scheduled tribe constitute 28.6 and 5.8 percent respectively of the total rural population while the same are 19.9 and 1.5 percent of urban population. Of the minorities, Muslims account for 28.6 percent of the total population. This rate is 33.3 percent in the urban and 11.8 percent in the rural areas. Scheduled castes, scheduled tribes and minorities account for half of the total population in the State and in rural Bengal these three groups of people are most poor.

The state registered a 7.62 percent rise in Net State Domestic Product (NSDP) during 2008-09 (at 1999-00 prices) over previous year; the same however, was 8.80 percent during 2006-07. The per capita income during 2008-09(at 1990-00 prices) showed a 6.58 percent increase over previous year against 7.62 percent rise during 2006-07. The index numbers of agricultural production over previous year registered a decrease by 6.32 and 2.53 percent during 2002-03 and 2006-07 which, however increased by 0.76 percent during 2008-09. There has been a 7.43 percent increase in the consumer price index number for industrial workers during 2008-09 over previous year. Similarly, there has been an increase by 10.05 percent in the consumer price index for agricultural laborers during 2008-09 over previous year (table 6).

As revealed in Table-7, annual average growth of primary sector during 10^{th} Plan period was 1.54 percent, while the secondary and tertiary sectors showed more robust growth rate of 9.47 percent and 7.53 percent respectively. Hence, in the primary sector the growth was poor. The per capita income increased at a significant rate of 7.62 percent in 2006-07. During 2007-08, the increase in per capita income of West Bengal at constant 1990-00 prices was 6.78 percent (Table 7).

There is no significant reduction in demand for goods and services covering fall in production (table 8). It may be observed that primary sector in the total NSDP at constant 1990-2000 prices declined from 32.77 percent in base year to 25.69 percent in 2006-07.

During the 10th plan period the average contribution of primary sector was 28.15 percent which dropped down to 24.98 in 2007-08. However, with a boost in investment in the industrial sector, the share of secondary sector increased from 14.64 and during 10th plan period it was 16.36 percent. In the year 2007-08, share of secondary sector in total NSDP was 17.26 percent. With an improvement in the service sector, the share of the tertiary sector in the NSDP increased from 52.59 percent in1990-2000 to 57.76 percent in 2007-08, the 10th Plan average being 55.49 percent (table 8)

The performance of different sectors of the state economy can be envisaged by the estimates of NSDP at disaggregated level. The estimated NSDP of West Bengal at constant 1990-00 is shown in table-9. The SDP of agriculture, forestry and fishing increased to Rs. 40904, Rs. 1835.34 and Rs.5681.83, respectively during 2007-08 from the corresponding figures of Rs.30905, Rs.1653 and Rs.5316 during 2006-07 (table 9).

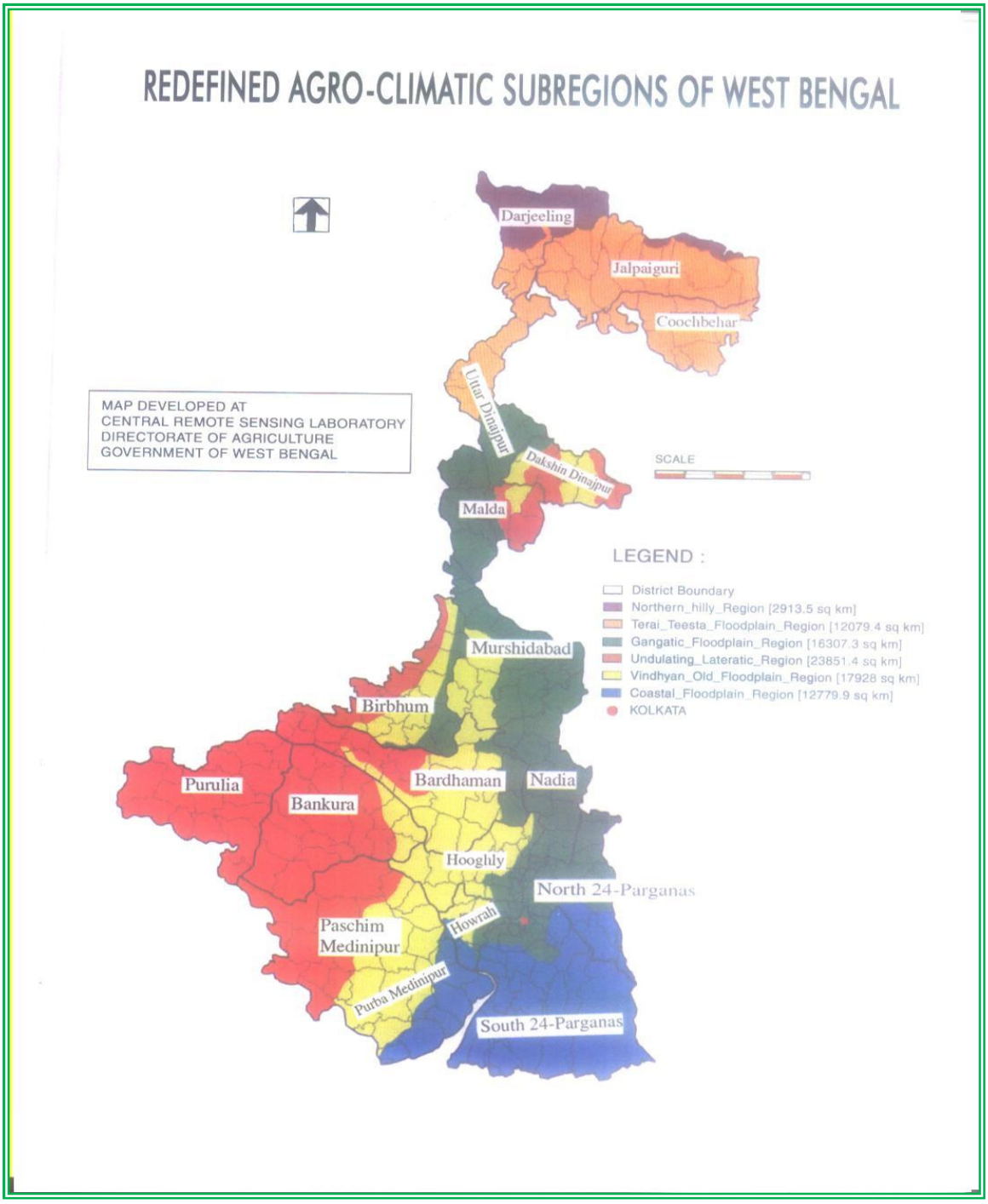
2.2 AGRICULTURE & ALLIED SECTORS

Agriculture in the State of West Bengal is the major occupation of the rural population. It is small farmer centric with 90 per cent of the cultivators being small and marginal farmers. Small and marginal farming communities hold 84% of the State's agricultural lands. In addition to this about 30 lakh landless families have earned the right to cultivate and grow crops on their own land after enactment of Operation Barga system. State has the highest population density (976 per sq km) in the country. As a result, the per capita cultivable land holding is under a steady process of fragmentation. This has resulted in uneconomic holding size to sustain a farmer's family. Increase in the price of agricultural inputs, fragmentation of land holding, uncertain prices of perishable agricultural produces, inadequate market infrastructure, distress sale of produce by small and marginal farmers etc, are some of the problems being confronted by the farmers of the state. Similarly, due to lack of proper marketing and processing facilities and for high price of feeds and fodder for farm animal, management of the traditional family mixed farming system in the rural areas has become more difficult than ever before. By and large, the socio-economic conditions of the farming community is gradually declining calling for time bound adoption of appropriate technical, social, financial and market interventions for ensuring sustainability.

The state is also faced with decline in soil fertility, annual degradation of natural resources due to floods, siltation of river & reservoir beds and erosion of river banks. The State has 21.91 lakh ha degraded lands of different kinds. In fact, about 29% of the geographical area of the State is under soil degradation. In addition to this, the State has 44.39 lakh ha of land with drainage problems to varying extents, limiting adoption of modern agro-techniques for higher productivity of field crops, horticultural crops and household animal productivity.

2.3 AGRO-CLIMATIC REGIONS

To attain scientific management of regional resources and sustainable agricultural development, the country has been divided into 15 broad agro climatic zones and the physiographic setting of the State come under three Agro climatic Regions. Agriculturally, the three broad regions are Eastern Himalayan Region (Zone II), Lower Gangetic Plain Region (Zone III) and Eastern Plateau & Hilly Region (Zone VIII). The map depicting the agro climatic regions is presented below;


REDEFINED AGRO-CLIMATIC SUBREGIONS OF WEST BENGAL
Darjeeling
Jalpaiguri
Coochbehar
Uttar Dinajpur
Dakshin Dinajpur
Malda
Murshidabad
Birbhum
Purulia
Bankura
Bardhaman
Nadia
Hooghly
North 24-Parganas
Howrah
Paschim Medinipur
Purba Medinipur
South 24-Parganas
MAP DEVELOPED AT
CENTRAL REMOTE SENSING LABORATORY
DIRECTORATE OF AGRICULTURE
GOVERNMENT OF WEST BENGAL
SCALE
LEGEND :
District Boundary
Northern_hilly_Region [2913.5 sq km]
Terai_Teesta_Floodplain_Region [12079.4 sq km]
Gangatic_Floodplain_Region [16307.3 sq km]
Undulating_Lateratic_Region [23851.4 sq km]
Vindhyan_Old_Floodplain_Region [17928 sq km]
Coastal_Floodplain_Region [12779.9 sq km]
KOLKATA

Three broad regions are further stratified into six agro-climatic sub regions. Salient features of these sub regions are as follows:

Zone II: Eastern Himalayan Region

a.) Hills sub region: Covering Darjeeling district. Mainly brown forest soil, acidic in nature (pH 3.5-5.0), annual rainfall varies from 2500-3500mm., high humidity, less sunshine hours, poor soil depth and quality limits crop productivity. Pre-monsoon showers commences from March.

b.) Teri sub region: Covering Jalpaiguri and Coochbehar district. Soils are mostly sandy to sandy loams, porous, low in base content, poor in available nutrients; acidic(pH 4.2 to 6.2); rainfall varies from 2000-3200mm; high water table, low water holding capacity, high humidity, less sunshine hours during the monsoon months and marginality of lands in some parts limit crop productivity. Chronically deficient in micronutrients, like Boron, Molybdenum and Zinc, in particular.

Zone III: Lower Gangetic Region

a.) Old alluvium: Comprising North and South Dinajpur and Malda districts. Soils are lighter in higher situations and heavier in lower situations, mildly acidic to neutral in reaction (pH 5.2 to 7.0); fairly fertile over most of the sub region; rainfall 1500-2000mm in upper and 1300-1500m in lower parts, considerable area is flood prone.

b.) New alluvium: Covering Murshidabad, Nadia, Hoogly, Burdwan and North 24 Parganas. Soils are deep, mostly neutral in reaction (pH 5.5 to 7.0) and fertile; rainfall 1350-1450 mm; most productive area of the State.

c.) Coastal saline: Covering South 24 Parganas, Howrah and Midnapore (E). Soils are mostly heavy clay containing higher salts of sodium, magnesium, potassium with organic matter at different stages of decomposition. Mostly neutral soils (pH 6.5 to 7.5). Electrical conductivity varies from3.0 to 18.0 mm, rainfall 1600-1800 mm; salinity and water congestion limit good crop productivity.

d.) Red laterite: Covering Birbhum, Bankura and Midnapore (W) districts. Soils are coarse in texture, highly drained with honeycomb type of ferruginous concentration at a depth of 15 to 30cm.; erosion prone; acidic in nature (pH 5.5 to 6.2); poor available nutrients; average rainfall 1100-1400mm., low moisture holding capacity and poor nutrient status limit crop productivity.

Zone VII: Eastern Plateau & Hill Region

The region covers Purulia district. Soils shallow modulated gravely, coarse textured, well drained with low water holding capacity. Upload soils are highly susceptible to erosion; acidic in reaction (pH 5.5 to 6.2). Rainfall varies from 1100 to 1400mm. which is spread over only three months, mid June to mid September.

Due to high slopes of the hill region of the northern part of the State with high rainfall and cooler temperature round the year, this area is almost covered with forests, plantation and orchard crops. Only one third area of this region is being cultivated with crops. The crop productivity is poor due to high slopes, high rainfall and erosion, shallow and acidic nature of the soils. The region offers good scope for extension of cultivation of ginger, summer vegetables, peach, plum etc., adopting a sustainable approach.

The soils of Terai and Teesta region are light textured, strongly acidic due to high rainfall. Rice, jute and tobacco are the major *kharif* crops of this region, while in winter a number of winter vegetable crops, potato and a few pulses and oilseed crops are being grown with poor productivity. This agro-climatic region is also suitable for extension of cultivation of wheat, potato, groundnut, superfine & scented rice, high value spices like black pepper, cinnamon, ginger, turmeric, garlic etc. Cultivation of medicinal and aromatic plants and allied sectors like animal husbandry and fisheries are other potential areas for further development. The development of agriculture rests in the timely supply of good quality seeds and propagation materials of good varieties with a developed marketing channel. Small & marginal farmers of North Bengal also have tradition for large scale cultivation of winter vegetables. However, they do not get adequate remunerative price for want of easy and cheap transport system, strong marketing system, cold storages and agro-processing units. This region is located at the centre of the eastern region of India and strategically positioned with three international frontiers- Bangladesh, Nepal and Bhutan and also borders the States of Jharkhand, Bihar, Orissa, Sikim and Assam. As a matter of fact, there are good prospects for agro-processing units for primary processing of vegetables, fruits and spices and at the same time bringing them in a semi-processed condition or secondary processed material with backward linkages to small rural centers.

West Bengal has by far the largest alluvial land, being 35 lakh ha in the country of which 22 lakh ha comes under Vindhya and Gangetic alluvial soil regions. These are endowed with neutral to near neutral, deep and fertile soils with high water holding capacity. The areas have advantage of river valley irrigation as also ground water potentials. A wide range of wet and dry season field crops, vegetables, fruits and spices are being grown with around 200% cropping intensity. Yet the productivity levels of a majority of the crops are below the potential levels mainly on account of low input and technology application influenced by poor economic status of the farmers and their limited access to institutional credit. These two regions have great promise for large scale cultivation of a variety of winter and rainy season vegetables as well as flowers. Notwithstanding the fact that mango, litchi, guava and banana are the prosperous fruit crops of these regions, the old mango orchards in Malda and Murshidabad districts have outlived their economic life and need replacement and/or rejuvenation. Common facilities like uninterrupted power supply, good quality water supply, cold-chain facilities, warehousing facilities, forward integration with processing industry are the interventions required for further development of the sectors in the region.

In the western belt of West Bengal there exists a vast tract relatively arid where the lands are lateritic and undulating. Such lands represent about one third of the cultivated area in the districts of Purulia, Bankura, parts of Paschim Medinipur, Bardhaman and Birbhum. Uplands of varying sizes, from a few hectares to a few square kilometers, are interspersed with terraced rice fields in the depressions and on the slopes. The bottom terraces where moderate yields of rice are obtained, generally belong to a few comparatively better-off farmers. The majority of the inhabitants of this region are predominantly tribals and other backward communities. They have largely depended on these marginal uplands where they attempt to grow some hardy varieties of poor yielding rice, certain small millets, a minor pulse-horse gram and a minor oilseed-niger; to eke out a living. Except in the year of good rainfall, the yields are very poor, hardly compensating for the labour and other inputs. In spite of this, however, more and more such uplands are being brought under plough due to

pressure of rising population. The nutritional status is poor partly due to leaching losses on account of high soil porosity. The productivity of the soils in the region could be improved substantially through adoption of interventions like selection of suitable crop varieties, management of soil, adoption of water harvesting and soil conservation techniques, manuring, adjustment of sowing time, etc.

The southern most areas of West Bengal in the districts of South 24-Parganas, Purba Medinipur and southern Howrah are low lying and level part of the deltas of the river system of the Ganga on the northern coast of the Bay of Bengal. The rice fields are classified as medium low and low lands which are inundated by floods and rain water with poor drainage. Water stagnates throughout the monsoon period to a level of 30 to 60 cm. The vast tracts of coastal saline soils occur on the fringes of Bay of Bengal. Underground water table is present at a shallow depth with high salt content. Salts are raised to the surface during the dry periods of the year rendering it unfit for cultivation of many crops needed by the local people. These areas extend to 8.4 lakh ha. Only 4% of the cultivated area is irrigated with sweet water. The region is, therefore, a mono-cropped area with 4.2 lakh ha being cultivated area in the wet season and the rest six to seven months during winter and summer remain generally fallow. Of course, a few enthusiastic farmers in the less saline areas have adopted commercial cultivation of chilli and watermelon adjacent to their homestead. Possibilities of extension of sunflower, groundnut and cotton cultivation providing saline water (Ec 5.2 dS/m) irrigation, have been reported. During the *Kharif* season, this tract receives about 1600 mm rains between June to October. This amount of water is far in excess of that required for *Kharif* crops. The proven technique of storing the excess rain water in $1/5^{th}$ excavated land of the total cultivated land of a farmer and raising the adjacent embankment and crop field (Bhattacharya,1990 and RKMLSP) is strongly suggested for large scale adoption. This technique would surely bring in prosperity with the cultivation of fruits and vegetables on pond embankment and diverse field crops both in *Kharif* and *Rabi* seasons on the raised fields and pisci-culture amongst the small and marginal farming communities of this agro climatic region.

2.4 LAND UTILISATION

Net sown area covered 60.63 percent of the total reporting area during the period 1985-86 and 2006-07, while the current fallows varied between 0.7 to nearly 4 percent during the same period. Area under forests covered 13 to 14 percent of the total reporting area while 19-20 per cent of the area was not available for cultivation (table 11)

2.5 OPERATIONAL HOLDING

In West Bengal marginal operational holding (less than 1 ha) accounts for 88.8 percent of the total operational holdings as against 69.8 percent at all India level. Incidentally, this is the second highest in the country after Kerala. The trend of distribution in respect of small and other classes are much behind that of All India level. Large holdings (above 10 ha) are absent. Over the years number of holdings increased to a large extent owing to fragmentation and the average holding size stood at 0.82 ha in the state during 2000-01 as against 0.94 ha during 1980-81 (table 12 &13)

2.6 AGRICULTURAL CROPS

The cropping pattern in the State is dominated by food crops which account for about 78 per cent of the area under principal crops. Among single crops, paddy is cultivated in 57.19 lakh hectares followed by cereals (all combined) in 61.69 lakh hectares and oilseeds in 7.07 lakh hectares, jute in 6.09 lakh hectares and potato in 4.00 lakh hectares. West Bengal was the largest producers of paddy in the country with a production of 14719.50 MT in the year 2007-08 while the second largest producer of potato after Uttar Pradesh with 9900.80 MT in the same year. With a vegetable production of 12555960 MT, the State is also one of the highest producers of vegetable in the country. Traditionally, West Bengal has been the highest producer of jute. The State also accounts for 25 per cent of tea production in the country, next only to Assam. There are 309 tea estates in the State in the organized sector covering 103431 hectares. Besides, 8078 small growers are growing tea in 11094 hectares.

Over the years, detailed data for selected crops on area coverage, production and productivity, etc. when recalculated using the index numbers for the assessment of different parameters would show that overall agricultural growth rates have plateaued with marginal ups and downs, quantitative loss in one being compensated by gains in another and vice-versa (table 14 &15)

Production of rice and wheat has increased during 2006-07 over that in the year 1990-91. However production of pulses declined during the same period. Of the oilseeds, production of rapeseed and mustard remained almost static, while the production of sesame and other oilseeds improved during 2006-07 over that of 1990-91. Production of raw jute also improved over the years. Production of potato and sugarcane improved during the period under reference (table 16)

A look into the comparative yield rates in west Bengal and India would reveal that per hectare yield in rice, gram and potato is higher in the state than at all India level while the yield rates in wheat and mustard are lower than the all India level. It may also be observed that has been a substantial improvement in the yield rates of different crops both at the state and All India level during the period 1980-81 and 2007-08 (table 17)

Cropping intensity in West Bengal improved steadily during the period 1990-91 to 2006-07 as the same was recorded as high as 182 percent during 2006-07 as against 159 recorded during 1990-91 (table 18)

Contribution of West Bengal to all India production of jute, potato, sesame, tea and rice were quite substantial, as these crops contributed 70.75, 30.35, 22.80, 20.28 and 14.16 per cent, respectively, to the total all India production (table 18)

The coverage under high yielding varieties of rice improved significantly during the recent years where more than 90 percent of areas under rice have been covered with high yielding varieties. The entire wheat area has been under high yielding since the eighties (table 19)

2.7 FERTILISER & PESTICIDE CONSUMPTION

The consumption of fertilizers in the state has been rising over the years both in quantity and per ha application. The consumption of fertilizer NPK per hectare in 2007-08 has been 150 kg/hectare in the ratio of nutrients N, P, K being 2.22 : 1.26 : 1. Pesticide consumption, however, remained either static or improved marginally (table 23)

2.8 IRRIGATION POTENTIAL

Total ultimate irrigation potential of the State is 67.43 lakh hectares. The State Water Investigation Directorate (SWID) has assessed the ultimate gross irrigation potential that can be created through minor irrigation development in the State at 44.33 lakh hectares. Of this, 13 lakh hectares are from surface water sources and 31.33 lakh hectares are from ground water sources.

The gross irrigation potential created through major, medium and minor irrigation in the State till the end of March 2009 was 55.01 lakh hectares. The percentage of utilisation of potential created is 81.73 percent in major and medium irrigation structures, while it is 81.64 percent in minor irrigation. Out of the ultimate gross minor irrigation potential of 44.33 lakh hectare, 39.30 lakh hectares has been created up to 2008-09.

2.9 AGRICULTURAL MARKETING

The Agricultural Produce Market Committee Act in West Bengal was implemented by the State government in 1971. There are 43 Principal Market Yards and 641 Sub-Market Yards in the State as on 31 October 2007. There are still 795 markets outside the purview of notified area of regulated market committees in West Bengal. The State is, however, yet to amend the APMC Act on the lines of the guidelines issued by Government of India. Of late, the State government is considering amending the act so as to allow private corporate houses to procure agricultural produce directly from Self Help Groups (SHGs) instead of individuals.

2.10 LAND DEVELOPMENT

Out of the total reported area of 86.84 lakh ha in the state, around 22.14 lakh ha constituting nearly 25% is affected by different problems associated with land degradation. The problems associated with land degradation are rill, gullies and ravines, water logging, saline / saline alkali, mining, sea coastal, landslide, stream bank erosion and sand ladening. Development of the degraded areas adopting watershed approach needs to be given priority. Other investments such as land leveling, shaping, bench terracing, on-farm development, vermi-compost making, etc, should also be popularized amongst the farmers.

2.11 FARM MECHANISATION

The scope for mechanization exists in cultivation of almost all the major crops grown in the State viz. paddy, wheat, mustard, groundnut, potato, jute etc. There is also the scope of mechanization of horticultural crops mainly for crop protection and harvesting operations. The existing level of available farm power is about 1.2 kW/ ha which is inadequate to enhance the cropping intensity and output of the farm sector. This level needs to be raised to 3.0 KW/ha by 2020.

2.12 PLANTATION & HORTICULTURE CROPS

The State has immense potential for development in horticulture sector both through horizontal (area expansion) and vertical integration (productivity improvement). With the implementation of National Horticulture Mission, the State Government contemplates doubling the production under horticulture crops by the year 2011. It may be mentioned that McKinsey, in its vision document for West Bengal, has stated that the State should

aspire to be 'the food bowl of India' by 2010. The potential for cultivation of horticulture crops such as banana, mango, pineapple, etc, tea plantations and floriculture amongst other crops is estimated at Rs.385.89 crore.

The area coverage under fruits increased marginally by 3.80 percent during 2007-08 over the preceding year and production increased by 4.78 percent. The area under vegetables increased marginally to 9.12 lakh hectares in 2007-08 from 9.04 lakh hectares in 2006-07. Area under flowers increased by 5.55% in 2007-08 over 2006-07 and production of loose flowers increased by about 11 percent during 2007-08 over 2006-07. Production of cut flowers however, increased by 52 percent during the same period. The production of major fruits in the State like, mango, banana, papaya has been increasing steadily over the last few years, however pineapple production has declined. Among the vegetables production, tomato, cabbage, brinjal, cucurbits, Lady's finger are increasing (table 20-22)

2.13 FORESTRY & WASTELAND DEVELOPMENT

The total recorded forest area in the State is 11,879 sq.km. of which 7054 sq.km. is Reserved Forest, 3772 sq.km. is protected forest and 1053 sq.km. , being Unclassified State Forest thus constituting 13.38% of the geographical area of the State. By legal status, Reserved Forests constitute 59.38%, Protected Forests 31.75%, Unclassified Forest 8.87%. The forest cover including the forests created outside the recorded forest area is 15.52% of the geographical area as assessed in the year 2005. There is potential for jatropha and bamboo cultivation and for development of farm forestry and nurseries.

During the year 2007-08, 231570 cum of timber; 262023 cum of firewood; 251.28 quintal of honey; 13.96 quintal of wax; 1296.30 MT of Sal seed; 2065.34 MT of Kendu leaves and 3227.14 quintal of citronella grass were harvested from different forest areas and total revenue of Rs.4856.14 lakh was earned (table 29, 30).

2.14 ANIMAL HUSBANDRY

The State has immense potential in Animal Husbandry sector. As per the Livestock Census 2007, there are an estimated 191.88 lakh cattle and 642.44 lakh bird (including fowl and duck) populations in the state. Production milk increased to 40.47 lakh tones during 2007-08 as against 34.70 lakh tones during 2000-01 registering a 17.5 percent increase (table 25)

As regards the production of eggs, 306 crores of eggs have been produced during 2007-08 as against 228 crores during 1990-91, an increase by 34 percent (table 26)

The production of all varieties of meat increased during the recent years in the state. The production of mutton, poultry meat and goat meat increased by 343, 328 and 76 percent respectively during 2007-08 over the year 1990-91 (table 26). Both credit & non credit agencies can play significant role in making available the required inputs and investments for various activities in animal husbandry sector.

2.15 FISHERIES DEVELOPMENT

West Bengal is one of the leading producers of fresh water fish and the largest producer of fish seeds in the country. In the inland fishery sector, West Bengal accounts for 30% of the total fish production of the country. Its share of the all India fish seed production is 62%. Total fish production in the State has increased from 14.71 lakh tonne in 2007-08 to 14.84 lakh tonnes in the year 2008-2009. The significant aspect is that the State is no longer a fish deficit State. The production level has surpassed the consumption by 40,000 MT.

Fish seed production has increased from 13,475 million in 2007-08 to 14,000 million in the year 2008-09.

There is significant increase in the export earning from the sector as it grew from Rs. 50 crore in 1987-88 to Rs.725 crore in 2008-09. The major commodity in export is shrimp. The State has already emerged as the fourth largest State in the country's total exports despite having a small coastline of 150 km.

The micro-finance programme under fisheries in the State has also made rapid strides in recent years. Since the year 2003-04, a total of 8125 SHGs have been formed with a total members of 85,240. As against 8125 groups, 4250 groups have been credit linked and 3885 groups have taken up economic activities through project lending in fisheries sector.

The significant growth of the fishery sector in the State over the last two and a half decades has been possible primarily because of the development strategy followed by the State Government. The basic strategy has been to bring in scientific pisciculture practices in existing waterbodies and also new water bodies. The financial returns from pisciculture have increased. This has encouraged farmers in increasing numbers to take up pisciculture.

However, there is still considerable scope for further utlisation and exploitation of fisheries resources in the State as there are still large areas of water bodies in the State which are not being utilized to their full potential for pisciculture.

Infrastructure development is another key growth driver. This needs to be done under support from Government as well as through private initiatives. Certain infrastructure which are require to be developed urgently are ; hatcheries for crabs, ornamental fishes & prawns, soil & water testing laboratories, modern fish markets, training cum information centres, European standard fish processing plants, ice plants, cold storages etc,.

2.16 COLD STORAGES, STORAGE GODOWNS

Lack of adequate scientific post-harvest storage facilities both for perishable and non-perishable agriculture produce is one of the problems associated with the agriculture production in our country which results in 10-30% post harvest losses estimated at over Rs.20,000 crore every year. In this context, Govt of India has launched credit linked Capital Investment Subsidy Schemes (CISS) for construction/ renovation of Rural Godown in 2001 and CISS for construction/ modernization of Cold Storage for Horticultural produce in 1999. In order to develop and strengthen agricultural marketing linkages, GoI has also announced a similar credit linked CISS in 2005 for infrastructure creation including market user common facilities and functional infrastructure. However, the scheme being reform linked, is yet to be made applicable in the State of West Bengal, pending amendments to the APMC Act.

West Bengal is a major producer food grains - especially rice with a total food grain production of around 159 lakh MT and oilseed production of 7.05 lakh MT. The State is the

largest producer of vegetables in the country and a major producer of fruits and flowers. The production under major crops in the State is given below:-

Being a surplus production State for both perishable and non perishable agricultural commodities, adequate storage infrastructure is of paramount importance. The total storage capacity provided by the State Warehousing Corporation is about 217350 MT for food grains. The storage capacity of corporation which was 2.59 lakh tonnes in 2002 has declined to 2.17 lakh tonnes in the year 2008. This apart, 371 warehouses with a combined capacity of 7.72 lakh MT is available for storage of agricultural produce. However, the storage capacity is considered to be grossly inadequate. Similar situation prevails in respect of cold storage facilities for perishable horticulture produce. As on December 2007, the State had 459 cold storage units with a combined capacity of 76 lakh MT, of which 54.45 lakh MT storage capacity is exclusively for storage of potato (400 potato cold storage units) and the remaining capacity is from multipurpose cold storage (59 units). The wide gap in the available storage infrastructure vis-a-vis the requirement, offers an opportunity for both public & private sector investment in creating post harvest infrastructure for agricultural produce.

The State had 684 regulated markets comprising 43 principal market yards and 641 sub market yards. Pending amendments to APMC Act, private sector investment in creation of market infrastructure is absent.

2.17 INCOME ANALYSIS

Per Capita Income in Districts of West Bengal

District	Per capita income in Rs.		District	Per capita income in Rs.	
	Rural	Urban		Rural	Urban
Coochbehar	11026	35409	**Murshidabad**	15361	33872
Jalpaiguri	14440	35230	**Nadia**	20768	47662
Darjeeling	16115	46756	**North 24-Pagranas**	18301	41992
Uttar Dinajpur	10340	30942	**South 24-Parganas**	15832	34643
Dakshin Dinajpur	11669	38690	**Howrah**	19592	38662
Malda	13940	54342	**Burdwan**	18369	55791
Birbhum	14830	40604	**Hoogly**	25635	46198
Purulia	10677	32782	**Purba Medinipur**	13612	27109
Paschim Medinipur	10250	27854	**Bankura**	14182	32342

Chapter –III

SWOT Analysis of Agriculture & Allied Sectors

Chapter III

3. SWOT ANALYSIS OF AGRICULTURE & ALLIED SECTORS

The analysis of strengths, weaknesses, opportunities and threats (SWOT) is considered to be a pre-requisite for the formulation of a full proof strategy for development of each sector. An attempt has been made to analyse the sector-wise strengths, weaknesses, opportunities and threats towards 4% achievement of agricultural growth in the state at the end of 11th plan period. This analysis has been made after taking into consideration the status of various social, economical, developmental and environmental parameters. This analysis will provide necessary inputs towards formulation of the elements of district vision.

3.1 AGRICULTURE

Strengths	Opportunities
• Major areas of the State are blessed with natural resources like ample rainfall, suitable soil, topography surface and ground water resources and good climate for production of variety of crops, both agricultural and horticultural. • Responsive soils to different inputs and management practices. • High cropping intensity, particularly in old and new Alluvium sub regions where the soil is fairly fertile. • Huge availability of untapped ground and surface water for irrigation in the Terai sub region. • The Teesta Barrage Project envisages to provide water for irrigation to about one lakh hectares of agricultural land within the next five years in Jalpaiguri district. • More than 60 per cent area in old and new Alluvium sub regions is benefitted from major and minor irrigation projects. • Huge possibilities of growing rain fed crops like legumes, kharif maize, short duration mustard (terai), pulses like black gram, moong, lentil, etc, particularly, in the Terai and old Alluvium sub regions. • Fairly good purvey of agricultural credit from the banking and cooperative sectors in the Lower Gangetic Plain Region. • Strong Panchayati Raj System for effective Planning and implementation of	• Scope for increasing cropping intensity with water harvesting measures and crop diversification. • Organic matter rich fertile old and new alluvium soil offer good prospect for increasing productivity and cultivation of all types of crops. • Soil amelioration measures through adoption of organic farming, vermi-composting offer a good scope for shaping of agricultural scenario of the State. • Scope for increasing pulses and oilseeds production with sub soil moisture under maximum tillage and increasing jute seed production in the western part of the State. • Scope for engagement of progressive farmers into contract farming and establishment of agro-based industries. • Wide production base with availability of raw material during a major part of the year offering good scope for multi product based fruit and vegetable processing units.

development schemes at grass root level
- The two State Agricultural Universities, namely, Bidhan Chandra Krishi Viswa Vidyalaya (BCKV) and Uttar Banga Krishi Viswa Vidyalaya (UBKV) are there for providing knowledge support to the agricultural development programme
- A network of Krishi Vigyan Kendras (KVKs) provides extension support to agriculture and allied enterprises.

Weakness	Threats
• Small and fragmented land holdings. Around 88 percent of the total land holdings belong to marginal and small farmers. • Average holding size is 0.82 ha. Thus it becomes difficult to introduce advanced technology in farmers' fields. • Mono cropping and growing paddy as subsistence farming. • Financial weakness of farmers. • Lack of scientific attitudes and laggardness of farmers. • Inherent soil and climatic problems in general, in the Terai areas in particular. • Fast deteriorating soil health and productivity due to excess application of chemical fertilizers and low application of organic inputs. • Inadequacies and untimely credit flow from financial institutions. • Inadequate market infrastructure and predominance of intermediaries. • Poor post harvest management and value addition • Improper drainage system in low-lying pockets resulting in prolonged water logging affecting crop productivity • Inadequate irrigation facilities, agricultural extension services and input delivery system. • Unavailability of quality Seeds in remote parts of the state	• Indiscriminate use of chemical fertilizers and Plant protection chemicals. • Lack of interest among young farmers in the agricultural and allied activities due to increasing avenues in other occupations. • Reluctance of poor income group farmers to adopt modern agricultural technologies. • Diversion of agricultural land to other economic activities. • Decreasing trend of agricultural labour force due to migration. • Degraded environment and ecosystem, erratic behaviour of monsoon and deterioration of quality of surface water & depletion of ground water. • Increasing salinity in soil in the coastal areas.

- Low seed replacement rate
- Lack of awareness regarding Seed treatment facilities

3.2 HORTICULTURE DEVELOPMENT

Strengths	Opportunities
• Conducive and suitable agro-climatic conditions, topography and soil types for horticultural and plantation crops • Prospects in production of various types of vegetables including hybrids, flowers and spices. • Support extended under National Horticulture Mission • Existence of Agri-Export Zones in various districts, offers good scope for focussed growth of specific horticultural crops. • A growing tendency to diversify from traditional agricultural crops to horticultural crops. • New alluvium zone offers good scope for increasing production of potato and various tropical and sub-tropical vegetables. • Second largest producer of flowers – both traditional and high value cut flowers. • Excellent potential for production of high value cut flowers like dendrobium / cymbidium orchids, liliums, gladiolus, anthurium in the Darjeeling hills, gerbera rose in the plains under green houses	• Area available for expansion of horticultural and plantation crops. • Opportunities to improve existing orchards/plantations through better management practices. • Scope for nursery raising of a number of horticultural crops. • Growing trend of organic fruit and vegetable production. • Establishment of post harvest technology centres in fruits & vegetable processing in different districts. • Wide opportunities for exports with special reference to mango, pineapple, vegetables, potato in fresh and processed products; flowers • Development of Food Parks, Flower Auction Centres, creation of exclusive AEZs are widening the scope for exports

Weakness	Threats
• Lack of awareness on scientific farming of horticulture crops, supports given by government through various schemes. • Inadequacies in availability of quality plant material in time especially for perennial horticulture crops • Dependence on other States to meet quality seed requirements for vegetables	• Limited market information system and other infrastructure for market promotion. • Overuse of chemical fertilisers & pesticides. • Receding ground water level and environmental degradation. • Occurrence of un-seasonal rains and

more specifically for potato • Lack of interest, investment & innovation for renovation of old orchards. • Weak infrastructure for horticultural extension, farmers' training and capacity building • Limited marketing information on Horticultural crops and products. • Lack of knowledge of organic farming resulting in loss of opportunities for production and export of organic produce. • Inadequate cold storage facilities for preservation of fruits, vegetables, flowers etc. and limited refrigerated vans, grading and packaging facilities and transportation • Inadequate credit flow to the sector.	floods adversely affecting production, transport and marketing of perishable horticulture produce

3.3 FORESTRY DEVELOPMENT

Strengths	Opportunities
• Existence of substantial community/barren/waste/fallow land provides good scope for expansion of social forestry. • Initiative of the Forest Department to increase tree coverage through different mixed plantation efforts generated interest among the rural community to adopt different forestry schemes. • Successful implementation of JFM scheme with people's participation • Comprehensive approach to develop forestry including social and agro forestry will not only increase greenery, restore biodiversity and ecosystem in general, but also would go a long way to income generation of the rural masses. • Eagerness of farmers to plant different timber and fuel wood species on the embankment of water bodies, ponds and fallow lands. • Availability of plenty NTFP for strengthening rural livelihood options.	• Agro-climatic conditions are congenial for forest plantations • Abundant scope for development of farm forestry/agro forestry/commercial forestry etc. • Existing natural resources are quite favourable for eco-tourism. • Increased demand for raw materials from paper mills particularly for supply of bamboo/wood. • Huge scope for mixed plantation and fodder plantations under farm forestry. • Protection & development of forest through Joint Forest Management committee (JFM) • Environmental degradation related awareness among vast population.

Weakness	Threats
• Inadequate fund flow to Forest Department for social forestry • Growing industrial and mining activities deplete forest and grazing lands. • Due importance not given for commercial planting and management of social forestry schemes	• Increasing population pressure and consequent thrust for food crops is a growing threat to the existing forest coverage. • Dearth of grazing land prompts cattle's encroach upon forest areas. • Human intervention on forest for collection of fuel wood and other forest resources for livelihood is a growing threat to forest.

3.4 SERICULTURE DEVELOPMENT

Strengths	Opportunities
• Traditionally, Malda, Murshidabad and Nadia districts are famous for production of high quality silk. • Extent of adoption of upgraded technology by silk growers in these districts is quite encouraging. • Increasing interest among farmers for sericulture activity (farming, rearing, weaving, etc.) • Good extension support from sericulture department. • Suitable agro-climatic conditions for sericulture in the Terai and Old Alluvium regions where large number of SC/ST population can undertake sericulture activities. • Good infrastructure facilities, such as, seed Farm, Technical Service Centre, Growth/Extension Centres and Government Cocoon market etc.	• Possibilities of production of high value silk with the supply of quality inputs and vast scope for adoption of modern techniques in sericulture. • Promotion of bivoltine variety of silk worm • Promotion of Muga and Tassar cultivation. • High potential for commercial cocoon production. • Good scope for forward integration of reeling and weaving activities with focus on quality fabrics

Weakness	Threats
• Limited infrastructure and market facilities • Inadequate credit flow to the sericulture sector. • Lack of awareness of modern sericulture and value addition in general.	• The Silk Growers often face economic set back due to market fluctuations and competition

3.5 ANIMAL RESOURCE DEVELOPMENT

Strength	Opportunities
• Animal husbandry has natural linkages to agricultural activities and provides good option for income enhancement of farmers through livestock – crop productive system. • Animal resources are diverse and plenty in number in the State. Good population of Black Bengal variety of goat. • Dairy and poultry farmers under both co-operatives and private sectors are commercially successful. • A good number of institutions like Paschim Banga Go-sampad Vikash Sanstha (PBGSBS) for breeding, WB Cooperative Milk Producers' Federation Ltd.(WBCMPF) for milk marketing, WB Dairy & Poultry Development Corpn Ltd.(DAIRPOUL) for feed, WB Livestock Development Corpn Ltd.(WBLDC) for meat marketing and above all Directorate of Animal Resources & Animal Health(AR&AH) for health & extension, working in tandem for the overall development of the sector • Bright scope for involving SHGs for poultry, goatery, piggery, duckery, etc. • Huge scope for increased production of fodder crops including maize	• Increasing demand for milk, dairy and poultry products offer good scope for Animal resource development. • Potential for increasing livestock population and promoting allied sectors, such as, dairy, poultry, duckery, goatery, sheep rearing etc., providing supplementary income options for small and marginal farmers as well as landless labourers. • Fish cum-duckery with khaki Campbell duck has become very popular among the Self Help Groups (SHG). • Small scale piggery and backyard poultry can be a successful venture in tribal areas. • Heifers rearing as a result of cross breeding of indigenous cattle has good potential. • A newer strain of poultry birds developed by the State Poultry Farm can be easily adopted by the BPL families as these breeds can be fed on kitchen waste only. • Promotion of the concept of mixed fodder cultivation (Lucern, Berseem, Napier grass etc.) • Large scale implementation of artificial insemination programme, breed up gradation and enhancing milk production.

through crop diversification programs to meet the increasing demand for cattle and poultry feeds. • Congenial environmental conditions for poultry farming (both for layers and broilers), duckery, piggery, etc. • A good network of Health Centres/Artificial insemination centres and other related infrastructure to support development of Animal Husbandry. • Pranibandhus are promoting door step insemination services in the villages.	• Scope for organizing more number of awareness camps-cum-training programs and huge scopes for large investment in the sector. • Support from government for backyard poultry. • Excellent opportunities for private sector investment in poultry and dairy sectors including processing

Weakness	Threats
• Low level of awareness about diversification and modern technology. • Insufficient veterinary institutions and extension activities. • Indigenous non-descriptive cattle population with low milk productivity account for 70% of the cattle population • Animal husbandry is a secondary livelihood option for agricultural farmers. • Inadequate bank finance for backyard poultry and quail farming. • Poor maintenance of parent stocks and inadequate supply of improved variety of livestock. • Absence of proper animal insurance settlement/ claim system. • Imperfect market mechanism, predominance of intermediaries in procurement of milk, milk products, poultry products, etc. • Limited grazing land and inadequate fodder production. • Recurrence of Bird-flu adversely affecting investment in the sector	• Growing industrial and mining activities deplete grazing land. • Migration of farmers to other area/regions for better income alternatives/opportunities. • Youths not evincing keen interest in animal husbandry activities. • Recurrence of disease problems in poultry and dairy sectors. • Absence of cold chain facility

3.6 FISHERIES DEVELOPMENT

Strength	Opportunities
• The State has large impounded resource of large number of water bodies besides a riverine system for fish production. • All varieties of major and minor carps are cultivated besides various types of local fish species naturally available in the water bodies. • Per capita consumption of fish is highest in world and hence high demand for production of fish • Major producer & supplier of fish seed in the country (65% of country's seed is sourced from West Bengal) • Availability of good quality of spawn/seed from natural as well as commercial hatcheries. • Existence of active and functional Fisherman's cooperative societies, Fish Production Groups and a large number of Self Help Groups (SHG) all over the State contributing well for the growth of the fishery sector. • Pro-active Fisheries Department • Various governmental schemes and demonstration farms provide able support for development of fisheries.	• The state has 2.10 lakh Ha of impounded brackish water resources in India, which is the highest in country, but only 0.48 lakh Ha have been developed. • Increasing fish productivity through development of beels & baors • Setting up of more number of hatcheries for seed production in different districts/blocks. • Integrated fish farming with agriculture, horticulture, dairy, poultry, offers immense scope for development. • Organizing demonstration, training and awareness camps in the fish farmers' villages for dissemination of advanced technology. • Expansion of fishery activities through excavation of additional tanks, renovation of derelict tanks, desilting river beds etc. • Promoting fish farming in canals • Thrust on poly culture with prawns for maximum utilization of resources. • Promotion of paddy cum fish farming, air breathing fish farming, crab fattening, ornamental fish culture. • Huge scope for inland fishery activities and production of value added products from low cost fish.
Weakness	**Threats**
• Large water bodies are under derelict and semi-derelict conditions. • Lack of organized fish culture at village level. • Shortcomings in marketing, absence of adequate ice plant and cold storage facilities at the production point. • Inadequate bank financing in the fishery sector. • Highly season specific activity. • Inadequate demonstration and extension campaign at field level.	• Drying of natural water bodies due to extensive use of water for irrigation and or during summer. • High siltation restricts fish production. • Over exploitation of fisheries resources in sea, especially the juvenile fishing • Flood, natural calamities and water pollution from indiscriminate use of pesticides in the agricultural field are big threats to pisci culture.

3.7 WATER RESOURCES & IRRIGATION

Strength	Opportunities
• By and large, a good annual rainfall and presence of perennial rivers and other surface water resources • Good ground water potential with scope for further exploitation • Major irrigation projects apart, irrigation potential already created through shallow and deep tube wells, river lift and through utilization of water bodies etc. • Predominantly sandy loam to loam soil type offers good prospect for ground water recharge	• Promoting use of surface water for irrigation through proper rain water harvesting. • Good prospect for increasing gross cropped area through effective water management practices. • Promoting river lift irrigation. • Popularisation of drip and sprinkler irrigation for horticultural crops.

Weakness	Threats
• Total irrigation potential not utilized optimally. • Little efforts towards surface water irrigation through harvesting of rain water. • Little knowledge about surface water conservation and management. • High wastage of irrigation water due to faulty irrigation system. • Over exploitation of ground water. Micro nutrient deficiency in soils, specifically that of boron, molybdenum and zinc.	• High arsenic levels in ground water in some parts of the State.

ANALYSING SWOT

Strength over Opportunities

Agriculture	Strategies
	• Diversification and intensification of agriculture. • Improvement of productivity and profitability of thrust crops by adopting a newer and sustainable technologies and use of inputs. • Expansion of area under oilseeds, food crops and vegetables • Promotion of organic farming. • Increasing credit flow to farmers through banking sector • Increased advocacy to harvest and use rainwater • Encouraging Agro processing and value addition to agriculture produce.
Irrigation	• Effective participatory irrigation management for better utilization of water resources • Identification of location specific cropping sequences with emphasis on crop diversification to less water intensive and more profitable crops like pulses, oil seeds, vegetables
Animal Husbandry	• Breed up gradation through artificial insemination. • Introduction of new breeds, suitable to the local climate • Preservation of indigenous breeds. • Promoting backyard poultry as well as poultry farms.
Fisheries	• Establishment of private hatcheries to supply quality fingerlings. • Promotion of integrated fish farming • Diversification from major carp based farming to others like air breathing fishes, crab, prawn, paddy cum fish farming etc,. • Demonstration and training for capacity building of farmers.
Forestry	• Encouraging Joint Forest Management • Encouraging local tribal community to raise saplings for the use of forest department.

Weakness over Opportunities

Agriculture	Strategies
	• Soil & Water conservation through Watershed approach • Infrastructure development for marketing and agro processing. • Emphasis on promotion of System of Rice intensification (SRI), better seed replacement, INM, IPM and farm mechanization. • Participatory irrigation management through water users groups. • Conjunctive use of surface and ground water. • Coverage of all farmers under Crop insurance. • Capacity building of farmers. • Adoption of dry land farming technology. • Organic cycling of nutrients and farm waste.
Animal Husbandry	• Infrastructure support for processing and value addition of animal products. • Capacity building of farmers. • Transportation facilities for key inputs like Liquid Nitrogen and Frozen semen. • Animal livestock insurance coverage. • Development of infrastructure for animal health • Village level demonstration for AI and breed up gradation.
Fishery	• Pond preparation for composite fish culture. • Supply of fingerling and fish seed through fisherman co-operatives. • Renovation of derelict village tanks • Long term leasing of public fish ponds to fishermen groups • Decentralised production of fish seeds and fingerlings. • Scientific management of fisheries in reservoirs.

Strength over Threat

	• Policy interventions and awareness creation for reducing adverse impact of chemical fertilizers & pesticides on agricultural crops. • Strengthening soil testing infrastructure and introduction of ***"Soil Health Cards"*** at farmers' level • Soil test based nutrient management • Restriction on conversion of agricultural lands to non agricultural purposes. • Massive plantation in wasteland & fallow lands
Animal Husbandry	• Promotion of commodity interest group for organised marketing
Fisheries	• Conservation of native fish fauna • Encouraging farmers to take up fish seed bank

Weakness over Threat

	• Promotion of organic input production, application and organic farming through group mobilization, extension support • Bio-diversity conservation • Management of problematic soil • Maintenance of soil health through INM and IPM • Soil & water conservation. • Bringing extension services through Farmers' Clubs
Animal Husbandry	• Strengthening production and distribution of different inputs. • Technology up gradation of livestock farmers.
Fishery	• Biological control of weeds. • Awareness creation among the fish farmers' community for effective management of water bodies

Chapter – IV

Development of Agriculture Sector

4.1 INTRODUCTION

West Bengal with more than 65% of the population engaged in agriculture & allied sectors is primarily an agrarian state. Among the farmers more than 90% are poor, small and marginal. It is also an accepted fact that in the state, the performance of the agriculture sector influences the growth of the economy. Apart from meeting the food and fodder requirements, its importance also stems from the raw materials that it provides to industry. The prosperity of the rural economy is also closely linked to agriculture and allied activities. Deceleration in the growth of agricultural output has been witnessed after 1994-95. Though the share of the sector in GDP has been declining over the years, its role remains critical as 65% of state's population still depend on agriculture sector for subsistence and employment. Hence the per capita income in agriculture is declining. Moreover productive capacity of land is declining due to nutrient mining, imbalance in the application of soil nutrients, neglect of micro nutrients and inadequate application of organic manures. Slow growth in agriculture with no significant decline in labour force has created a serious disparity between agriculture and non-agriculture.

In West Bengal, improving the viability of smaller farm holdings by providing access to technology, inputs and credit remain a big challenge. Efficiency in resource use encompasses production, marketing, processing, transport etc. Farmers are at a considerable disadvantage in this respect. Moreover efficient use of resources, including water and chemical inputs is essential for sustainability.

Furthermore, agriculture is fraught with a number of risks like production risk in the face of natural calamities and other man-made disasters, marketing risk due to price fluctuation and thereby increasing the vulnerability of farmers. Farm harvest prices of various commodities often fall below minimum support price (MSP) in the market due to several deficiencies in the prevailing marketing system. As the institutional arrangements for meeting income losses are either nonexistence or very weak, farm households often turn to private sources which lead to indebtedness and loss of productive assets.

4.2 LAND USE PATTERN

West Bengal largely have alluvial lands whether Vindhya or Ganga alluvium. To add to its diversity it has in its west an extended plateau and in the north a hilly terrain of Himalayas. Coastal lands are alluvium with salinity dispersed in different degrees. Being mainly in the delta of the river Ganga, the land is bisected by large number of rivers and their tributaries that flow north –south or northwest to south taking the pool of water to the Bay of Bengal in the south. Since ancient times the land on the riverbanks is under cultivation by humans. Much earlier natural forest started growing because of fertility of the land and plenty of rainfall in the area for its geographical location. With an increase in habitation development and population growth, commercial agriculture with staple food crops like rice expanded in these forest areas. The scope for further expansion has reached its minimum level since a major part of arable land is already brought under cultivation. This is amply reflected from the fact that the net sown area which was 59.5% of geographical area in 1985-86 remained stagnant or marginally increased to 61% in 2007-08 with Forest area remains stagnant as well at 13.5%. Rest of land is mainly put to non agricultural use i.e. urban areas, industries, mining and infrastructures and barren totaling to 20.5%. Cultivable waste land and fallow land is very low at 4.2%. Details of land use

classification is as follows –

Land Use Classification – West Bengal

Particulars	2007- 08	
	'000 ha	Percentage (%)
Geographical Area	8875.2	
Net Sown Area	5295.8	61.0
Forest Area	1173.7	13.5
Area under Non Agril.Use	1761.9	20.3
Barren and Uncultivable Land	21.5	0.2
Permanent Pasture & other Grazing Land	6.1	0.1
Land under Misc. Use	61.3	0.7
Cultivable Waste Land	32.9	0.4
Fallow Other Than Current Fallow	20.2	0.2
Current Fallow	310.8	3.6
Total Reporting Area*	8684.1	100.0

Attention needs to be paid to the cultivable waste land of 32.9 thousand ha in the State mainly in the districts of Burdwan, Birbhum, Bankura, Purulia and Paschim Medinipur. South 24-Parganas, Nadia and Murshidabad has drainage problems and therefore demanding distinctly different approaches for their reclamation. Improvement and scientific management of 6.1 thousand ha of pasture and grazing land also deserve attention for the development of animal resources of West Bengal. High population pressure coupled with increasing demand for land due to rapid urbanization and industrialization are the emerging issues to be addressed to on priority. The compensating answer is to increase grossed cropped area from the current level of 184% by adopting an integrated approach involving better management of existing irrigation infrastructure; optimum exploitation of surface and ground water resources and rain water harvesting. Another problem is land degradation, which has increased very fast due to several reasons.

Status of Degraded Land in West Bengal

SL. No	Types of Degraded Land	Area ('000 ha)
1	Saline and saline-alkali	820.45
2	Water logged	576
3	Sheet -rill-gullied area	666
4	Sea coastal	12
5	Stream Bank erosion and sand laden area	67.35
6	Land slip & Land slide	35
7	Mining	14.5
Total		2191.3

% degraded land to total geographical area	24.69%
% of degraded land to non-forest area	28.51%

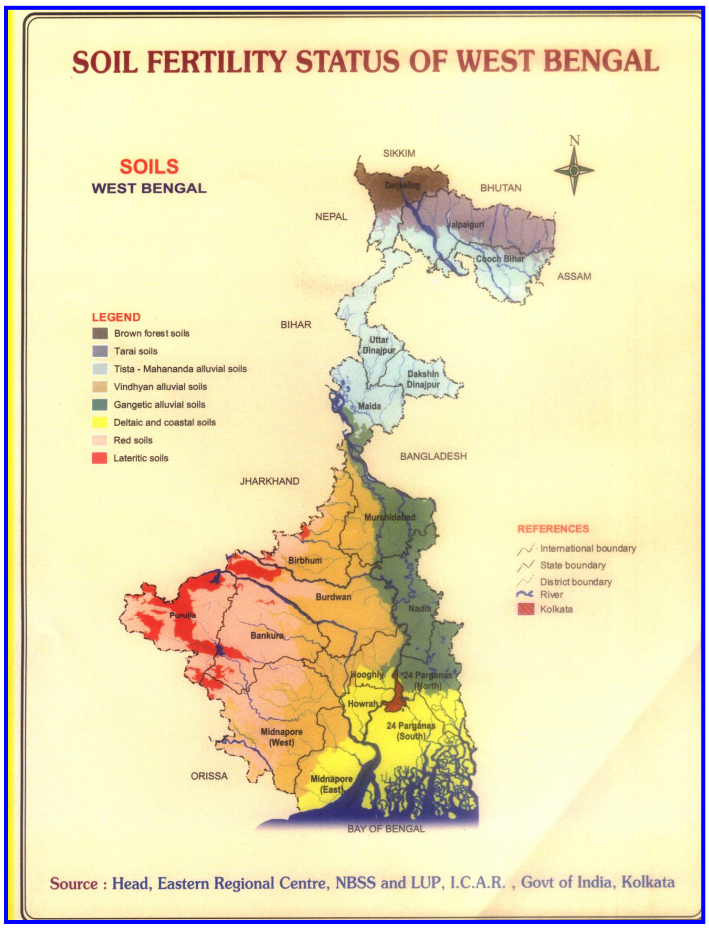
At present, 24.69 % of total geographical area and 28.51% of non–forest area of West Bengal is falling under degraded land category which is a serious threat to our food production system. The district-wise break-up details of the degraded lands is as under;

District- wise Degraded lands

Districts	Problems	Approx. Area in ha. (Non-forest area)
Darjeeling	In Darjeeling Hills: Landslips & landslide, Gully, Torrential velocity of streams, Mining, Acidity, outer slope of cultivated terraces, surface flows over the slopes of runoff. In Siliguri Sub-Division: Splash, Sheet & rill erosion, gully formation, sand laden, stream bank erosion, acidity, mining.	67, 100
Jalpaiguri,	Splash, sheet & rill erosion, stream bank erosion, sand laden, gully formation, soil acidity, water logging, flash flood.	84, 000
Cooch Behar and		62, 000
North Dinajpur		13, 800
South Dinajpur	Stream bank erosion and sand laden	9, 500
Malda	Sand laden, stream bank erosion and river cutting, water logging.	28, 000
Murshidabad	Sand laden, stream bank erosion, river cutting, and moisture stress.	85, 000
Birbhum	Sheet & rill erosion, undulating tract, moisture stress, gully and sand laden	1, 04, 000
Burdwan	Sheet erosion, undulating tract, gully, moisture stress, mining and sand laden	1, 33, 000
Nadia	Water logging, stream bank erosion	54, 200
North 24 – Parganas	Scarcity of sweet water, ingress of saline water, water logging, sea coastal erosion and soil salinity.	1, 82,610
South 24 – Parganas	Scarcity of sweet water, ingress of saline water, water logging, sea coastal erosion and soil salinity.	5, 00, 830
Howrah	Soil salinity, water logging	92, 650
Hooghly	Sand laden, water logging	50, 200
East	Soil salinity, scarcity of sweet water, sea coastal	3, 42, 310

Midnapore	erosion.	
West Midnapore	Sheet, rill, gully erosion, undulating / rolling type topography, moisture stress etc.	1, 46, 700
Bankura	Sheet, rill, gully erosion, undulating / rolling type topography, moisture stress etc.	89,200
Purulia	Sheet, rill, gully erosion, undulating rolling type topography, moisture stress etc.	1, 46, 200
	TOTAL	**21,91,300**

4.3 SOIL HEALTH



Soil health depends on the physical and biological properties of soil. The content of soil organic matter (SOM) / organic carbon is the crucial indicator. The soil health can be deteriorated because of poor organic carbon content, land degradation, soil erosion, increase or decrease of soil Ph etc,.

India is the third largest producer & consumer of fertilizer in the world after China & USA. The impressive growth of consumption of fertilizer in India as well as West Bengal in the post-green revolution period ensured increase in food grain production from 74.0 million tonnes in 1966-67 to 228 million tonnes during 2008-09. But because of imbalances in use of chemical fertilizers and non-use of organic manure and bio-fertilizers, the adverse effect on soil fertility has been noticed. Soil organic manure (SOM) not only determines the biological characteristics of the soil but also its physical and chemical properties. The top soil micro-environment teeming with millions of micro-organisms is intimately associated with the operation of nutrient cycles (e.g. nitrogen cycle, phosphorous cycle, etc.); these organisms need organic food for their own nourishment as well as appropriate conditions for their asymbiotic and beneficial symbiotic association in the rhizosphere. An improved fertile soil response of chemical fertilizer will be better.

The following steps a farmer should take to improve soil health:

- ✓ Based upon soil test results (pH of lands) chemical fertilizers have to be used and necessary liming programme should be taken.

- ✓ Monitoring organic carbon content of soil application of organic matter to soil should be made a regular practice.
- ✓ Using of animal residues (special cow dung) as fuel purpose should be restricted with the awareness campaign and an alternative to meet the fuel requirement should be worked out. Renewable & non-renewable energy resources and cultivation of fuel wood through social forestry have to be encouraged.
- ✓ Farmers should be convinced for growing green manure crop & planting organic matter supplying trees on his land
- ✓ Soil Health Card' has to be introduced to take stock of the health status at a regular interval.

4.4 MAJOR CROPS & VARIETIES IN WEST BENGAL

Major agricultural crops and varieties in West Bengal are as under;

SL. No.	Crop	Varieties
1	**Rice (Aus)**	HYV, Heera, Aditya, Prasanna, Kalyani-2, Khanika
		HYV, Rasi, Tulsi, IET-2233, Annanda, IET-579
	Rice (Kharif)	**Upland (15-30 cm.)** Rupsail, Raghusail, Bhasamanik, Patnai-23, SR-226B, Nagar Tilakkachari
		Shallow water (30-50cm.) HYV, IR-64, Ratna, Khitish, Vikash, IET-4786, Lalat
		Semi-deep water (50-100cm.) HYV, Jaya, Ajaya, Kunti, Shsyasree, Vikramacharya, Prakash, Pratap, IR-20
		Deep water (above 100 cm.) HYV, IR-42, Shalibahan, Pankaj, Sharna, Bipasha, Sabitri, Gayitri, Suresh, Biraj, Jogen, Tulashi, Rajashree, Sabita, Nalini, Amulya, Matangini, Purnendu, Dinesh, Urnendu, Jitendra, PNR-381, Manassarovar, Swarnadhan, Sashi, Madhukar, Neeraja, Jalapriya, CSR 10, CSR 13, CSR 27
	Boro	HYV, Tulsi, Aditya, IR-64, Khitish, Vikas, IR-36, Shasyasree, LET-4786, IET-2233, Annada, Satabdi, Rasi
	Rice (Hybrid)	CNRH 3, DRRH 2, JKRH 401
3	**Wheat**	HYV, K-9107, HP-1731, HD-2643, HP-1633, Sonalika, HUW-468, UP-262, PBW-543, PBW-443, PBW-343, PBW-533, HD-273, HD-2733, HD-2285, NW-1014
4	**Potato**	K. Jyoti, K. Chandramukhi, K. Badsha, K. Ashoka
		Processing variety : Atlantic, Chipsona- I, Chipsona - III

5	**Sugarcane**	Co J-64, Co -7218, Co- 87263, CoS-687, Bo-91, Co 62033, CoS-76
6	**Jute**	JRO-632, JRO-524, JRO-7835, JRO-878
		JRC-7447, JRC-212
7	**Oilseeds**	
	Mustard and Toria	Benoy, Subinoy
	Till	Tilottama, Rama
	Linseed	Grima, Neela, Mukta
	Groundnut	AK 12-24, JL-24, ICGS-44, Somnath, ICGS-II, Girnar-I, Rabi Summer
		Sunflower, Morden
8	**Pulses**	
	Pea	Dhusar, GF-68, Garden pea, Bonavillia, Arkel, GF-68
	Arhar	TAT-10
	Pigeon Pea	Sweta, Chuni
	Gram	Mahamaya-1, Mahamaya-2, Anuradha
	Kalai	Kalindi, Goutam, Sarada
	Mung	Sonali, Panna, Pusa Baisakhi, K-850
	Lentil	Asha, Subrata, Ranjan
	Khesari	Nirmal, BIOL, Sarada, Ratan
	Soyabean	JS-2, Pusa-16, Soyamax
	Chickpea	Mahamaya-1/2
	Blackgram	Kalindi, Pusa, Baisakhi
	Cowpea	Co-1
9	**Maize**	Hybrid, Composite Kishan, Composite Azad Uttam, Composite Megha
		Diara, Arun, Tarun, Probha, Agoti-76, Vijay, Ganga, Safed-2, Kishan Composite Vikram, Deccan-101
10	**Jute**	Navin
11	**Mesta**	Sada, Lal
12	**Rice bean**	Kalyani-1
13	**Mustard**	Sej-2, JD6, Pusa Bold, Toria-PT 507, Panchali Yellow sarsoon - Ragini, Jhumka, Subinoy
14	**Vegetables**	
	Summer Bhindi	Parvani Kranti, Pusa Sawani

	Summer Brinjal	Rajpur Selection, Pusa Kranti, Pusa Cluster, Pusapurp long, Makra
	Hybrid Brinjal	Long-13, Sourav, Supriya, Sonata
	Winter Brinjal	Muktakeshi, Pusa Bhairab, Bhangar
	Bottle gourd	Pusa Meghdut, Pusa Summer Prolific Long, Jorabota, Borsathi
	Ridge gourd	Suryasakha, Borsathi, 12 Pata, Sathputia, Surekha
	Bitter gourd	Pusa Do Mausumi, Longgreen, Arka Harit, Co. Long, Co-1, M.Green Long, Panchali, Hybrid-49, Royal Bengal
	Pumpkin	Pusa Alankar, Baisakhi, Madhukhara, Baidyabati, Largered, Arkachandan
	Cucumber	Poinset-76, Balmakhira, White Wonders, Pusa Sangyog
	Summer Pointed gourd	Guli, Damodar, Kajri, Bombaylata, Ghugut, Dudhiya
	Cabbage	Golden Acre, Pride Of India, Syavoy, Drumhead, English Ball
	Hybrid Cabbage	Rare Ball, Green Express, K.K.Cruss, Manisha, Kalyani, Ganga
	Cauliflower	Jaldi Patnai, Early Snowball, Pusa Katki, Snowball-16, Pusa Dipali, White Queen, Dania, Pusa Snowball-1,2
	Hybrid Cauliflower	Snowpack, Gurdian
	Winter Onion	Sukh Sagar, Pusa Ratna,Pusa Red, Red Globe, Patnai White
	Beet	Crimson Globe, Detroiat, Darkred, Rubiqueen
	Hybrid Beet	M.Lal
	Carrot	Pusa Kesar, Nantish, Korlesh, Halflong
	Hybrid Carrot	Hally
	Tomato	Pusa Rubi, Pusa Gaurav, Punjab Chuhara, S.L.-120, Roma, Early Duarf, Best Of All
		Hybrid Tomato Rajani, Baisakhi, Abinash-2, Sadabahar, Gaurav, Nath-88, Rocky, Rashika, Hira, Moti, Shital, Meghna, Navin
	Radish	Red Bombay, Kontai Lal, Pusa Himani, Japanese White
	Chilli	Pusa Jala, Suryamukhi, Bulet, Patnai, Guntur, Dhani
		Hybrid Chilli Tejashwini, Surya, Sujata, Nath Diyva, Jwalan, Atm, Kranti, Kiran
	Capsicum	California Oandara, Yellow Oandara, Sweet Bannana, Hambars
	Hybrid Capsicum	Bharat, P-2, Beauty Bel, Nathhira, Greengold, Atlas
	Green Pea	Bonnveli, Telephone, Alderman, Pioneer

	Watermelon	Sugar Baby, Adhary, Ashahi Yamato
	Potato	Kufri Jyoti, Kufri Chandramukhi, Kufri Alankar, Kufri Chamatkar, Kufri Shakti, Kufri Shinduri
	Sweet Potato	Pusa Lal, Kalmegh, Pusa Safed, Goldrush
	Ladies Finger	Pusa Savani, Parbani Kranti, Sathshira, Longreen, Jhati
	Hybrid Ladies Finger	Vijay, Improved Vijay, Makiho No.-10,12, Amar, Ajay-2
	Chinese Cabbage	Chinese Cabbage, Pakchoi, Odeti
	Red Cabbage	Primoro, Red Queen
	Kohlrabi	White Viena, Purple Viena, Pusa Kanchan, Largegreen, Rapid Star
	Broccoli	White Viena, Purple Viena, Pusa Kanchan, Largegreen, Rapid Star
	Lettuce	Great Lakes, Bolt, French Breakfast, Darkgreen
	Teasle Gourd (Kakrol)	Tall, Round
	Smooth Gourd (Dhudhul)	Pusa Chikni, Pusa Supriya
	Broad Beens (Seem)	Altapati, Noldog, Ghritakanchan, Gobornada, Pusa Early
	French been	French White, Contender, Pusa Parbati, Pusa Mausumi

4.5 INPUT MANAGEMENT

The basic inputs of agriculture are seed, fertilizer, manures and pesticides. The production of chemical fertilizers in West Bengal is only 30% of the total requirement. Most of the requirement is fulfilled by the fertilizers from different states and abroad. Production of manures and bio-fertilizer are not adequate at present and cater only 30% of local demand. To improve and maintain soil fertility status production capacity of manure and biofertilizers needs to be increased many fold. A study finding recently published by researchers in the department of Agriculture has identified wide spread deficiency of micro-nutrients in 9 districts of West Bengal that includes Murshidabad, Nadia, Birbhum, Hoogly, North 24 Parganas, Burdwan, Jalpaiguri, Paschim Midnapur and Malda. Further samples from major growing regions showed deficiency of zinc, boron and manganese and copper respectively. Application of organic manures is a simple and effective means to address micronutrient deficiencies.

Chemical Fertilisers

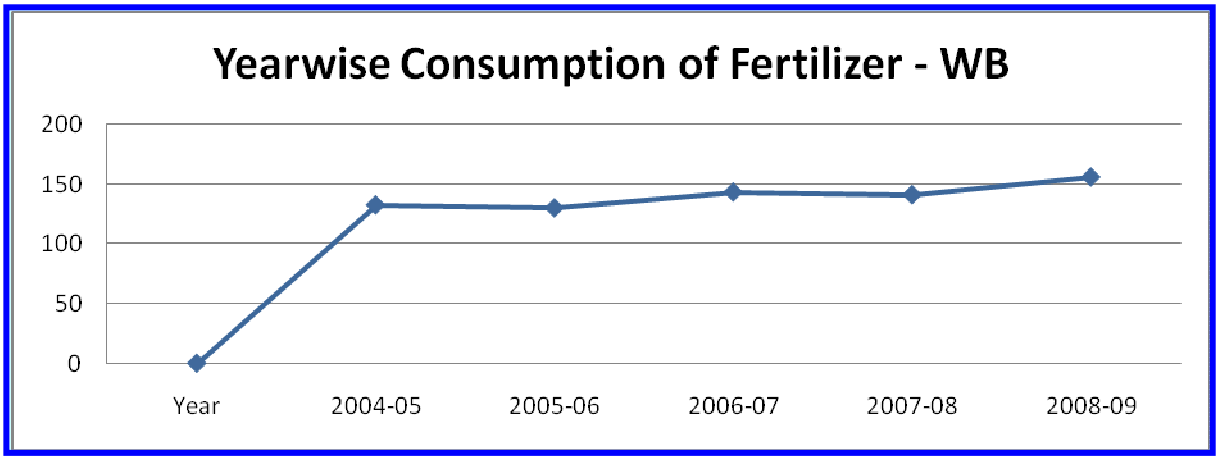
The consumption of fertilizers in the state has been rising over the years. This state has consumed 1519.3 thousand tonnes of NPK in 2008-09. There is a sharp 37.5 % increase in consumption of NPK over the last 5 years. The consumption of Phosphate has increased maximum i.e. 52.5 % over the last 5 years where as consumption of N & K has increased by 25.2 % and 47 % respectively. The ratio of NPK was 2.22: 1.26: 1 in 2007-08 and is estimated to be 1.7: 1.02: 1 in 2009-10. The year-wise consumption of NPK fertilisers in West Bengal are as under;

YEAR	N	GOLY	P	GOLY	K	GOLY	TOTAL	GOLY
2004-05	630.9	_	339.6	_	290.9	_	1261.5	_
2005-06	611.4	-3.1	357.8	5.3	270.5	-7.0	1239.7	-1.7
2006-07	678.4	11.0	386.3	8.0	300.5	11.1	1365.2	10.1
2007-08	684.5	0.9	385.8	-0.1	304.4	1.3	1374.7	0.7
2008-09	698.2	2.0	415.4	7.7	405.6	33.2	1519.3	10.5
2009-10 (estd.)	789.7	13.1	517.8	24.6	427.6	5.4	1735.0	14.2

(*GOLY = Growth Over Last Year ** All figures in '000 MT)

The per hector consumption of fertilizers was 155. 8 kg/ha (estd) in 2008-09, which was 141 kg/ha in 2007-08. There is 17.6% increase in consumption of fertilizers in a unit over the last 5 years.

Year	Consumption of fertilizer (Kg/ Ha)
2004-05	132.46
2005-06	130.00
2006-07	143.20
2007-08	141.00
2008-09	155.80



Consumption of Urea is increasing than phosphatic fertilizers because of stiff increase of prices of phosphatic fertilizers and thereby farmers are unable to use it for their crop

production practices. The price that is obtained for the produce also cannot support increased investments. The trends in year-wise, product-wise consumption of various fertilisers in the state are as under;

('000 tonnes)

Year	Urea	SSP	Potash	DAP	10-26-26	14-35-14	20-20-0	12-32-16	15-15-15	28-28-0
2004-05	1099.0	395.2	315.6	335.2	334.9	44.7	15.7	0.3	54.6	28.8
2005-06	1038.7	391.9	257.6	344.2	383.1	43.7	20.3	2.3	65.8	25.6
2006-07	1165.8	373.9	283.6	374.9	438.1	58.8	22.7	2.5	51.9	22.8
2007-08	1167.4	300.7	275.7	378.3	475.7	44.4	42.5	8.6	51.5	19.4
2008-09	1165.5	370.9	459.1	380.2	422.9	11.9	152.0	70.3	48.7	3.5
2009-10 (Estd.)	1290.7	455.9	431.2	506.6	541.5	40.4	77.7	69.6	75.6	20.4

The production scenario of fertilizer in West Bengal is presented in the following table;

Name of the Company	**Production of Fertilisers ,2008-09 ('000 tonnes)**							
	Urea	**SSP**	**DAP**	**10-26-26**	**14-35-14**	**12-32-16**	**AS**	**Total**
Tata Chemicals Ltd.	-	129.2	144.8	310.3	-	109.5	-	**693.8**
SAIL (Durgapur)	-	-	-	-	-	-	13.1	**13.1**
ISSCO, Burnpur-Kulti	-	-	-	-	-	-	8.1	**8.1**
Jayshree Chemicals	-	64.8	-	-	-	-	-	**64.8**
SAI Fertiliser	-	53	-	-	-	-	-	**53**
Teesta Agro.	-	86.7	-	-	-	-	-	**86.7**
Total	**-**	**333.7**	**144.8**	**310.3**	**0**	**109.5**	**21.2**	**919.5**

The extensive use of Urea and DAP is also slowly but steadily building up soil acidity. Therefore, change of the form of nitrogen nutrition is under serious consideration. Fertilizer promotion activities are required to be revived to educate farmers about the usage of fertilizer at right time at right quantity and obviously based on the soil fertility status which they will come to know after testing their soil at a regular intervals.

Organic Manures & Bio Fertilizers

Restoration of soil fertility is the need of the hour all over the world, especially in the context of food security. The importance of organic manure and bio-fertilizers has increased to enhance organic carbon content and microbial activities in the soil so that it becomes more responsive to crop production practices. Due to geographical advantages, West Bengal has different naturally occurring organic forms of nutrients available. There are green manures, crop residue, bio-gas slurry, animal excreta, compost, vermin-compost, bio-fertilizers, etc; Following Table depicts the requirement and availability of Bio-Fertilisers and Organic Manure in the state;

Year	Bio Fertiliser (in MT)		Organic Manure (in lakh MT)	
	Projected requirement	Availability	Projected requirement	Availability
2006-07	750	465	485	87
2007-08	790	525	495	100
2008-09	850	690	505	125
2009-10 (target)	900	800	525	225

Organic inputs on one hand reduce cost of production and helps healthy food production being environment friendly. It is envisaged that the practice of regular use of bio-fertilizers of different kinds by the farmers is capable of saving about 30% of nitrogenous and 25% of phosphatic fertilizers reducing the cost of production to a great extent in addition to benefiting the soil and environment.

Plant Protection Chemicals

Different types of plant protection chemicals are being used by the farming community in West Bengal. The chemical pesticide consumption in West Bengal has been declined from 0.55 kg/ha (1992-93) to 0.42 kg/ha (2004-05). Use of bio-pesticide and botanical pesticide is being emphasized. Pesticide residues are being found increasingly in our farm produces posing a threat to human health. In view of this, emphasis would be given to establish more facilities for pesticides-residue testing of agriculture commodities marketed within the state or outside. Most of the plant protections chemicals are sold here are manufactured by private commercial establishments. Recently bio & Botanical Pesticides based plant protection materials are becoming popular in West Bengal.

Consumption of Pesticides (active ingredients in MT)			
Particulars	**2006 - 07**	**2007 - 08**	**2008 - 09**
Pesticides	3830	3945	3710
Bio & Botanical Pesticides	_	_	390
Total consumption of Pesticides	**3830**	**3945**	**4100**

At present different types of insecticides in granular - W.P-liquid-dust form, Fungicide in W.P-liquid form, Accaricides in W.P –liquid form, Weedicides in liquid –dust form, Bio & Botanical pesticides in W.P – liquid form are available in the markets of West Bengal. Substitution of chemical fertilizers with organic manures and pesticides with bio and botanical pesticides are pro-environment measures, which has been noticed amongst the farmers of West Bengal.

4.6 SEED

Being an agrarian state with relatively high level of cropping intensity and diversified crop production, the production and productivity has a direct correlation to the availability of quality seed which forms the critical production input. It is well documented that improved seed quality alone can increase 20% crop yield. The seed production scenario in West Bengal is as under;

SL. No.	Crop	Area ('000 ha)	Seed Rate (kg/ha)	Seed Requirement in MT	Seed Replacement Ratio (%)	Seed Replacement Quantity in MT
1	Paddy (HYV)	5719.8	50	285990	29.5	84367.05
2	Mustard	407.5	6	2445	38	929.1
3	Pulses					
	a.) Lentil	58.7	35	2054.5	27	554.72
	b.) Gram	25.1	50	1255	25	313.75
	c.) Khesari	33.5	50	1675	19	318.25
	d.) Kalai		20	0	32	0
	e.) Mung	16.5	20	330	32	105.6
	f.) Tur (Arhar)	1.1	20	22	44	9.68
4	Potato	400.8	2000	801600	25	200400
5	Jute	609.8	6	3658.8	76	2780.688
6	Wheat	352.6	100	35260	39	13751.4
7	Maize	77.2	20	1544	26	401.44
8	Sesame	203.1	6	1218.6	33	402.138

Seed Production & Seed Replacement Rate (%)

During the 10th plan period, the total quantity of seeds produced in the State was 173.42 thousand tonnes. The plan target, as well as the year-wise achievement target of the Seed Replacement Rate (SRR) is presented below;

Sl. No.	Name of Crop	Plan Target for SRR (XIth Plan) (%)	2007-08 Achievement (%)	2008-09 Achievement (%)	2009-10 Target (%)
1	Wheat	41	38	38.5	39
2	Paddy	33	27	28	29.5
3	Other Cereals (Maize)	30	23	24	26
4	Pulses				

	a) Gram	27	23	24	25
	b) Lentil	29	25	26	27
	c) Khesari	21	17	18	19
	d) Urd	35	29	30	32
	e) Moong	34	30	31	32
	f) Arahar	46	41	42	44
5	Oilseeds				
	a) Rape & Mustard	40	36	37	38
	b) Sesame	35	31	32	33
	c) Ground nut	40	36	37	38
6	Other Crops				
	a) Jute	80	72	73	76
	b) Potato	27	23	24	25

The analysis of the data presented in the foregoing tables clearly suggests the gap in desirable rate of seed replacement and actual status. The main reasons for the low rate include:

- ☞ Un-availability of quality seed from reliable source in time
- ☞ High cost of seed – which a majority of small and marginal farmers cannot afford.
- ☞ Low level of awareness on the importance of quality seed

Seed Testing- Infrastructure in the State

Healthy viable and genetically pure seed forms the basis of sustainable crop production in agriculture. The concept of quality seed is complex one. Evaluation of physical and genetic purity, germination capability, moisture, seed health etc. as per prescribed standard of I.S.T.A (International Seed Testing Association is considered as hallmark of judging the quality of seed. Keeping the above in consideration three Seed Testing Laboratories have been set up in West Bengal (Tollygunge, Kolkata in 1958 and Burdwan & Malda in 1965). All the three Seed Testing Laboratories are working at present in the State as Notified Seed Testing Laboratories vide Indian Seed Act, 1966 and Seed Rules, 1968.

The mission of seed testing is as under;

- ☞ Evaluation of the seeds marketed and produced in the state.
- ☞ Advisory service for proper implementation of the Seed Act ’66 in the state.
- ☞ Imparting training to generate awareness among the farmers about the benefit in the use of quality seed.
- ☞ Functioning as referee laboratory in the state for ascertaining Genetic Purity of seed through DNA finger printing technology.
- ☞ Formulation of Technology for maintaining proper vigour and viability of seed during storage at farmers’ end.

In tune with the mandate, the infrastructure facilities have been functioning as testing facilities for ensuring the quality of seed. The details of seed samples anlysed in the

Facilities and projected during the remaining period of XI plan are as under:

Actually Analyzed			Target for Analysis		
2006-07	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
12335	14203	20000	30000	40000	50000

Initiatives for strengthening seed infrastructure

At present approximately 50% of seed requirement in the State is being sourced from other parts of the country. The diverse agro climatic conditions in the state offers good scope for seed production of different crops. With a targeted production of 2.23 lakh MT of quality seed set for the XI plan period, the state government has taken necessary initiatives involving all the stakeholders. The contemplated share of different seed producing agencies during the 11th plan is – WBSSC: 20%; Government Farms: 10%; Agricultural University: 10%; other Government agencies 20%; Seed village SHGs 10%; and private 30%. Considering the six agro climatic zones and the soil fertility status, West Bengal is far behind in exploring the potential of seed production.

- ☞ Government of India, Ministry of Agriculture, has made the provision for infrastructure development and quality control of seed (for DNA Finger Printing Lab.)
- ☞ Establishment of 4 new SSTLs towards infrastructure development of 4 new seed testing laboratories throughout the state.
- ☞ Establishment of at least one well equipped Seed health unit at Tollygunge for the state as no such seed health unit is existing at present in the state .The seed health unit will be attached to SSTL, Tollygunge as this centre will act as Nodal Centre for quality seed testing lab for the state and it is mandatory to have one seed health section attached to seed testing laboratory to achieve quality seed.
- ☞ State is having 196 Govt. Seed Farms with gross area as 9383.35 acres and cultivable area of 6288.85 acre. The average production of Govt. seed farm during XI th plan period is estimated 6250 MT.
- ☞ Seeds and planting material certification arrangements of the state is running through state seed certification agency. The state is emphasizing for self sufficiency in quality seed production. Different private organizations are coming up with quality seed production in the state. More over PPP Model is being initiated in the state for quality seed production in different Govt. Agricultural farms.
- ☞ For adequate storage of seeds to meet the demands in the event of erratic condition of the climate, two seed banks one at North Bengal & another at South Bengal under the supervision of West Bengal State Seed Corporation Ltd. are in operation.

Further Interventions required:

The ***'demand – supply gap'*** for quality seed in respect of both food and non-food crops is ever increasing. Being a critical factor for productivity enhancement greater emphasis should be on seed production adopting the following strategies:

- ☞ Identification of crop specific seed production zones based on agro climate, soil and water resources availability.
- ☞ Emphasizing on decentralized production through ***"seed village concept"*** with active involvement of progressive farmers, farmers' clubs, PACs/societies.
- ☞ Active involvement of KVKs both in production as well as extending technical support to farmers/other agencies involved in seed production
- ☞ Establishment of centralized processing infrastructure at potential blocks/district level
- ☞ Encouraging PPP mode in existing government seed farms for better utilization of resources.

4.7 FARM MECHANISATION

Farm Mechanization plays a vital role for timely completion of various agricultural operations like land preparation, sowing, transplanting, irrigation, weeding & inter-culture operation, spraying, dusting, harvesting, storing & processing etc. Use of improved farm implements in agriculture reduces the cost of cultivation which leads to more income per unit area. Mechanization helps in early release of land which facilitates for adopting diversified & multiple cropping systems. Judicious use of farm machinery/equipments generates additional man-days.

Productivity in agriculture depends greatly on availability and proper use of farm power by farmers. During last 5 decades farm power availability in India was on an average 0.25 KW/ha (1951) and 1.35 KW/ ha (2001). In 1951 97.4% of this was from animals and in 2001 power from mechanical sources is 82%. Mechanization in agriculture progressed faster in northern states. As index tractor numbers have increased fast in states like Punjab (82.5 / th ha), Haryana (62.9 / th ha), West Bengal remains at 2.9 /th ha but power tiller no is higher (2.8/th ha) in West Bengal compared to that in Punjab and Haryana. West Bengal has farm power availability of only 1.25 KW/ha which is only 36 % of that of Punjab. Target is to double the farm power (use farm mechanization) to 2.5 kw/ha from 1.25 KW/ha by the end of 11^{TH} 5 Year Plan.

Following table depicts the co-relation between the farm Power availability and average productivity of the food grains;

State	Farm Power availability (KW/ha)	Food Grain Productivity (Kg/ha)
Punjab	3.5	4032
Haryana	2.25	3088
West Bengal	1,25	2217
All India	1.35	1723

An added advantage with farm mechanization is significant reduction in labor cost as depicted in the following table. :

Particulars	Indigenous farming	Mechanized farming	% of Cost Saving
Land Preparation	1800	675	62.5
Transplanting of seedling	1700	569	66.5
Harvesting	1000	665	33.5
Threshing	750	600	20
Total	5250	2509	47.8

With late start and having mostly small and marginal holdings, farm mechanization is gradually picking up in West Bengal and mostly for smaller machinery The uses of different implements in West Bengal are as under ;

Implements	2006-07	2007-08	2008-09	2009-10 (Target)	2010-11 (Target)	2011-12 (Target)
Manually Operated/ Bullock Drawn	14941	29852	35071	49310	61520	85830
Power Drawn	2409	5716	27332	38330	54325	73075
Tractor & Power Tiller	3540	3860	5625	6175	7150	9400
Total	**20890**	**39428**	**68028**	**93815**	**122995**	**168305**

At present mechanization in agriculture in the state is mostly confined to the use of power tillers, small implements, plant protection equipment and power threshers. With the growing seasonal demand and high cost of labour, the need for mechanization is being increasing felt. 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"*** is being promoted in the state. This enables small farmers to hire the equipment needed on rental basis. This also will open up employment opportunities in the service sector.

During the year 2008-09, 49 agri.-implement hubs were established @ one hub per sub-division. Before operation of the hub a MoU is to be signed between the owner of the implements hubs and the district authorities. Considering the success, during the year 2009-10 another 29 nos. of implement hubs are likely to be operational. The district wise details of the hubs to be implemented with co-operative societies/ SHG during 2009-10 are as follows:

District	Physical (No. / Unit)	Financial (Rs. In Lakh)
Jalpaiguri	1	8.00
Coochbehar	1	8.00
Uttar Dinajpur	1	8.00
Dakshin Dinajpur	1	8.00
Malda	1	8.00
Murshidabad	2	16.00
Nadia	3	24.00

North 24 –Parganas	3	24.00
South 24 –Parganas	2	16.00
Howrah	1	8.00
Hooghly	2	16.00
Burdwan	4	32.00
Birbhum	1	8.00
Bankura	2	16.00
Purulia	1	8.00
Paschim Medinipur	2	16.00
Purba Medinipur	1	8.00
Total	29	232.00

Farmers cooperative and big farmers may be encouraged for using medium range machinery like self-propelled rice transplanter, reaper etc. Modern equipments include laser land leveller, rotavator, sub-soiler, zero-till drill, happy-seeder raised bed former ,ridge-seeder, inclined plate planter, automatic potato planter, straw baler, multi crop thresher, sprinkler and drip irrigation system, automated milking machine and pasteurization machines, cattle feed machines and feed plant, portable fish carp hatchery, egg incubators, other livestock and poultry equipments etc. The hard pan formation below the surface soil through use of tractor and power tillers though economical may be counterproductive in the long run.

Promotion of farm mechanization simultaneously calls for strengthening the network of maintenance/repair service providers, which at present is inadequate. This demand supply gap can be met by providing training and linking with the bank to unemployed youth, which will create employment opportunities.

Future Water Security

National Water Commission reported that the present state of 83% of irrigation water being fresh water may decline to 76% in 2025 and 65% in 2050 creating the real water crisis. Consequently food production may also decline around 14 million tones during 2021 – 2025. Crop production will continue to require large quantities of water with a good distribution round the year. In West Bengal also irrigation practices with unplanned frequency and higher depth of irrigation present low water use efficiency. Over-use of water leads to qualitative deterioration of water, irrigation or potable. Moreover breaks of monsoon and heavy rainfall in a very short time span often cause surface run off. Hence attempts to make region (block–wise) budgeting are urgently needed. These will minimize the imbalances between over and scarcely irrigated plots. World Bank Site selection for rainwater harvest and also selection of crops, varieties and crop sequence are important issues that need to be sorted out by experts.

4.8 WATER RESOURCES & MANAGEMENT

West Bengal is endowed with a large water resources in the form of rivers, ponds, beels, baors, jhils, khals, canals etc; West Bengal has 22 water basins and 4 numbers of large drainage systems. The gross basin area is 76.24 lakh ha. Total water available is 14.75 m ha m (million ha meter), out of which 90% of water is available as surface water which is around 13.29 m ha m and 9.9% is available as a ground water which is around 1.46 m ha m. It has been estimated that 40% of the available water resource may be utilized keeping in view the present technological, geological and infrastructural constraints.

Surface water	Ground water	Total Water resource
13.29 m ha m	1.46 m ha m	14.75 m ha m

Irrigation

Irrigation is essential for food security as it helps increase productivity of crops and also cropping intensity. Overexploitation and overuse of irrigation water in a mismanaged mode is destructive for the economy and ecology of an area. Day by day water is becoming more and more precious commodity. Conservation of every drop of it with scientific planning of water resource use and scientific water and irrigation management is very important. In India 6/10th of crop output comes from irrigated fields that are only 1/3rd of total crop acreage.

The ultimate irrigation potential that can be created for West Bengal is 69.18 lakh ha. Against this, an irrigation potential (2005-06) of 53.75 lakh ha has been created of which 42.95 lakh ha is utilized. Out of the total irrigation potential utilized, 11.61 lakh ha are from major and medium irrigation sources and rest 31.34 lakh ha is from minor sources.

Irrigation Potential in West Bengal			
Particulars	**Sources of Irrigation (Lakh ha)**		
	Total	**Major & Medium**	**Minor**
Ultimate irrigation potential	69.18	23	46.18
Irrigation Potential Created (2005-06)	53.75	15.61	38.14
Irrigation Potential Utilized (2005-06)	42.95	11.61	31.34

Following table provides the details of the sources of irrigation and the extent of cultivable command area of each of the irrigation structures.

Type of structure	No of Structure	Cultivable Command Area (Ha)
Dug Well	39,,373	27961
Shallow tube well	6,03,667	11,69,106
Deep tube well	5,139	1,83,152
Surface flow	53,781	3,29,399
Surface lift	1,07,595	3,85,431
Total	**8,09,555**	**20,95,049**

As revealed, shallow tube well covers the maximum command area, followed up by surface lift irrigation and surface flow of rivers, tanks, ponds etc,

TRENDS OF GROUND WATER DEVELOPMENT

The distribution of ground water resources varies across the State with the majority resources available in the unconsolidated, alluvial sediments of the Ganga-Brahmaputra

systems. The western hard rock formations, area under coal fields, the fringe zone and the Northern Hilly Himalayan Zone have limited potentials. Problem of salinity in shallow zones is observed in the coastal and deltaic tracts of Purba Medinipur, Howrah and 24-Parganas districts.

The working group constituted for the estimation of Ground Water Resources for the State has completed the assessment in respect of 269 blocks leaving aside 72 blocks, (59 blocks falling under the coastal saline tract and 13 blocks falling under hilly terrain). As per the assessment, the State has 27.45 lakh ha m of net groundwater availability and 11.64 lakh ha m of gross annual groundwater draft for these 269 blocks. The overall stage of groundwater development is at 42% of net groundwater availability. While none of the blocks is falling under 'over-exploited category' one block is categorised as critical and 37 blocks as semi-critical. District-wise position of blocks as per exploitation of groundwater is given in the following table:

District wise Critical and Semi Critical blocks in West Bengal

Sl. No.	District	Critical block	Semi-critical block	
1	Bardhaman		1) Mangalkote 2) Memari II 3) Purbasthali II	4) Ketugram I 5) Bhatar 6) Monteswar
2	Birbhum		1) Rampurhat II 2) Muraria II	3) Nalhati II 4) Nanoor
3	Hooghly		1) Pandua	2) Goghat I
4	Malda		1) Harishchandrapur II	2) Kaliachak I
5	E. Medinipur		1) Moyna	
6	W. Medinipur		1) Daspur II	
7	Murshidabad	1) Bharatpur II	1) Sagardighi 2) Suti II 3) Berhampur 4) Bhagabangola I 5) Bhagabangola II 6) Domkal 7) Hariharpara 8) Jalangi	9) Lalgola 10) Mur-Jiaganj 11) Nabagram 12) Nowda 13) Naninagar 14) Bharatpur I 15) Barwan
8	Nadia		1) Chapra 2) Hansakali 3) Karimpur I	4) Karimpur II 5) Tehatta I 6) Tehatta II
	TOTAL	**1**	**37**	

(Source: Central Ground Water Board, Government of India)

Based on the stage of groundwater development (SoD), the State could be classified into 3 zones of growth trends, i.e., high, medium and low trends. Murshidabad, Nadia, North 24 Parganas and Malda districts could be grouped under high growth trend areas (being SoD >50%). The district of Uttar and Dakshin Dinajpur, Bardhaman, Hooghly, Purba and Paschim Medinipur can be termed as medium growth trends areas (being SoD >35% <50%). Low growth trends can be seen in Darjeeling, Jalpaiguri, Purulia and Howrah districts. Murshidabad, Nadia and North 24-Parganas districts have reached a stage of optimisation of ground water development and some blocks in districts like Malda, Bardhaman and Dakshin Dinajpur are fast approaching optimization level.

The groundwater development in the three North Bengal districts, viz., Darjeeling, Jalpaiguri and Coochbehar are quite low being only 5%, 4% and 17% respectively which are much below the State average. These three districts are, however, bestowed with about 18% of the State's available groundwater resources.

The trend in irrigation development indicates that there is predominance of area underground water irrigation in the districts of Nadia, Murshidabad and 24 Parganas (North) whereas districts of Bardhaman, Birbhum, and Bankura show predominance of surface water irrigated areas.

Cropping pattern of the State is predominated by cultivation of rice as it is highest producer of rice in the country. The expansion in area under Boro Paddy has placed increasing demands on irrigation, giving a fillip to ground water extraction on a large scale.

Water harvesting structure assumes importance in the districts of Purulia, Bankura; parts of West Medinipur, Bardhman and Birbhum districts and such structures may have to be dovetailed in watershed management programme to boost irrigated agriculture in these districts. Steps may also be required to promote artificial recharge structures, viz., check dams, underground dykes, recharge wells, etc, in districts underlain by the hard rock formations.

Steps may have to be taken to promote and propagate drip irrigation system as an effective measure for conservation of water in the dry and water scarce tracts of Purulia, parts of Birbhum, Paschim Medinipur and Bankura districts, particularly in those tracts where cultivation of vegetables and horticultural crops are common. Voluntary agencies may also be involved wherever feasible. Coordinated efforts are required to popularise micro irrigation system.

ENERGISATION OF AGRICULTURAL PUMPSETS

Out of 37910 inhabited mouzas in the State, only 12346 mouzas have been electrically intensified and 5201 inhabited mouzas are yet to be electrified. The average level of energisation is 450 to 500 pumpsets/year. Projects sanctioned under RIDF worth Rs.571 crore towards Power System Improvement in different districts would result in considerable savings in the electricity which could be used for energising additional pumpsets.

Strategies for development

From the foregoing paragraphs it may be inferred that 77% of the gross irrigation potential is already created of which, 80% is utilized. For optimum exploitation of the potential the following interventions would be necessary:

- ☞ Identification of low water intensive location specific crops and cropping sequences under command areas. Emphasis should be more on vegetables, pulses, oilseeds where productivity and returns per unit of water are higher compared to water guzzlers like rice.
- ☞ Introduction of water saving technologies under irrigated rice (boro / aus crops) like System of Rice Intensification where feasible. The technology has the potential to reduce the irrigation requirements by 30%,
- ☞ Sustainable exploitation of ground water resources
- ☞ Effective participatory irrigation management for better utilization of water resources

- ☞ Awareness, training and capacity building of water user groups on irrigation water management
- ☞ Promote and propagate drip irrigation system as an effective measure for conservation of water in the dry and water scarce tracts of Purulia, parts of Birbhum, Medinipur and Bankura districts, particularly in those tracts where cultivation of vegetables and horticultural crops are common.
- ☞ Promotion of Rain water harvesting especially in high/intense rainfall regions and utilizing the same for supplemental/life saving irrigation. This technology option is more applicable to areas like the Sunderbans, red laterite zones covering Purulia, Bankura, parts of West Medinipur, Birbhum, etc.

4.9 YIELD & PRODUCTION GAP ANALYSIS

Yield Gap Analysis

The state of West Bengal has certain specific advantages with respect to agriculture sector especially favorable agro climate with good rainfall, fertile alluvial belts, very good surface and ground water resources and higher cropping intensity of 182% facilitated by creation good irrigation infrastructure. This has enabled the State to assume a critical role in meeting the food security needs of the country as a whole. The State contributes to 7% of the total food grain production in the country with rice alone accounting for 15% of all India production. Other significant agriculture produce from the state include potato and tea accounting for 30% and 24% of all India production. A comparative analysis of the productivity levels of major crops grown in the State (Ref.: Table /Annexure: 19) suggests that the productivity more or less at par or marginally higher than the All India average, except in a few crops like potato where the productivity in the State is significantly high at 25 MT/ha compared to All India level of 17 MT/ha. The basic inference that can be drawn is that the higher share in production is more on account of gross cropped area rather than higher productivity levels. Despite the fact that almost 100% of the area under rice is under HYV, the potential yield gap is rather high for several reasons. The same is the situation in respect of other major crops grown the State.

The yield gap analysis of different crops is mentioned below;

SL. No.	Crops	2007 - 08 Actual (Kg /ha)	2007 - 08 Target (Kg / ha)	Yield Gap in Qty	% of Yield Gap	2011 - 12 Target (Kg /ha)	Yield Gap in Qty	% of Yield Gap
1	**Aus Paddy**	2009	2346	-337	-16.8	2745	-736	-36.6
2	**Amman Paddy**							
	a) Local	1956	2100	-144	-7.4	2200	-244	-12.5
	b) HYV	2350	2476	-126	-5.4	2897	-547	-23.3
3	**Boor paddy**	3259	3250	9	0.3	3802	-543	-16.7
4	**Total Rice**	2573	2655	-82	-3.2	3106	-533	-20.7
5	**Wheat**	2602	2289	313	12.0	2678	-76	-2.9
6	**Total Cereals**	2578	2628	-50	-1.9	3075	-497	-19.3
7	**Total Pulses**	786	791	-5	-0.6	961	-175	-22.3
8	**Total Food grain**	2521	2562	-41	-1.6	2996	-475	-18.8

9	**Total Oilseed**	998	950	48	4.8	1112	-114	-11.4
10	**Potato**	24704	22922	1782	7.2	27861	-3157	-12.8
11	**Jute***	13.47	14.21	-0.7	-5.5	16.00	-2.53	-18.8
12	**Total Vegetable**	12555.96	14107	-1551.0	-12.4	18000	-5444.0	-43.4
Y = Yield rate in kg / ha								
*** = Yield rate in bales /ha, 1 bale = 180 Kg**								

Production Gap Analysis

The actual production gap over estimated production / productivity targets for the year 2007-08 and projected production quantities and likely gap are analyzed covering the major crops and the details are furnished below

in '000 MT

SL No	Crops	2007 - 08				2011 - 12		
		Production	Target	Gap in Qty	Gap %	Target	Likely Prodn	Gap %
1	**Aus Paddy**	565.8	762.8	-197.0	-34.8	910.4	-344.6	-60.9
2	**Aman Paddy**	9227.6	10143.1	-915.5	-9.9	12105.1	-2877.5	-31.2
	a. Local	922.76	1014.31	-91.6	-9.9	1210.51	-287.8	-31.2
	b. HYV	8304.84	9128.8	-824.0	-9.9	10894.6	-2589.8	-31.2
3	**Boro paddy**	4926.1	4544.3	381.8	7.7	5423.4	-497.3	-10.1
4	**Total Rice**	14719.5	15450.3	-730.8	-5.0	18438.9	-3719.4	-25.3
5	**Wheat**	917.3	896.5	20.8	2.3	1070.0	-152.7	-16.6
6	**Total Cereals**	15902.6	16604.8	-702.2	-4.4	19816.8	-3914.2	-24.6
7	**Total Pulses**	158	186.5	-28.5	-18.1	240.7	-82.7	-52.3
8	**Total Food grain**	16060.6	16791.3	-730.7	-4.5	20057.5	-3996.9	-24.9
9	**Total Oilseed**	705.7	665.0	40.7	5.8	842.6	-136.9	-19.4
10	**Potato**	9900.8	8018.9	1881.9	19.0	11847.6	-1946.8	-19.7
11	**Jute***	8216.0	8512.3	-296.3	-3.6	9773.8	-1557.8	-19.0
12	**Total Vegetable**	12555.6	12880.0	-324.4	-2.6	17460.0	-4904.4	-39.1
*** = Yield rate in bales /ha, 1 bale = 180 Kg**								

An analysis of the likely production gap as at the end of XI Five Year Plan clearly sets the goals to achieve a growth rate of as low as 10% under Boro rice to as high as 60% in Aus rice and 52% under pulses. The yield gap analysis also indicates varying levels of productivity gaps for various crops and seasons. While crop productivity is influenced by several factors relating to climate, soil, technology, some of the major reasons in the state are listed below:

- ☞ Continuous adoption of traditional cropping sequences without emphasis on crop diversification
- ☞ Imbalances in fertilizer application including non-adoption of crop specific requirements and split application
- ☞ Non-application of organic inputs resulting in fast erosion of soil fertility and resulting major /micro nutrient deficiencies

- ☞ Poor management of irrigation resources especially under command areas resulting in declining productivity
- ☞ Though almost 92% of area under rice (100% in case of boro rice) is under HYV, the productivity gap is marginally high partly on account of low seed replacement rate.
- ☞ Poor extension including training and capacity building of farmers on innovative technologies

With the scope for further area expansion being limited, the thrust therefore has to be on bridging the yield gap by adopting a comprehensive strategy involving, timely and better quality input supply, technology transfer especially innovations like SRI for rice belts, strengthening of extension and forward linkages like marketing and storage infrastructure.

4.10 EXTENSION SERVICES

It is important to disseminate information about new technologies so that the farmer is able to make use of the latest agricultural developments. There also exists a gap between research findings and the needs of farmers. For technology to be successful, it is important that it should serve a useful purpose to the end user. The Agricultural Extension Service works through an Agricultural Research System in the States. The main objective of Agriculture Extension Services or AES's is to transmit latest technical know-how to farmers. Besides this, the AESs also focuses on enhancing farmers' knowledge about crop techniques and helping them to increase productivity. This is done through training courses, farm visits, on farm trials, kisan melas, kisan clubs, advisory bulletins etc,.

The arrangements for agricultural extension in India have grown, over the last five decades, in terms of activities, organisational types and available manpower. Public sector extension, represented mainly by the State Department of Agriculture (DOA), continues to be the most important source of information for the majority of farmers. Activities of other extension agencies, be it Non-Governmental Organisations (NGOs), input agencies, mass media, research institutions or farmers associations, though increasing, are still restricted to certain regions, crops and enterprises. The performance of public sector extension is under scrutiny for quite some time and questions are being raised on its capability to deliver goods in the rapidly changing environment. The shifting emphasis of Indian agriculture towards diversification, commercialisation, sustainability and efficiency has made it necessary for the state extension organisations to critically examine their extension approaches.

In the State of West Bengal, which is mainly agrarian with predominance of small and marginal farmers, extension support through institutions is more crucial, especially in the context of commercialization of agriculture. The agricultural extension arrangements in the State can be broadly classified under four different heads on the basis of service provider viz.

- Government of West Bengal
- Education / Research Institutes
- Developmental initiatives of NABARD and
- NGOs as facilitators of transfer of technology

Government of West Bengal: The Department of Agriculture, headed by the Director of Agriculture is responsible for implementation of Government policies related to agriculture extension in the State. Additional Directors of Agriculture (ADAs) and Joint Directors of Agriculture (JDAs) are heading the agricultural extension work at State level and Range (the State has been divided into seven ranges) level respectively. The Deputy Director of Agriculture, Administration formerly known as Principal Agriculture Officer (PAO) is the nodal authority at district level extension works. Each subdivision has a Sub-divisional Agricultural Officer (SAO) assisted by subject matter specialists to channelise the agricultural extension services in the subdivision. The block level extension works are carried out by Agricultural Development Officer (ADO). At the Panchayat level, the Krishi Proyukti Sahayaks (KPSs) are attached to help the ADO to maintain close contact with the farming community at their respective operational areas.

Commodity Research Centres (rice, oilseeds and pulses, sugarcane, potato, wheat) and Dry Land Crop Research Centers (maize, ragi) were set up to carry out research on these essential food items with Zonal and Sub-divisional level sub centres for multi locational testing of the research findings before recommending for adoption by the farming community.

Seventeen (ten static and seven mobile) Soil Testing Laboratories, three Fertilizer Quality Control Laboratories, one Pesticide Quality Control Laboratory, one Seed Testing Laboratory and one Bio Pesticide Quality Control Laboratory are operating in the State to provide agricultural extension services to the farmers. The other extension services provided by the department include:-

- Dissemination of information on modern agricultural practices through publications and handouts for the benefit of literate farmers as well as through mass media;
- Organizing exhibitions, field demonstrations, seminars, group meetings etc.
- Training and capacity building of farmers through nine Agricultural Training Centres (ATC) functioning in the State;
- Production and supply of quality agricultural inputs especially seeds, fertilizers and pesticides;
- Pest and disease surveillance and on-site advisory work.

Recent initiatives of Government of West Bengal

ask Force of Secretaries on West Bengal Agriculture Commission

econdary freight subsidy for fertilizer mobility and SWAN connectivity for ADOs

xtension Services through Jeebika Sahayaks (Livelihood Associates)

griculture related services through NeGP and Agrinet

raining programme for fertilizer dealers and retailers in association with FAI

ocus on Agriculture and Allied sectors through ATMA

Education / Research Institutions

- Two State Agricultural Universities and four National Level Institutions are operating in the field of agricultural extension services in the State which are working in close association with State Agricultural Department in the State for dissemination of knowledge and transfer of technology.
- **Krishi Vigyan Kendras** (KVK) or Farm Science Centres are specialised institutions providing vocational training to farmers based on learning through work experience. There are 16 KVKs in the State functioning under different Agricultural Universities including Viswa Bharati, Veterinary University, NGOs and ICAR. The KVKs are strategically located covering different agro climatic regions catering to location specific training, demonstration and extension needs.
- There are six centers of Agricultural Technology Management Agency (ATMA) for facilitating a participatory mode of extension delivery, which are farmer driven and farmer accountable.
- Kisan Call Center is in operation in the State (in line with the all India system) to facilitate the farmers in providing advice and latest information in agriculture.

NABARD: NABARD has been instrumental in facilitating the adoption of new/upgraded technology by farmers/entrepreneurs to promote increased productivity and production. NABARD has devised a scheme known as **Capacity building for Adoption of Technology (CAT)** through exposure visits and training the farmers. The objective of the scheme is to sensitise farmers - preferably marginal, small and tribals - to enable them to adopt proven technologies in agricultural developments made by research institutes, corporate houses, NGOs, progressive farmers/entreprenuers. The entire cost towards such visits / programmes is supported by NABARD.

Farmers' Clubs (FCs) in West Bengal are engaged in supplementing extension services of State Government Line Departments in the field of Agriculture, Animal Husbandry, etc., FCs are actively involved in developing awareness/imparting training to farmers regarding use of bio-fertilisers, production of vermicompost, crop diversification and adopting more scientific cropping practices.

NABARD has also been implementing several developmental programmes like watershed development, wadi projects which among other things, involve adoption of soil and water conservation measures and resource based crop development that involve transfer of tested and replicable technologies. These projects are being implemented with NGOs as project implementing agencies. The experience suggests that the NGO officials, with training and capacity building in such technologies, can serve as effective extension workers and the field impact of such extension interventions are clearly visible. In fact, a few NGOs of repute like the Ramakrishna Mission have been playing a very effective role in extending training and extension support to several entrepreneurs engaged in agriculture and allied activities.

Agril. Extension – Present limitations

- ✓ Involvement of multiple agencies with overlapping objectives
- ✓ Need for technology transfer is felt more in agriculturally and socio-economically backward districts.
- ✓ A well co-ordinated approach is apparently lacking with different players adopting independent, target oriented approach.
- ✓ Limited attempts to understand the farmers'/location specific needs
- ✓ Emphasis on technology transfer without fully understanding social/psychological barriers of target groups (farmers)
- ✓ Importance is not attached to participatory approach with involvement of farmers/entrepreneurs

Available Options

KVK – NGO – Farmers' Clubs Linkage

KVKs are the grass root level extension institutions of ICAR/SAUs with mandate for transfer of technology. The KVKs in general have necessary technical manpower and access to the technologies developed by the SAUs, State Agriculture Departments and other Research Institutions and necessary physical infrastructure for imparting training and capacity building to the farmers.

NGOs can play a very effective role in knowledge disseminations through social mobilization, people's involvement and technological interventions. This is clearly demonstrated in adivasi and watershed projects. The major gap (with NGOs) is the technical input/manpower, which can effectively be filled in by the KVKs which have the mandate for technology transfer but have a few limitations including financial support. An effective linkage of these three grass root level institutions can be one feasible option in TT process. Such linkage could be either need based or on long term basis. The broad role of different agencies would be:

NGOs

- Identification of problems and needs in consultation with the farmers/farmers' clubs and groups
- Consultation with KVKs for identification of appropriate location specific technological interventions to the problems
- Work out the process for technology dissemination including training/capacity building of farmers, in consultation with the KVK concerned.
- Assessment of the financial implications in transfer of identified technology and approach funding agencies like NABARD (under FTTF)
- Facilitate implementation of the process in association with farmers' clubs and farmers
- Need based hand holding.

Farmers Clubs

- Progressive Farmers' groups with local experience and knowledge of banking

- As key facilitationrs /channels both in problem identification and implementation process
- KTKs
- Identification of appropriate technologies in consultation with SAUs, Agriculture Departments or other institutions
- Recommend adoption of new technologies for the benefit of farming community
- Guide the NGOs in working out implementation process and assessing the financial implications
- Design appropriate training module for the farmers including field demonstrations
- Training, field demonstrations and hand-holding

What needs to be done

1. A co-ordinated approach among all Research & Extension organizations at regional/district level in assessing the extension needs.
2. Using the village/field level groups like Farmers' Clubs /NGOs/other agencies for facilitating effective transfer of various technologies already developed at the above institutes
3. Utilization of various promotional funds created by NABARD like FTTF, FIPF, RIF, CAT, etc., by the research and extension organizations/bodies like KVKs
4. Collaboration with ATMA at State/District Level

NGOs as facilitators of transfer of technology: In West Bengal, efforts have been made to supplement the public extension system through private extension machinery like NGOs, Farmers' Clubs, SHGs, Farmers Interest Groups, Women Groups, Farmer Association and Farmer Cooperatives. They are actively involved in extension services including technology transfer through capacity building, skill development and support services. Following is the numbers of private extension machineries created in the state;

- No. of Farmers Interest Group Formed : 560 nos.
- No. of Commodity Organization formed : 60 nos.
- No. of NGO attached with the extension system : 130 nos.
- No. of Farmer Organizations developed : 65 nos.
- No. of Agri-preneures and Agribusiness established: 35 nos.
- No. of Agro Service Centers formed : 25 nos.
- No. of Farmers Clubs established : 3550 nos.

Agri-portal, an website created by Department of Agriculture, Govt of West Bengal is playing a major role in providing extension services to the farmers.

4.11 AGRICULTURAL MARKETING

Background: There are 40,782 villages in the state with a very high population density of 903 per sq ft. The state has 6 different Agro-climatic zones with different kinds of soil. It is a leading producer of paddy, wheat and potato, jute, tea and oil-seeds. It is a major producer of fruits such as mango, guava, pineapple, papaya, and bananas. It is the leading producer of fresh water table fish and fish seed in India.

While the potential of marketing a wide variety of Agricultural produce is high, there are major impediments in realizing the potential. The major problems are:

- ☞ The majority of those making a living out of agriculture are small / marginal farmers/ share croppers/ oral lessees. Together they account for 78.69% of all farming households. They receive inadequate financial support from formal sources such as the Government, Cooperatives or Banks. Timely availability of credit to farmers is an important first step in the Marketing cycle.
- ☞ In this situation where the majority is small/marginal farmers / oral lessees any marketing in order to succeed has to be tailored as a societal marketing strategy. It has to include ***all segments in the farming community***, and not be confined to only those who are large farmers. Especially in the perspective of declining land holding the task becomes more critical as the majority *are* small farmers who look at a shrinking size of holding and the share croppers or oral lessees have even less control on the quantum of produce or a mix of crops that can earn them higher returns. It isn't surprising that most farmers give priority to a rice based cropping system. This gives them food security, easy market access and is low on risk. But this does not support high income generation.
- ☞ Agriculturists earn not more than 15-20% of the price ultimately paid by the end-consumer. 70-80% of the price is shared by the intermediaries. This can only be improved if the marketing channel is controlled more by growers than by middlemen. Therefore the growers or people who are appointed by them should control more of the service chain in the marketing structure.
- ☞ The inadequacy of basic infrastructure for collection, sorting, packaging movement and storage of a variety of goods is an impediment to marketing. To upgrade the current marketing system two major aspects have to be dealt with: (1) Building the physical infrastructure for which substantial capital outlay is required and (2) Setting up an efficient service platform which will make the infrastructure developed viable and profitable. For the physical infrastructure Cooperatives / Banks can play a part along with large or medium sized companies who are looking at investment opportunities.
- ☞ The key element in an effective market delivery mechanism is to motivate the majority of small / marginal farmers to form / join their own cooperative of which they will be the owners. The cooperative (the most successful Indian examples are the Milk Federation in Gujarat or the famous Dabba Wallas in Mumbai will enable the cooperative to:

  (1) Overcome fragmentation of land when planning for the most remunerative crop portfolio

  (2) Negotiate the best terms for credit and instead of personal risk convert the risk to a collective risk

  (3) Access Government and Cooperative Loans more easily

  (4) Have a stake in the Marketing Process

  (5) Evolve areas of collaboration with the private sector for establishing modern weighing scales- cold chain-modern storage facility-packaging at the Haat/ Bazaar level at the primary stage in distribution

  (6) Evolve branding for the cooperative for long-term gain

(7) Build up reserves for the future

(8) Get access to the latest developments in agriculture through association with prestigious Government bodies both at the state level and at the Centre

(9) Initiate all-round development at the village level including roads, housing, health, education, availability of water and electricity, rain water harvesting etc, depending on the priorities set by the cooperative and a supportive relationship with the local panchayats. The cooperative will engage a team of experts to deal with various groups and to ensure that the exchanges of ideas give the best return to the cooperative. An independent team of auditors would look into the finances and they will have fixed tenures as stipulated by the Government/ authorities. The role of the existing Cooperation Department will be crucial in initiating the process of forming cooperatives where any individual whether he is a small farmer / a share cropper/ or oral lessee would be welcome to participate. Each individual can increase his stake in the cooperative through gradual investment. There should be pre-planned approach to the workings of the Cooperation Department based on targets set, close monitoring and effective networking at the panchayat level.

Existing Marketing Infrastructure

West Bengal State Marketing Board runs 28 principal market yards and about 200 sub-market yards which are managed through 46 regulated market committees. Besides, there are 2918 rural haats / bazaars managed by private operators. There are also 350 daily markets in municipal /semi-urban areas managed privately or by local authorities.

There is scope to upgrade these bazaars / haats. Efforts should be made to remove the middle tier as it will bring the producer closer to the end consumer thereby removing the presence of middlemen and benefiting both the producer and the end consumer. Without various layers of intermediaries the producer stands to get a better price for his produce while the consumer gains by paying less for what she buys since intermediaries do not add to the end price.

The Agricultural Marketing Report suggests setting up of Three-tier Marketing Network with the Primary Tier as rural haats. These will function as collection centres. Farmers' Cooperatives will be responsible for (a) Collection (b) Grading (c) Packaging (d) Weighing and stamping (e) Transportation of primary produce. Farmers' Cooperatives that utilize the centre may undertake these jobs or assign their Self Help Groups to execute.

It is at the Primary Tier that modern cold storage/ godowns including provision of refrigeration for perishable commodities and all facilities for washing, weighing and stamping for grade and weight should be made available. For areas earmarked for piggery or goat/sheep farming modern abattoirs must also be constructed to ensure healthy processing and maximum recycling of all other ingredients that are not sold / packaged for consumption.

If semi-processed or packaged products are moved to the Zonal Markets / Urban Markets consumers will derive price benefit and the large modern day store format will welcome value addition done at the Primary Tier itself as their work gets reduced. Even at this stage it would be possible to generate a long-term relationship with cooperatives operating at the Primary Tier. These Cooperatives might even open up revenue channels through trading in futures which would be demand based. At the Co-operative, services of a team of experts in

marketing, trading, distribution logistics including efficient physical movement of goods may be hired to ensure efficient management control. (A pattern replicating what successful Co-operatives have been following in the country).

There are existing facilities with the Government which may be effectively utilised for marketing purposes. For example, there are 196 State Farms which are stated to be in a moribund state. These should be revamped and become centres of excellence. Modern technology that has to benefit the farming community should be tried and tested in these farms. These should also be central to imparting training to farmers through Co-operatives. They may in turn be paid by the Co-operatives for the training they impart. Marketing would benefit from these centres by virtue of having better products- a wider portfolio of products- and research pertaining to packaging/ preservation of different kinds of food, and experiments in horticulture. There are currently only 3 seed testing laboratories in West Bengal. These farms should be equipped not only with seed testing laboratories but should also be equipped with labs for soil testing, tackling of pests and so forth. Likewise advanced centres for ARD should be set up in every district. Each of these 196 farms should be specially geared up to supplement all planned developmental activity as envisaged in the State Agricultural Plan for the 11^{th} Plan Period. For instance in a fruit growing area the experimental farm would concentrate on the fruit grown as well as any other local produce.

For Market Intelligence the Agricultural Marketing Directorate that has 100 Data collection centres and 22 Food Processing and Training-cum Market Production Centres provides information on price/s of different products. This is highly laudable provided there exists a mechanism of quick and continuous collection of information, and more importantly, efficient dissemination of the information collected and collated. In Marketing there is often an information over-load which stunts decision making at critical times. Since we don't have sufficient information on the current systems being followed by AMD we presume the systems are efficient and relevant to the overwhelmingly large marginal farmers in West Bengal.

Likewise Food Processing & Horticulture Department has their agro processing centres and outlets and manages 5 Export Processing Zones. These would add fillip to marketing efforts if they are efficient and proactive in their task.

Summing up

- ✓ Agri-marketing necessitates a bottom up strategy. It has to encompass an all-inclusive plan, wherein it is possible to make everyone an owner of the Marketing Process. It is in this context that Co-operatives seem to be very important if the marketing plan is to succeed.
- ✓ To build a sustainable infrastructure it would be essential to hire experts in marketing, packaging, logistics and technical experts in various disciplines in agriculture. Past experience (NDDB) shows that the producers –farmers-should own the marketing structure. The experts would at all times be responsible to the Farmers whom they serve.
- ✓ Finally Marketing is an on-going process. It demands constant vigil of customer needs, and adequate outlays in advertising, promotion and below-the-line activities to keep the attention of the customer on to products sold. The importance of brand-building can never be over emphasised.

- ✓ At the Urban centres it would be essential to have long-term contracts with the large chain stores. The other alternative is to build own stores of the Co-operatives like SAFAL or Mother Dairy. The latter course is more expensive, but in the long-term more successful as consumers trust a Government supported delivery system rather than a private delivery system.

4.12 RESEARCHABLE ISSUES

Green revolution transformed India from a food deficit country to food secure country. Combination of High yielding varieties – water – fertilizer – agrochemicals has given primary boost to our crop production system. However, in post Green revolution period starting late eighties agricultural growths slowed down. West Bengal, although could maintain higher productivity than, national average, its growth also slowed down. Decelerated / stagnated growth rate was accompanied by a new set of problems such as soil degradation, salinization, pest incidence, ground water shortage, rising cost of inputs, etc. There are also some serious issues confronting Indian agriculture on account of perceived global warming. All these issues are possibly driving us towards a bleak future which can seriously jeopardize agriculture. Hence vigorous efforts are called for in making changed policies and strengthening of research followed by participatory extension to introduce eco-friendly, low-input sustainable technologies to increase production in a sustainable manner with equity in distribution.

Before setting research goal and objectives for West Bengal, we may think global but act local, as the agriculture is small farmer centric. The 11th five year plan has set up a steep target, especially with regards to wheat, pulses and oil seed. A need-based, well co-ordinated and action based research & extension plan is required. While prioritizing need based research in our state, we should keep in mind:–

1. Agro-climatologically & natural resource deficient area.
2. Very little availability of surplus land for horizontal growth.
3. Less developed backward villages which is almost 10% of the total village.
4. Financial resource constraint.
5. Low cost & low energy consuming technology
6. Conservation of natural resource.

Our agriculturists have to take the challenge and deliver result with a time bound manner to the needy stake holders for their survival in these difficult phases.

The researchable issues (Zone wise) as prioritized by the line departments covering agriculture and allied sectors in ATMA programs are presented below:

1. Proposed Researchable Issues – Vindhya Alluvium Soil

SL No	Strategies proposed for research	RESEARCH	
		Thrust area	Activity proposed
1.	Improvement of cropping system by crop diversification	Introduction of location specific varieties particularly for AES – III.	F.L.D – salt tolerant paddy, Cotton, Sunflower.

2.	Increasing the productivity of cereals, pulses and oilseed	Introduction of hybrid seeds	F.L.D.- on Hybrid paddy, Cotton, Pulses and oilseeds
3.	IPM/ INM	to find out standard module of IPM/INM of cereals, pulses, oilseed crops except rice	F.L.D. on IPM/ INM
4.	Cotton - development of short duration variety	Release of variety for short duration cotton crop	F.L.D. on short duration cotton variety
5.	Popularisation of rain water harvesting	Research on standard water harvesting structure of surface (rain) water	Field Trial
6.	Effective weed management under semi deep and deep water rice.	Standardization of effective seed management under semi deep and deep water conditions.	Farm trial

2. Strategies for Integrated Nutrient Management

No.	Strategies proposed for extension	Extension	
		Thrust Area	Activity proposed
1	Popularization of concept of INM in kharif Paddy for increasing production	Awareness building on INM in Kharif Paddy	Mass awareness campaign Demonstration formation of farmers group Credit linkage with financial Institutions
2	Popularization of green manuring in kharif paddy to reduce cost of cultivation and to increase production	Awareness building on Green manuring	Mass media campaigning Demonstration formation of farmers group development of electronic package
3	Popularization of bio fertilizer in kharif paddy to reduce cost of cultivation and to increase production	Awareness generation on use of bio fertilizer	Mass media campaign Training Demonstration Development of electronic package
4	Emphasis on crop rotation with leguminous crop for increasing production of kharif paddy	Awareness building on crop rotation with leguminous crop	Mass awareness campaign Training
5	Popularization of concept of INM in mustard for increasing	Awareness building on INM in Mustard	Mass media campaign Demonstration Credit linkage with

	production		financial institution
6	Emphasising use of straight fertilizer to meet up Sulphur deficiency to increase production	Awareness building to reduce sulphur deficiency through application of straight fertilizer.	Mass awareness campaign Demonstration Training
7	Emphasizing use of bio fertilizer for increasing production of mustard	Awareness building on use of bio fertilizer	Mass media campaign Demonstration Training Development of electronic package
8	Emphasizing use of gypsum for enhancing productivity of groundnut	Awareness building on use of Gypsum to enhance productivity	Mass media campaign Demonstration Training Development of electronic package
9	Popularization of concept of INM in pulses to increase production	Awareness building on INM in Pulse crop	Mass media campaign Demonstration Training
10	Emphasising use of bio fertilizer in Pulse crop for increasing production	Awareness building on use of bio fertilizer	Mass media campaign Demonstration Training

3. Strategies for Integrated Pest Management

Sl. No.	Strategies proposed for extension	Extension	
		Thrust Area	Activity proposed
1	Popularization of concept of IPM for reducing cost of cultivation of kharif paddy	Capacity building on IPM in kharif paddy	Training Demonstration
2	Emphasizing adoption of IPM practices in Oilseed crop for increasing production	Capacity building on IPM in Oilseed	Training Demonstration Electronic package development

4. Proposed Research Strategies – Red & Lateritic Zone

Sector	Strategies proposed for Extension	Extension	
		Thrust area	Activity proposed
1. Agriculture	Promotion of Dry land Farming	Adoptability of Dry land crops and its varieties	Varietals screening

	Integrated Nutrient Management	Use of leaf colour chart (LCC) (Time specific Nutrient management)	Standardization of dose of fertilizer for Aus/Aman/Boro
	Promotion of SRI	Use of Drum Seeder, zero tillage-transplanting of paddy	Standardization of package of practices of SRI
		Intensification of Hybrid Rice cultivation	Varietals screening Standardization of Fertilizer Dose
	Soil Moisture Conservation	Horti plantation (Cashew nut)	Varietals screening of cashew nut

5. Proposed Research Strategies – Gangetic Alluvium Zone

SL. No.	Strategy proposed for Research	Thrust Area	Activity Proposed
1.	Testing of various hybrid short duration varieties of Paddy	Increase production in shorter time span	On farm trials in farmers field
2.	Improvement of acid soils using locally available liming materials including Dolomite	Reduce soil acidity	On farm trials in farmers field
3.	INM & IPM in rice based cropping system	Promote eco friendly technology	On farm trials in farmers field
4.	Water harvest technology and rain water management and its proper utilization and residual effects on crops	Natural Resource Management	Replication of research result under adaptive trials, Refinement, validation and Assessment
5.	Selection of drought and disease resistant varieties of Paddy, Maize	Combating extreme weather	On farm trials in farmers field
6.	Developing remunerative cropping pattern for rain fed farming	Enhance farmers household income	On farm trials in farmers field
7.	Evolving suitable technology for preparation of high quality compost and vermin compost	Promote indigenous technology	Releasing proven technology for general recommendation for the concerned AES

6. Proposed Research Strategies – Tarai Region

Sector	Strategies proposed for research	Thrust area	Activity proposed

Agriculture Paddy	☞ Development of drought tolerant short duration cultivar ☞ Development of disease resistant rice variety with yield capacity comparable to MTU 7029 ☞ Development of hybrid rice with good cooking quality ☞ Development of vitamin - A enriched rice cultivar (Golden rice) ☞ Formulation of acceptable IPM & INM packages for paddy	☞ Varietal improvement ☞ Adaptive trial ☞ Development of acceptable package of practices	☞ Research ☞ Exposure visit and seminar / symposium participation
Jute	☞ Development of acceptable retting technology, involving minimum use of water & keeping the jute sticks intact. ☞ Replacement of popular variety Nabin (JRO 524) with a better cultivar ☞ Development of cultivation practices in sandy loam soil, with special reference to Nematode infestation	Innovation of jute fibre extractor and retting technology. Adaptive research & trial	Research Exposure visits and participation in seminars/symposia
4. Rapeseed & Mustard	☞ Development of short duration high yielding cultivar, replacing Binoy (B – 9) ☞ Development of Club – root resistant variety for acid soil (For AES – II).	1. Varietal improvement 2. Adaptive research & trial	Research Exposure visits and participation in seminars/symposia
5. Pulses	☞ Development of input responsive high yielding variety ☞ Development of variety, which can withstand adverse weather conditions ☞ Varietal development	☞ Varietal improvement ☞ Adaptive research & trial	Research Exposure visits and participation in seminars/symposia

	for lentil, which can tolerate *Botrytis* disease infestation.		
6. Maize	☞ Development of strategy for termite control, especially in sandy loam soil. ☞ Varietal improvement for yield maximization	☞ Development of IPM strategy ☞ Varietal improvement ☞ Adaptive research and trial	Research Exposure visits and participation in seminars/symposia

7. Research Strategies for Short Term Crops

Sector	Strategies proposed for research	Thrust area	Activity proposed
Agriculture			
Aus paddy	Location specific scented rice varieties	Multi locations & multi varieties trial for varietals suitability	Frontline demonstration; On-station demonstration
	Location specific varieties of fine quality rice	Varietals suitability	Frontline demonstration
Kharif paddy			
	Varieties suitability in deep water	Multi locations & multi varieties trial for varietals suitability	Frontline demonstration
	Effectiveness of bio-fertilizers in kharif rice productivity	use & application trials for Azospirilum, azotobactor & phosphobactrin	Frontline demonstration
	Effectiveness of micro nutrients in kharif rice productivity	Zn & other micro nutrients application	Frontline demonstration
	Effectiveness of bio & botanical pesticides	Bio & botanical pesticides for productivity enhancement & pest-disease management	Frontline demonstration
	Management practices of algal weed	Algal weed management	Frontline demonstration On-farm trial
Boro paddy			
	Standardization of package of practices of direct wet seeding	Time of sowing, weed management & nutrient management	Frontline demonstration; On-station trial

	by plastic drum seeder		
Ground nut			
	Fertilizers recommendation incorporating the bio-fertilizers & organic manure without hampering the existing yield	Nutrient management	Frontline demonstration
	Management practices of Heliothis sps. & spodoptera with the help of bio-agent		Frontline demonstration
Mustard			
	Effectiveness of sulphur application in increasing the oil content	Variation of the amount of sulphur for multi locations	Frontline demonstration
	Standardization of the package of practices of mustard under zero tillage cultivation practices	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Potato			
	Standardization of the package of practices of potato under zero tillage	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Lathyrus			
	Standardization of location specific DAP spraying for enhancing the productivity	Stage of crop growth & dose of application for enhancing the productivity	Frontline demonstration

6. Proposed Research Strategies – Coastal Region

Sector	Strategies proposed for research	Thrust area	Activity proposed
Agriculture			
Aus paddy	Suitability of	Multi locations & multi	Frontline

	location specific scented rice varieties	varieties trial for varietals suitability	demonstration; On-station demonstration
	Location specific varieties of fine quality rice	Varietals suitability	Frontline demonstration
Kharif paddy			
	Varietals suitability in deep water regime	Multi locations & multi varieties trial for varietals suitability	Frontline demonstration
	Effectiveness of bio-fertilizers in kharif rice productivity	Azospirilum, azotobactor & phosphobactrin use & its proper method of application	Frontline demonstration
	Effectiveness of micro nutrients in kharif rice productivity	Zn & other micro nutrients application	Frontline demonstration
	Effectiveness of bio & botanical pesticides	Bio & botanical pesticides for productivity enhancement & pest/ disease management	Frontline demonstration
	Management practices of algal weed	Algal weed management	Frontline demonstration On-farm trial
Boro paddy			
	Standardization of package of practices of direct wet seeding by plastic drum seeder	Time of sowing, weed management & nutrient management	Frontline demonstration; On-station trial
Ground nut			
	Fertilizers recommendation incorporating the bio-fertilizers & organic manure without hampering the existing yield	Nutrient management	Frontline demonstration
	Management practices of heliothis sps. & spodoptera with the help of bio-agent	Bio agent	Frontline demonstration
Mustard			
	Effectiveness of	Variation of the amount	Frontline demonstration

	sulphur application in increasing the oil content	of sulphur for multi locations	
	Standardization of the package of practices of mustard under zero tillage cultivation practices	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Potato			
	Standardization of the package of practices of potato under zero tillage cultivation practices	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Lathyrus			
	Standardization of location specific DAP spraying for enhancing the productivity	Stage of crop growth & dose of application for enhancing the productivity	Frontline demonstration

4.13 EMERGING ISSUES - CLIMATE CHANGE

"The threat from climate change is serious, it is urgent, and it is growing... If we fail to meet it - boldly, swiftly and together - we risk consigning future generations to an irreversible catastrophe."

-- Barack Obama

Climate Change and Agriculture: The issues of global warming and climate change have been debated for quite some time now and do not need to be emphasized. Climate change and agriculture are interrelated and climate change over the next century may have significant effects on crop production and food availability. The croplands, pastures and forests that occupy 60 percent of the Earth's surface are progressively being exposed to threats from increased climatic variability and, in the longer run, to climate change. It is speculated that by 2050, there would not be any glacier left in the world. The melting of ice would result in frequent floods and significant rise in sea level. Changes in rainfall pattern shift in setting in / withdrawal of summers- winters and temperature shifts in the agro-eco systems will affect cropping patterns.

The UN Intergovernmental Panel on Climate Change (UNIPCC) report indicated that an overall increase of 2°C in temperature and 7% in rainfall would lead to an almost 8% loss in farm level net revenue. As climatic patterns change, so also do the spatial distribution of agro ecological zones, habitats, distribution patterns of plant diseases and pests and ocean circulation patterns with significant impact on agriculture and food production. Abnormal changes in the climate and resulting increase in frequency and intensity of drought and flood events have long-term implications for the viability of these ecosystems. The UNIPCC estimated that GDP in the developing countries would decline by 1.4–3.0% due to climatic change.

Changes in climate will affect India's entire environment, especially the nation's water resources, sea levels and biodiversity, impacting a wide range of sectors, particularly agriculture. The Nation's economy is closely tied with natural resource with over 65% of workers engaged in agriculture and allied sectors, and many others earning their living in coastal areas through tourism or fishing. There are many climate-related problems that people in India are already facing, such as diminishing water resources and frequent natural disasters, which are likely to be further aggravated by the impending changes in the climate. The poorest in the country, most of who live in rural areas, are almost totally reliant on natural resources for their food, shelter and living exposing their vulnerability to the impact of climate change. The impact of such changes in the country are estimated and quantified by various institutions and scientists of repute, a few of which are quoted here under:

- A World Bank report on climate change impact based on case studies in India has focused on drought-prone regions of Andhra Pradesh, Maharashtra, and flood-prone districts in Orissa on the edge of climate tolerance limits. It highlights the possibility of the yields of major dry land crops declining in Andhra Pradesh. Sugarcane farmers of Maharashtra may see yields go down by as much as 30 per cent. Rice production in Orissa will face a similar fate with yields in the flood-prone coastal regions dropping by12 percent.
- According to estimation by Sinha S K and Swaminathan M S (1991), a 2°C increase in mean air temperature could decrease rice yield by about 0.75 ton/hectare in the high yield areas and by about 0.06 ton/hectare in the low yield coastal regions. Further, a 0.5°C increase in winter temperature would reduce wheat crop duration by seven days

and reduce yield by 0.45 ton/hectare. An increase in winter temperature of 0.5 °C would thereby translate into a 10% reduction in wheat production in the high yield states of Punjab, Haryana and Uttar Pradesh.

- ☞ As against the UNIPCC estimate that GDP in the developing countries would decline by 1.4 – 3.0% due to climatic change, in India, the effects of global warming are likely to be more severe. For every 2°C rise in temperature, the reduction in GDP is expected to be about 5% and for the next 6°C it would be anywhere near 15–16%.
- ☞ Likewise, FAO has estimated that India would lose up to 125 MT of cereals as the direct impact of climate change on agriculture - such as changes in agricultural inputs, shift in planting dates, preference of crop genotypes due to adaptation to changing climate, soil erosion, soil drainage and lower fertility level, increased incidence of pests, weeds and diseases in food crops. The shortage in grain production will result in less availability of food items, especially to the economically poor people.
- ☞ According to the National Climate Centre in Pune, rainfall has decreased in July and greater rainfall has been recorded in August in key crop growing areas of the country. Another major change in the monsoon pattern is that there has been a shift westwards, with the rainfall getting confined to certain pockets, which may result in floods, resulting in the lack of food for people.

The devastating impact of natural calamities that we experienced in the recent past – ***Cyclone Aila*** in West Bengal, unseasonal rains in Krishna – Tungabhadra catchment resulting in flash floods, and the delayed on-set of monsoon in the country – are fresh in our mind, and perhaps, are the warning signals of what is imminent in the future on account of climate change.

With over 70% of Indian agriculture being rain fed and totally dependent on vagaries of monsoon and an equal percent of population depending agriculture for subsistence, the consequences of climate change could be to say the least, disastrous.

The impact of such climate changes is multi dimensional and can be summarized as under:

- ☞ Threat to agriculture and food security.
- ☞ Threat to biodiversity with adverse implications for forest-dependent communities.
- ☞ Adverse impact on natural ecosystems such as wetlands, mangroves and coral reefs, grasslands and mountain ecosystem.
- ☞ Adverse impact of sea-level rise on coastal agriculture and settlements.
- ☞ Impact on human health due to the increase in vector and water-borne diseases such as malaria.

The Task ahead

Addressing the impacts and combating climate change assumes top priority in our country in the context of its influence on the poorest of the society. It is a major challenge because the changes are not so visible and the strategies are seen as anti-developmental. The immediate priority is to undertake location specific research to study the climate change impact on major crops and cropping sequences. The need for such research is more critical in the Eastern Region of the country where the agrarian economy with small and marginal holdings predominates.

Chapter – V

Development of Allied Sector

5.1 INTRODUCTION

Allied Agricultural Sector is equally important for the development of state especially the rural economy. These sectors can provide supplementary income, alternative livelihood especially to the land less, employment opportunities during non-agricultural season; mitigate the natural calamities like drought. Allied agriculture sector like horticulture, dairy, poultry, goatery, sericulture, fisheries etc, can contribute immensely in value added services and food processing industry. The ability to create man hours and entrepreneurship among the youth is also very high in these sectors. Consumer demand of milk, meat, egg, fruits, and fish is increasing day by day as the quality of life has increased in urban and peri-urban area. The rise of per capita income and more exposure to the mass media has helped to increase the value added product created from the allied agriculture sector. The state has the potentiality to encash these market demands by producing the raw material to meet the demand on account of its diverse climatic conditions

5.2 HORTICULTURE

Status of Plantation and Horticulture Crops in West Bengal

The State of West Bengal with six diverse agro-climatic zones is conducive for growing a wide variety of horticultural crops. The state is a major producer of fruits, vegetables, flowers, tea and spices. The state has immense potential for development of horticulture sector both through horizontal (area expansion) and vertical integration (productivity improvement). With the implementation of National Horticulture Mission, the State Government contemplates doubling the production under horticulture crops by the year 2011. The state has achieved self-sufficiency in critical food crops and has assumed leadership across a wide range of agricultural produce.

Fruits and Vegetables

Among fruits, while mango occupies the largest area about 42% of the total under fruit crops, the state contributes 22.88% and 10% of national pineapple and litchi production respectively and thus ranks 1st and 2nd in production at the national level for these two crops respectively. The other important fruit crops grown guava banana, sapota, mandarin, jackfruit etc. The total area under fruit crops in the state is 1.942 lakh ha with a production of 27.67 lakh MT (2007-08). Malda, Murshidabad, 24 Parganas North, Nadia and Darjeeling are some of the major fruit growing districts in the state.

West Bengal is the largest producer of and vegetables in the country producing traditional vegetables like brinjal, tomato, cabbage, cauliflower, Cucurbits and lady's finger and nontraditional vegetables like broccoli, gherkin, baby corn, brussel sprout, celery etc. Cauliflower, cabbage and brinjal contribute to 36, 34 and 31% of the national production respectively. The total area under vegetables (excluding potato) is 9.124 lakh ha with annual production of 125.56 lakh MT (2007-08). Major vegetable growing districts include Murshidabad, Nadia, North & South 24 Parganas, Burdwan, Hooghly and Bankura. The state

is the second largest producer of potato with highest productivity (26 MT/ha as against national average of 18 MT/ha)

Flowers

The state enjoys favourable agro-climatic conditions to grow a variety of both traditional and high value/exotic flowers. Historically, development of floriculture in India began in the Darjeeling hills of North Bengal. In fact, nurseries at Kalimpong, in Darjeeling district, were among the first to export floriculture products from India to USA, UK and other European countries. Tuberose, Rose, Chrysanthemum, Gladiolus, Marigold, Jasmine, Sunflower, Gerbera, Gypsophila, Balsam, China rose, Cosmos, Orchid and Lily are some of the major ornamentals grown in the state. The state also grows substantial quantity of bulb, corm, and foliage plants. This advantage gives West Bengal the scope for commercial floriculture, especially in North Bengal and also in some parts of South Bengal. The gross area under different floriculture crops in the State is 19,590 ha with a production of 48,500 MT of loose flowers and 196.80 crore spikes. Important flower growing districts include East & West Midnapur, Nadia, Darjeeling, North & South 24 Parganas and Howrah are the major producers of flowers.

Spices

The total area under different spice crops in the state is 1.12 lakh ha with an annual production of 2.999 lakh MT. The major spice crops include chillies, ginger, turmeric, coriander and large cardamom. The important districts include Coochbehar, Nadia, North & South 24 Parganas, West Midnapore, Jalpaiguri and Darjeeling.

Plantation Crops

Among plantation crops, excluding tea, coconut, areca nut, betel vine and cashew are the major crops together accounting for 69848 ha. Betel vine, which is cultivated in 18597 ha provides sustainable livelihood to a large number of small and marginal farmers.

Tea

Tea is the main plantation crop covering about 1.13 lakh ha with a production of about 200 million kg and is mainly concentrated in the three districts i.e. Jalpaiguri, Darjeeling and Uttar Dinajpur. Some of the critical issues relating to the tea industry include:

- Low levels of productivity, consequently high cost of production,
- Decline in quality of production.
- Declining price trend in international markets, adversely influencing domestic prices.
- Tough competition from other tea exporting countries like Kenya, Sri Lanka, China and Vietnam which have competitive advantage due to high productivity and low production cost.

➢ Stagnant / marginal increase in domestic consumption from 714 million kg in 2003 to 757 million kg. in 2005 (< 3% annual increase).

Out of the above, productivity enhancement and reduction in production cost are the only factors which can be moderated at producer level. Hence the emphasis now should be on addressing these factors, which have a bearing on gaining competitive advantage in the export market.

Against a suggested re plantation rate of 2%, the actual rate of re plantation is less than 0.3%. High investments in replanting and crop loss (from existing gardens) are attributed to low rate of replanting. Rejuvenation and infilling in mid age group gardens is another area for productivity enhancement where again not much emphasis is being given by the tea industry. With a view to encouraging systemic re plantation, the Tea Board has launched a new subsidy cum loan assistance programme under the Special Purpose Tea Fund (SPTF) constituted for the purpose.

Medicinal and Aromatic Plants

In West Bengal, the diverse agro-climatic and physiographic conditions in the plains and hilly zone offer scope for cultivation of a variety of high value medicinal and aromatic plants. The total area under medicinal plants is estimated to be around 550 ha. However, the crop wise area coverage details are not available. Keeping in view the agro climate and the demand from herbal-based industry in the state, the State Medicinal Plants Board, West Bengal has identified 37 medicinal and aromatic plant species for commercial promotion in the state. Some of the constraints associated with promotion of commercial cultivation of medicinal plants in the State are:

- ☞ Unorganized production. The concept of Commercial production yet to be introduced.
- ☞ Absence of reliable information/database on production, procurement, processing and marketing channels in the State limiting the scope for identifying mapping the potential for development, addressing the infrastructure needs and market linkages.
- ☞ Lack of awareness among farmers
- ☞ Absence of a mechanism to create awareness among the farmers
- ☞ Inadequacies in input supply including plant material, technical / extension support
- ☞ Totally unorganized marketing with middlemen and intermediaries deciding the prices for the produce often to their advantage.

Of late a few user pharmaceutical industries (Ayurveda / allopathic) are entering into contract farming with farmers for sourcing their raw material requirements. Contract farming offers very good scope for promotion of herbal industry in the districts as it provides assured market for the produce. It would also facilitate the banks to extend finance to the farmers for cultivation through appropriate tie up.

Area & Production of Horticultural Crops

The area and production details under the broad categories of plantation and horticulture sector in West Bengal are furnished in the following table ;

West Bengal	Area ('000 ha)	Production ('000 MT)
Fruit	194.25	2766.67
Vegetables (Excl. Potato)	912.41	12555.96
Potato	400.8	9900.8
Spices (05-06)	108.5	216.7
Plantation crop (05-06)	69.65	4175.56
Flower- Loose	19.59	48.46
Cut		196.80 (spikes)
Total	**1705.2**	**29664.15**

The crop wise area and production details are furnished in ***Annexure 20 to 24***. The data in Annexure 20 and 21 suggest that the area under all the major horticulture crops in the state has increased over the period (2004 to 2007) at varying levels mainly on account of bringing cultivable waste lands under perennial horticulture crops and also adoption of crop diversification to more remunerative vegetables and flower crops.

Demand analysis for horticulture produce

The per capita consumption of fruits and vegetables in the country including in the State of West Bengal, is less than 200 gms/day against the recommended norm of 350 gm. Inadequate production, transport and distribution bottlenecks associated with perishable produce are major contributing reasons for low level of consumption. This apart, predominantly cereal based food consumption habit in the country is also considered a major reason. This is amply explained from the fact that in West Bengal with a population of 8.74 crore (census 2001), the total production of vegetables including potato in 2007-08 was 224.56 lakh tonne. Considering 20 per cent wastage, another 20 per cent for outside state trading and seeds and 10 per cent for processing and exports around 50 per cent of production i.e. 112.28 lakh tonnes were available for consumption. This works out 303 g per head per day. But consumption of West Bengal is only 125 g (50^{th} National Sample Survey Bulletin No. 402). One consequence of this trend is the high pressure on food grains. It is difficult to cope up with the rising demand of the food grains but the pressure can be offloaded by supplementing with vegetables. This approach is also crucial for ensuring nutritional security and addressing the endemic problem of mal-nutrition. Since the pressure on land is high and scope for area expansion is limited as in the case of food crops, the emphasis should be more on vertical integration through productivity enhancement measures.

Projected requirement of fruits and vegetables in West Bengal

With rapid urbanization, the demand for fruits and vegetables especially in sorted graded and value added form is reflecting an increasing trend. Similar trend is also observed for exotic and specialty fruits and vegetables like organic and RTS products. Keeping in view the

expected population growth, the requirements of fruits and vegetables in the state are projected in the following table:

Particulars	Per capita		Requirement and Production in thousand tonnes							
	Req. gm/ day	Av. gm/ day	2008-09		2009-10		2010-11		2011-12	
Population (Projection) (in lakhs)			884.62		894.59		904.71		914.63	
			R	P (Tar.)	R	P (Tar.)	R	P (Tar)	R	P (Tar)
Fruits	60	51	5307	2800	5367	3000	5428	3250	5487	3500
Potato	125	125	4440	8840	4490	9747	4541	10746	4590	11847
Vegetables	250	125	8879	13758	8979	14834	9081	16036	9181	17460

(R – Requirement ; P (Act.) – Production (Actual) ; P(Tar.) – Production (Target)

The above data suggests a widening gap between consumption needs and likely production highlighting the opportunities available for increased production, which *inter alia* calls for an integrated approach including convergence of various development programmes under implementation in the State.

Development & Promotional Programmes under Implementation

National Horticulture Mission:

Consequent upon announcement of National Horticulture Mission (NHM), the GoWB has prepared a comprehensive State Horticulture Mission Document (SHMD) which serve as the basis for an integrated development of horticulture in the State. NHM is a centrally sponsored scheme with 100% GoI assistance during Tenth Plan and at 85% and 15% assistance from GoI and State Govt. during Eleventh Plan. The West Bengal State Horticulture Development Society has been constituted as State level project implementing agency with District Horticulture Development Societies. Taking into account the potentials available, 14 districts have been identified as Focus districts for development. Four districts namely, Uttar and Dakshin Dinajpur, Burdhman and Howrah are categorized as ***non NHM*** districts.

Agri Export Zones

In the context of favourable agro climate, predominance of fruit and vegetable production in the state and also the logistical advantages especially an easy access to bordering countries like Bangladesh, Nepal, Myanmar, South East Asian countries and Asia-Pacific region for exports, five Agri Export Zones (AEZ) have been set up in the state jointly by APEDA and the State Government exclusively under fruit and vegetable sectors. The crops and districts covered are as under:

Sr. No.	AEZ Project	Districts
1	Pineapple	Darjeeling, Uttar Dinajpur, Cooch-Behar and Jalpaiguri
2	Litchi	Murshidabad Malda, 24 Pargana (N) and 24 Pargana(s)
3	Potato	Hoogly, Burdwan, Midnapore (W) Uday Narayanpur and Howrah

4	Mango	Malda and Murshidabad
5	Vegetables	Nadia, Murshidabad and North 24 Parganas

Programmes of National Horticulture Board.

National Horticulture Board is implementing the several schemes with primary objective of encouraging adoption of improved production technologies by horticulture growers. Under the programme subsidy assistance is provided to the farmers availing bank credit for taking up scientific horticulture production. The broad areas of covered under the scheme include:

- ☞ High density planting of fruit tree crops
- ☞ Intensive vegetable farming under controlled conditions (greenhouses)
- ☞ Adoption of precision farming technologies including drip/fertigation systems
- ☞ Commercial floriculture units for cut flower production
- ☞ Strengthening of pos harvest handling infrastructure including sorting, grading, packing and integrated cold chain components.

Development Initiatives of NABARD

NABRD has been taking a proactive role in the promotion of horticulture sector in the State especially with institutional credit support. The key initiatives include:

- ☞ Formulation and circulation of location specific model bankable projects for the benefit of the banks and entrepreneurs.
- ☞ Assessment and quantification of investment needs covering various horticulture based activities in the State
- ☞ Co financing of innovative projects aimed at wasteland development through horticulture in Bankura district
- ☞ Financial assistance to farmers/producers' cooperatives for setting –up of and post harvest cold storage infrastructure for perishable horticulture products in Coochbehar district
- ☞ Promotion of horticulture as a sustainable activity for the small and marginal farmers in wastelands in the Watershed Development Programmes implemented with assistance from Watershed Development Fund
- ☞ Strengthening post harvest infrastructure with sanction of six Food Parks at Malda, Nadia, Darjeeling, East Midnapore and South 24 Parganas under Rural Infrastructure Development Fund involving a loan assistance of Rs. 3737.99 lakh.

Horticulture based sustainable livelihood for tribals through WADI approach.

- ☞ Consequent upon success of WADI (meaning horticulture garden in Gujarati) approach in Gujarat in providing horticulture based sustainable livelihood for the tribal families, NABARD took initiatives to replicate the model in the State of West Bengal and sanctioned two Adivasi Development Projects in Ranibandh and Bundwan blocks in Bankura and Purulia districts respectively covering 1000 families in each block. The projects were sanctioned during February 2006 with a total financial outlay of Rs. 392.24 lakh and Rs. 386.68 lakh for Ranibandh and Bundwan respectively. The projects are implemented with grant assistance equally shared by Backward Classes Welfare Dept., Government of West Bengal and NABARD. The livelihood component involves development of horticulture

garden (wadi) with location specific perennial horticultural crops in the cultivable wastelands owned by the tribal families. As on 31 March 2010, NABARD sanctioned 14 tribal development projects in West Bengal covering 7 districts involving a total grant assistance of Rs. 33.73 crore. The Government of West Bengal (Backward Classes Welfare Department) is partnering with NABARD in six of the projects contributing a grant assistance of Rs. 8.87 crore.

Emerging areas

Organic Farming under Horticulture

The concept of organic farming is relatively new in commercial agriculture sector in the state as is elsewhere. However there are specific pockets especially in the hill district of Darjeeling where cultivation of fruits and vegetables is being done with natural resources. Tea is an exception where an over 23 tea estates in the organized sector have switched over to organic tea production with required accreditation and catering exclusively to client specific export markets. The crops that are having a good scope to be grown under organic farming for the State includes tea, selected fruits and vegetables, medicinal plants and spices (ginger and large cardamom). A few NGOs like Ramkrishna Mission are promoting the concept of organic farming through farmers' awareness programmes. One of the major constraints associated with promotion of Organic Farming in the State is absence of any Accreditation / Certification Agency based in West Bengal. This is an issue to be addressed to especially by institutions like BCKV/IIT Kharagpur.

Contract Farming

The concept of contract farming is relatively new for the State. Considering the production of fruits and vegetables in the State more particularly in the AEZs, private investors including global corporate houses have been evincing keen interest for investment in fruit and vegetable processing in the State to tap the potential. This is widening scope for captive production of raw material (fruits & vegetables) catering to the specific needs of user industry through contract farming. A beginning has been made in this regard under potato where several farmers are taking up cultivation of potato varieties exclusively for processing purpose. Despite certain initiatives taken by the user industry, the concept and its advantage are yet to penetrate in the minds of the farmer. Promotion of contract farming simultaneously calls for appropriate provisions through amendments to APMC Act by the State Government.

Constraint Analysis & Reasons for Productivity Gap in Horticulture

Based on the information provided in the C-DAPs and interactions with line department officials, an analysis of the area and production data for the past five years has been made and presented below. A comparative analysis of the potential yield under recommended cultivation practices and actual yield realized by the fruit & vegetable growers under different agro ecological systems is presented below :

Table : Yield Gap Analysis of Major Horticulture crops

					Yield MT/ha
Crop	Average yield in 5 years	Highest yield in 5 years	Yield gap	Potential yield SREP **$**	Actual yield SREP *
1	2	3	4 (3-2)	5	6
Banana	18.60	19.96	1.36	30	12
Papaya	28.78	34.54	5.76	45	30
Tomato	14.67	15.47	0.80	40	30
Cabbage	18.27	29.02	10.75	45	30
Cauliflower	22.26	28.45	6.19	45	30
Peas	13.82	18.12	4.29	25	15
Brinjal	16.52	17.44	0.93	30	15
Onion	15.42	19.37	3.95	35	28
Cucurbits	11.90	12.77	0.87	15	10
Ladies Finger	11.19	11.20	0.01	15	12
*** As per SREP document and partly from Department feedback**					
$ With adoption of scientific production practices.					

Gaps in technology adoption:

i. Seed treatment before sowing not practiced

ii. Imbalances in fertilizer application and non adoption of recommended doses in split application at appropriate stages. INM seldom adopted

iii. Non application of organic manure (1 to 3 MT/ha applied against the requirement of 15 MT/ha)

iv. Application of micronutrients like Boron and zinc (chaelated compound) not been practiced in areas where the problem is endemic

v. Indiscriminate use of pesticides and fungicides affecting proper pest and disease management. IPM and IDM are not practiced

With respect to perennial horticulture crops, high initial investment and long gestation are key factors for reluctance by the farmers. Lack of awareness and ***inadequacies in extension*** are considered to be the main reasons for gaps in adoption of technologies. The key Issues and suggested interventions are as under :

Issue: ***Inadequacies in Extension infrastructure support.***

- ✓ With a view to strengthening the extension network, it is desirable to have at least one HO with supporting staff at block/sub Division level especially in potential districts. The initial emphasis could be in the focus districts identified under NHM.
- ✓ Though alternative modes of extension support through Agri Clinics and Agri Business Centre Scheme (ACABC) are contemplated, the response from Agri Graduates is not quite encouraging.
- ✓ Promote Informal extension channel like Farmers' Clubs, Farmers' Interest Groups and educated/ progressive youth and training them as technology transfer agents with active involvement both formal (department) and informal (NGOs, Farmers' Clubs) extension agencies

- ✓ Innovations like Prani Bandhu scheme, which is a proven success in the development of AH/Dairy sector to be replicated in Horticulture/Agriculture sectors as well – like Krishi Bandhu to think of.
- ✓ Well equipped Soil testing facilities at district and block level for comprehensive soil analysis and introduction of soil health card based Integrated Nutrient Management

Issue: ***Inadequacy and timely supply of quality planting material especially for perennial horticulture crops.***

- ✓ The State is a major producer and supplier of ornamental plants to other States in North India. The traditional ornamental nursery belts in North and South 24 Parganas, East Medinipur districts where necessary expertise and skilled manpower are available.
- ✓ Nursery being a highly viable activity, there exist very good scope for promotion of private nurseries for production of perennial horticultural crops especially in districts like Malda, Murshidabad. The programme can be dovetailed with the LoI scheme of NHB or NHM in consultation with the Department concerned for the benefit of prospective entrepreneurs.

Issue: ***Promotion of Medicinal Plants***

- ✓ Some of the constraints/infrastructure gaps are unorganized production, Lack of awareness among farmers and appropriate guidance on the scope for medicinal and aromatic plants, inadequacies in input supply including plant material, technical/extension support and totally unorganized marketing with middlemen and intermediaries deciding the prices for the produce often to their advantage.
- ✓ Contract farming offers very good scope for promotion of herbal industry in the districts as it provides assured market for the produce.
- ✓ Arrange sensitization and awareness programmes (seminars/workshops) and publication of books leaflets, audio-visual aids for the benefit of bankers and prospective entrepreneurs.
- ✓ Survey and documentation of database on medicinal plants cultivation, procurement, processing infrastructure, marketing channels.
- ✓ For supporting the activity with bank credit, LDMs and DDMs of NABARD could play a role in liaising and tie up with the banks and user industry for contract farming arrangements are contemplated in addition to organizing workshops.

Issue: **Development of Tea Sector**

- ✓ Systemic replantation programme to replace old and uneconomic gardens against a suggested replantation rate of 2%, the actual rate of replantation is less than 0.3% at present.
- ✓ Rejuvenation and infilling programme
- ✓ Better management to improve productivity
- ✓ Factory modernization to improve quality

Issue: ***Convergence of AEZs / NHM / NHB LoI Schemes***

- ✓ Though there exists scope for investment in infrastructure especially relating to both crop area expansion and post harvest handling facilities, institutional credit flow under AEZs remain insignificant. Absence of an effective coordination mechanism among the stakeholders including banks is considered to be the main lacuna.
- ✓ There is a need to link the developmental components under NHM with credit components and dovetailing the same with ACP.
- ✓ A good number of schemes in respect of which LoI stands issued needs a quick grounding.
- ✓ Identification of areas and activities which are capital intensive and need institutional credit support under NHM and AEZs
- ✓ Assessment of credit needs (activity specific and crop specific) and preparation of credit plans and dovetailing the same with the District Credit Plans followed by a Coordinated approach to operationalize the credit plans
- ✓ Organizing district level sensitization programmes for the benefit of field level functionaries of the banks covering thrust districts under NHM and AEZ
- ✓ Policy interventions favouring contract farming would facilitate exclusive production of varieties suitable for processing with user industry tie-up for buyback

Issue: **Gaps in Infrastructure for Horticulture development**

The horticulture sector in the state of West Bengal is highly diversified and the gaps in infrastructure are more activity / location specific. Some of the general gaps in infrastructure pertaining to the sector in the State that needs to be assessed and strengthened are discussed here under:

- ✓ Despite being a major producer of potato, the farmers in West Bengal continues to depend on other states like Punjab, Himachal Pradesh, UP for meeting seed potato requirements. Consequently the high cost of seed material and timely availability are the persisting problems for the potato seed growers. Identifying potential pockets for commercial potato seed production including True Potato Seed (TPS) and strengthening seed production infrastructure are necessary. The location specific seed production technologies need to be developed and standardized. Such initiatives will open avenues for private sector investment in potato seed production.
- ✓ In respect of medicinal plants, one of the infrastructure constraints relates to absence of any agency / center for quality analysis and validation. In the absence of such facility, the entrepreneurs are not in position to realize the right price for the right quality.
- ✓ While there exist good scope for promotion of organic farming especially for high value fruits, vegetables, spices and plantation crops, there is no certifying / accreditation agency functioning in the state.
- ✓ The ***"Producer (farmer) – Consumer markets"*** (Farmers' markets) introduced in some states like AP, Tamil Nadu and Karnataka were found to be successful and beneficial to both farmers and consumers. The State Government may consider introducing the concept in West Bengal especially in major vegetable producing and consuming centers.

- ✓ Being a major producer of vegetables, the State Government could consider establishing exclusive auction centers for fruits and vegetables on the lines of "NDDB Model" (Bangalore).
- ✓ Market intelligence to be made available at district / block level through IT on the lines of *e – choupals* promoted by ITC.
- ✓ Good connectivity between production and marketing centers is crucial for perishable horticulture products. Critical road links in potential horticulture belts could be identified and prioritized for development through government infrastructure development programmes like PMGSY
- ✓ The gaps in marketing /post harvest handling and strategies as identified are:

5.3 SERICULTURE

Sericulture is a labour intensive agro-based cottage industry contributing significantly to employment in the rural areas in some of the states where it is predominant. Four varieties of silkworms are reared in the country viz, mulberry, muga, tassar and eri While mulberry sericulture is taken up in several parts of the country, muga silk production is mainly confined to Assam. Tassar silk production is mainly taken up in Bihar, West Bengal, Madhya Pradesh and Orissa and is identified as an activity mostly associated with tribal habitations. Eri silk production is confined to Assam and Orissa states.

Of the four types, Mulberry silk is the main product produced extensively in the states of Karnataka, West Bengal and Jammu and Kashmir. About 85% of the country's production is contributed by Karnataka with introduction of bivoltine and multivoltine hybrids, enabled by rearing four to five crops in a year. Other states namely Andhra Pradesh, Assam, Tamil Nadu, Uttar Pradesh, Himachal Pradesh and Punjab Contributes roughly 1.8% of the total production of mulberry silk in India.

In West Bengal, mulberry sericulture is a traditional activity predominant in select pockets in some of the districts viz., Malda, Murshidabad, Bankura, Purulia, Darjeeling, Uttar Dinajpur, Coochbehar, 24-Parganas(N), Jalpaiguri, 24-Parganas(S), Midnapur, Dakshin Dinajpur, Burdwan, Birbhum, and Nadia. With regard to tassar silk, the activity is predominant in tribal habitations in Purulia, Bankura, Midnapur and Birbhum. The major crop under expansion programme in the State is mulberry. The status of the sector in the state (as on March 2008) is as under:

SL. No.	Item	Mulberry	Tasar	Eri	Muga
1.	**Plantation (acre)**	37871	13784	871	1106
2.	**DFL consumption (lakh)**	483	5.79	1.55	0.51
3.	**Cocoon production**	17415 MT	23654 Kahans	12.88	10 Lakh
4.	**Silk production**	1660.36 MT	28.97 MT	9.90 MT	218 Kg
5.	**Silk waste production**	528.10	15.23 MT	-	110 Kg

(Source: Annual Report, 2007-08, Department of Micro and Small Scale Enterprises, Government of West Bengal)

The focus area of development as contemplated by the State Government aims at improving the productivity and product quality in the pre-cocoon as well as post-cocoon stages by transferring new technologies developed by the Central Silk Board to the sericulturists in the State. Some of the key interventions of the department of Sericulture in this direction are:

- ✓ Introduction of HYV of mulberry including supply planting materials at subsidized rates.
- ✓ Supply of rearing inputs/appliances to the beneficiaries
- ✓ Maintenance and multiplication of basic silkworm seeds.
- ✓ Promotion of post cocoon sector through development of reeling/twisting infrastructure
- ✓ Encourage cultivation of eri and muga in the district of Jalpaiguri and Coochbehar, respectively, by providing necessary infrastructure and assistance to the tribes engaged in these activities.
- ✓ Training and capacity building of all the stake holders viz., officials, farmers, reelers and private seed producers.
- ✓ Marketing support to the producers

Progress in development interventions under sericulture in West Bengal

Item	2007 - 2008		2008 – 2009 (April to November, '08)	
	Target	Achievement	Target	Achievement
Extension of Area (acre)	2450	2428	2295	1548
DFL produced ('000 M.T)				
Seed	1285	1023	1085	721
Commercial	50889	49034	51440	33203
DFL reared ('000 M.T)				
Seed	1300	999	1085	79
Commercial	50995	49098	51570	34808
Cocoon Produced				
Seed ('000 M.T)	340000	226035	279365	116065
Reeling (M.T)	15712.2	17427	16514	12325
Raw Silk Produced (MT)	1689.8	1670	2379	1662
Silk Waste Produced (MT)	535.7	543	611	438
Additional Employment Generation (No.)	13300	13508	13590	9486

(Source: Department of Micro and Small Scale Enterprises, Government of West Bengal)

5.4 ANIMAL RESOURCE DEVELOPMENT

The State of West Bengal is richly endowed with various livestock and poultry. The share of livestock sector in total State Domestic Product (SDP) is 4.41% and that in Agricultural SDP is 18.6%. The State has made significant progress in the development of animal resources over a period of time. During 1976-77, production of milk was 10.64 lakh M.T, whereas it shot up to 40.77 lakh M.T during 2007-08. During the same period, the production of meat was 1.29 lakh M.T and 5.14 lakh M.T respectively. Similarly, production of eggs was to the tune of 676 million and 3121 million during the corresponding period. But despite such progress, the

State is still facing a number of challenges in augmenting productivity of livestock and poultry birds for bridging the wide gap that exists between requirement and availability of livestock products. West Bengal ranks 1st in cattle population in the country and 12th in the production of milk. The State ranks third in the production of meat but it is way behind in mitigating the availability of meat for the people of the state. It ranks 3rd in the poultry population but ranks 9th in the production of eggs.

Livestock population in last two Census Reports (2003 and 2007), West Bengal (in lakh)												
Year	Mammalian livestock							Avian livestock				
	Cattle	Buffalo	Sheep	Goat	Pig	Horse and Pony	Total	Total Fowl	Total Duck	Other Poultry	Total Poultry	Grand Total
2003	179.84	8.76	14.11	117.57	8.99	0.11	329.38	376.86	130.24	3.83	511.15	840.53
%	(54.6)	(2.66)	(4.28)	(35.7)	(2.7)	(0.03)	(100)	(73.7)	(25.5)	(0.75)	(100)	
2007	191.88	7.64	15.77	150.69	8.15	0.06	374.19	519.43	120.47	2.53	642.43	1016.62
	(51.3)	(2.04)	(4.21)	(40.3)	(2.19)	(0.02)	(100)	(80.9)	(18.8)	(0.39)	(100)	
Total (%)	18.87	0.75	1.55	14.82	0.80	0.01	_	51.09	11.85	0.25	_	100

5.4.1 DAIRY SECTOR

The State ranks 12th in national level milk production. The annual milk production in West Bengal is estimated at 4.10 Million Metric Tonnes as against the actual requirement of 5.5 Million Metric Tonnes. The per capita daily availability of milk in the State is 180 gms against the requirement of 220 gms recommended by ICMR (WHO recommendations 210 gm). The State Government on its part has been taking suitable steps to create an environment for investment in dairy sector so that the livestock resources are utilised optimally.

Available infrastructure: The major items of available infrastructure in the State for Animal Husbandry development are as under:-

Particulars	Units (nos.)
Veterinary Hospitals / Dispensaries	3248
Animal Health Centres (State+District+Block)	722
Artificial insemination centres	5634
Animal Development Aid centres	3248
Dairy Cooperative Societies	2607

Quality Animals: The main plank of livestock development would be on availability of quality animals. The breedable female bovine population of the State is as under:-

Type of animal	Cattle			Buffalo	Total Bovines
	Indigenous	Cross bred	Sub Total		
No. (lakh)	37.93	8.97	46.90	1.42	48.32
% share	80.87	19.13	100.00	-	-

% share	78.50	18.56	97.07	2.94	100.00

The number of breedable female cattle in each Gram Panchayat varies from 1300 to 2000. Assuming 2.5 AI per conception, the coverage of breedable population (2007-08) under AI is projected at 16.32%. The State Implementing Agency Paschim Banga Go Sampad Bikash Sanstha (PBGSBS) has planned to have one AI service unit for every 800 breedable females.

Development Initiatives

(a) The Animal Resources Development Department (ARDD) is responsible for livestock & poultry development in the State. For this purpose the Government has set up various units. The major units and their main responsibilities in order of importance are given below:-

Name of the unit of ARDD	Responsibility
Paschim Banga Go Sampad Bikash Sanstha (PBGSBS)	Breeding
Directorate of Animal Resouces & Animal Health(AR&AH)	Health & Extn.
WB Cooperative Milk Producers' Federation Ltd.(WBCMPF)	Milk Marketing
WB Dairy & Poultry Development Corpn Ltd.(DAIRPOUL)	Feed prodn.
WB Livestock Devleopment Corpn Ltd.(WBLDC)	Meat Marketing

(b) The Paschim Banga Go Sampad Bikash Sanstha (PBGSBS) was established on 26 January 2002 under the National Programme for Cattle and Buffalo Breeding (NPCBB). The basic aim of the Sanstha is to restructure and re-orient cattle and buffalo breeding operations in the State. With a view to upgrading the breeds, the Sanstha is involved in production of high quality milch cows as well as bulls with high genetic potential. The Sanstha has brought sizeable breedable female bovine population under organized breeding network as per the State Breeding Policy. For this purpose, the Sanstha is maintaining and supplying quality breeding inputs and services.

The breeding infrastructure of PBGSBS is as under:-

(i) Training Centres - Training Units - 9

(ii) Bull Mother Production - Bull Mother Farms - Two

(iii) Embryo Transfer (ET) Laboratory – One

(iv) Quality control and Molecular Biological Laboratories – Three

(v) Semen Production - Frozen Semen Bull Stations (FSBS) – Three

(vi) Frozen Semen Banks – 19 [1 Central Bank & 18 Dist. Level]

LN_2 Production - Four LN_2 Plants and 28 storage units

(vii) Government AI Units – Total – 2088 of which 39% [809] Mobile.

(d) The **breed-wise** total bulls vis-à-vis bulls in collection at the 3 FSBS is as under:-

Sl. No.	Particulars	Pure Jersey	CB Jersey	CB Holstein	Sahiwal	Red Sindhi	Gir	Total
(a)	Total bulls	30	20	4	49	13	48	164
(b)	Bull in collection	25	14	3	25	4	14	85
(c)	Production [Lakh]	7.15	2.37	1.15	6.03	1.26	1.67	19.63

(e) The agency-wise comparative performance of AI units is as under:-

Sl. No.	Particulars	Govt.	Prani Bandhus (PBs)	Coop. & NGO	Total
1	**(A) AI Units [No.]**	2088	2816	625	5529
	(B) % share	37.77	50.93	11.30	100.00
2	**(A) AI done [Lakh]**	5.59	11.04	2.69	19.32
	(B) % share	28.94	57.14	13.92	100

The 19.32 lakh AIs cover around 17% of the breedable population @2.5 AIs. The average AI performed per Pranibandhu per year is around 400. The average estimated monthly income earned by PB is Rs.4000/-. The number of calves born as a result of AI done by PBs is around 3.5 lakh.

(f) **Development initiatives of PBGSBS, the State Implementing Agency (SIA)**

- All Bull stations accredited with the prestigious IS/ISO: 9001-2000 Certificate
- Hazard Analysis and Critical Control Point (HACCP-IS-15000:1998) Certificate from AQSR India Pvt. Ltd., New Delhi
- Production increased from 8.08 lakh (01-02) to 19.66 lakh doses (07-08).
- AI increased from 10.05 lakh (01-02) to 19.32 lakh (07-08)
- Self employment to 2816 Educated Unemployed Youths as Prani Bandhuss
- Calf births increased from 3.09 lakh (01-02) to 6.71 lakh (07-08)
- Expansion of AI centres from 3699 (01-02) to 5529 (07-08)
- Assured Cold Chain Management for supply and storage of Liquid Nitrozen (LN_2)

(g) **Development initiatives of W B Co-op. Milk Producers' Federation Ltd**

- Formation of Primary Milk Producers' Co-op Societies (MPCS) – 3262
- Formation of Women MPCS – 593(women membership – 556723
- Average Milk Procurement per day – 3.23 kg

(h) **Development initiatives of WB Livestock Development Corpn. Ltd**.

- Supply of chicks to women self-help groups
- Marketing of poultry meat (turkey, quail, cockrel, ducks), rabbit meat
- Marketing of govt.milk products through various outlets

(i) **Development initiatives of WB Dairy & Poultry Dev Corpn. (DAIRPOUL)**

- Manufacture and distribution of livestock, poultry and fish feed
- Annual Sale of feed around 34000 MT

Milk Production in West Bengal: West Bengal has made significant progress in the development of animal resources, particularly in the production of milk. But despite such progress, the State is a milk deficit State. Milk Production in West Bengal during 2007-08 was as under;

Unit	Requirement	Production	Achievement
Lakh MT	57.47	40.77	71%

The following data reflects the estimated milk requirement in 2015 vis a vis the present level of production;

Production of milk Required in 2007 (Lakh MT)	Actual production of milk in 2007 (Lakh MT)	Production of milk required in 2015 (Lakh MT)	Additional milk production required (Lakh MT)
57.47	**40.77**	**64.55**	**23.78**

As the above data shows, the milk yield should go up by another 23.78 lakh MT to meet the demand in the year 2015-16. It has been seen over the years that in spite of increase in the production of milk every year, the demand is increasing at a faster pace. In other words, production from the poor milk yielders has not been sufficient to keep pace with the annual growth of population. Increase in milk production at this rate will take a number of years to eliminate the gap that exists between requirement and availability of milk. Hence it is necessary to adopt special measures and bring in huge investments for a period of five years to eliminate the shortfall and to maintain steady production thereafter.

Keeping in view the zero-deficit target set forth, the major activities that need to be taken up for increasing required milk production in this state can be grouped as follows:-

A. Maintaining the present trend of increase in Artificial Insemination (A.I.) of Cattle and Buffalo throughout the State.

B. Massive induction of good quality, better productive cows and buffaloes through different schemes.

C. Establishment and strengthening of infrastructure required to maintain the A.I. and Calves Born targets.

D. Introduction of newer up-to-date technologies for production of only female calves.

E. Establishment of large-scale Dairy Processing Units

F. Mass Automatic Milk Collection Units at Gram Panchayat level.

G. Introduction of technologies in Fodder Development including fodder development under Social Forestry Scheme, By-Pass Fodder Development, Preservation of fodders, Social Pasture, Land Development programme etc.

H. Development of genetically potent productive milch cows.

I. Review and introduction of Acts and Rules for legalization of Cattle Slaughter, Beef production including export thereof.

The state has poor infrastructure on milk collection and milk processing. The state govt. aims to strengthen the milk collection infrastructure by establishing bulk coolers and milk collection centres. The bulk coolers and milk collection centres will be managed by the milk societies and milk union will manage the milk processing centres. The three major dairies – Mother Dairy, Metro Dairy and Central Dairy procure skimmed milk powder (SMP) valuing about Rs. 200 crore per annum from other states. In order to resolve this problem and to increase milk processing in the state, Govt. should encourage private investment for establishment of skimmed milk powder units under PPP model.

The Govt. has established a network for procurement of surplus milk through a three tier cooperative system and processing and sale of processed milk in the diaries. The total amount of processed milk sold is about 10 lakh litre per day. Most part of it is marketed by Mother Dairy, Metro Dairy, Amul, and Central Dairy and then there are large no of small dairies. Amul is getting them processed in some local captive diaries. The diaries under milk directorate are old and are making huge losses mainly due to financial constraint, poor work culture and inflexibility in the management of Govt. diaries.

Feed & Fodder Production Scenario in West Bengal

Fodder: West Bengal is a state where Livestock forms an integral part of the farm. Livestock population is a part and parcel of the rural community and therefore livestock improvement through nutritional development is of utmost importance. West Bengal is a fodder deficient State. There exists a considerable gap between feed & fodder requirement and its availability in West Bengal. The demand has further increased due to introduction of cross breeding programme in a large scale in the State.

There are certain limitations are responsible for the above situation in the State, which are:

a.) Non availability of fodder land (Only 1.18% cultivable lands are used for fodder cultivation against 4.6% of national average).

b.) Availability of very limited pasture and grazing land (0.77% of the total land)

c.) Acute shortage in availability of quality fodder seeds in the State.

d.) Lack of awareness among the cattle owner/farmers about fodder cultivation.

Feed: Feed is the most important single item that accounts for more than 70% to 75% of the recurring cost of a farm. Production of main ingredients for feed, particularly maize, is insignificant in West Bengal resulting in fewer numbers of feed manufacturing units. Another important ingredient is soya bean which is not grown in the State. Farmers, especially in North Bengal, may be encouraged to grow maize in more land to meet the demand.

The following table depicts the production vis a vis the requirement of feed ingredients;

Feed ingredients (Requirement, Availability, Deficiency) in West Bengal				
Items	**Requirement ('000 tonnes)**	**Production ('000 tonnes)**	**Deficiency ('000 tonnes)**	**% of Deficiency ('000 tonnes)**
Green fodder (%)	37890	154	37736	-99.6
Concentrate (%)	11310	1541	11236	-87.93
Dry fodder (%)	15385	23547	8161	53.04
Cereal grain (%)	2555.61	224.74	2330.87	-91.21
Oil cakes (%)	2555.61	382.20	2173.41	-85.04
Pulse by products (%)	1277.80	22.70	1255.10	-98.22
Bran (%)	6005.67	1083.15	4922.52	-81.96

As revealed in the above table, there is deficiency in all the feed ingredients.

Areas of Concern

(a) Increasing AI coverage of breedable animals

- The State doesn't have recognised breed of cattle or buffalo, however, the indigenous cattle produce 61% of the milk
- The indigenous cattle are poor milk yielders (1.9 kg/day)
- The share of crossbreds in the total cattle population is only 12%. However, the share of CB breedable females is around 19%
- The present coverage of breedable females is around 17%
- It is a mammoth task to increase the coverage of breedable females
- Even at 30 lakh AI per annum the coverage will be around 25%

(b) Shortage of feed and fodder

- There is a rise in demand for feed and fodder, especially due to increasing crossbred population
- The State is a fodder deficit State
- The fodder requirement is around 615 MT/year
- As against these, availability is only 248 MT (40%)

- The area under permanent pastures and other grazing land is less than 0.1 per cent of the total reporting area
- The fodder land is only 1.08% in West Bengal
- There is acute shortage of good quality fodder seeds in the State
- The two main feed ingredients viz., maize and soybean are required to be imported from other States as the State does not produce them

(c) Animal diseases - some of the contributing factors of animal diseases are:

- Low hygienic standard
- Improper Housing
- Malnutrition
- Inadequate veterinary facilities *vis-à-vis* livestock *population*

Dairy sector in the state is in the hands of small & marginal households. As per Livestock Census, 1971, 20% of the total milch cattle were in the hands of the small and marginal farmers but as per Livestock Census, 2003, the figure has shot up to 52%. Presently, 85% of the total milk production in the state comes from these small and marginal farmers.

Certain developments have taken place that has placed the agricultural activities in a disadvantaged position like rising cost of inputs, low share of farmers' income in the consumers' rupee, price volatility, natural calamities, absence of adequate risk mitigation measures etc,.

Against this backdrop, animal husbandry activities can play a crucial and important role as providing a means for alternative livelihood, especially for small and marginal households. Rate of employment in the agricultural households being low, the significance of development of animal resources have increased. During the period from the 70's to 2005, average rate of employment in the development of animal resources has been 4% annually; during the same period, the agriculture has registered 1% employment growth annually. In the State, through rearing of animals and birds, total direct employment of about 18.97 lakh of people has been ensured while another 52.84 lakh of people are in indirect employment in the secondary and tertiary sectors. As a result, animal resources development has proved to be effective means of alternative livelihood to the rural agricultural community.

5.4.2 POULTRY DEVELOPMENT

The 1st Government poultry farm under British rule was established at Ranaghat in the year 1940. In the year 1949 a poultry breeding station was established at Haringhata Farm and there after a number of State Poultry farm and Poultry / Duck Multiplication and extension Centre were established in West Bengal to supply quality pure bred chicks/ ducklings in West Bengal. After mid 80's there was boom in unorganized entrepreneurship. However, after 90's organized corporate sector steps in to the poultry business.

In India egg production was 1832 million nos and per capita availability of egg was only 5 nos per year during 1950-51. While egg production of West Bengal during 1951 was 141.3 million nos and the per capita availability was 5 nos, with enhanced production of 46,166

million eggs during 2005-06 per capita per year availability of egg was increased to 42 nos in our country and currently per capita per year availability of egg are 35 nos in West Bengal.

Currently in the country, per capita availability of poultry meat is 1.76 kg per year while the recommendation of the Nutritional Advisory Committee, Govt of India is 11 kg and the world average consumption of poultry meat was 10.9 kg and 147 eggs respectively.

West Bengal holds 3rd position in respect of total poultry population, while standing 6th in the production of eggs (2006-07) in the country. About 25% of the total egg production in India comes from desi poultry while 56% of total eggs are produced from desi fowl, 12% from improved fowl and 32% by duck in West Bengal as estimated during 2006-07. In West Bengal desi fowl population is around 55.47%, duck 25.48%, improved fowl 18.26% and other poultry birds 0.79% respectively. But eggs are produced from the nondescript 'Deshi' poultry, productivity of which is very low as compared to the high yielding commercial variety, which are around 300. The growth of intensive poultry production in respect of layer in the state is limited due to high investment and non-availability of the major feed ingredients such as Maize, Soya, and Ground nut cake etc. At present, about 12 Millions of eggs are brought regularly from the States of Southern India to meet up the internal requirement of the State. To minimize the dependency over other States and to increase the availability of eggs in the State of West Bengal, schemes are required to be undertaken to encourage commercial layer production in this State.

A large no of eggs consumed in the state are obtained from Andhra Pradesh. Two pronged approach is required to increase egg production- first, to increase egg production through promotion of layer farms and second approach is to promote back yard poultry.

Poultry Population in West Bengal (2003 Livestock Census)

Year	Fowl			Duck			Others	Total
2003	Deshi	Improved	Total	Deshi	Improved	Total		
	283.54	93.32	376.86	125.91	4.33	130.24	3.83	511.15

Poultry Population in West Bengal (Projected)

Year	Fowl			Duck			Total
	Deshi	Improved	Total	Deshi	Improved	Total	
2005-06	292.58	103.84	396.43	128.07	4.28	132.35	528.78+others
2006-07	297.21	113.51	410.72	129.46	4.33	133.79	544.51+others

Egg Production in West Bengal

Egg production in West Bengal (in millions)								
Year	Fowl			Duck	Total egg production	Requirement	Deficit	Shortfall (%)
	Desi	Improved	Total					
2000 - 01	1312	449	1761	921	2682	7982	5300	66.4
2001 - 02	1356	432	1788	922	2710	8070	5360	66.4

2002 - 03	1357	437	1794	956	2750	8182	5435	66.4
2003 - 04	1412	453	1865	955	2820	8290	5470	66.0
2004 - 05	1462	520	1982	906	2888	8402	5514	65.6
2005 - 06	1529	451	1980	984	2964	7442	4478	60.2
2006 - 07	_	_	_	_	3039	8633	5594	64.8
2007 - 08	_	_	_	_	3057	8747	5690	65.1

Areas of Concern & Strategies

- During the last 08 years, there is consistent decrease in profit margin for the poultry farmers (except for the year 2003-04). The production costs and Ex-farm broiler prices (Rs. per kg.) are as under:-

Year	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08
Cost	28.00	28.50	29.00	30.00	32.00	34.00	34.50	38.00
Price	34.25	32.92	33.10	33.17	34.70	35.15	35.33	36.47
% Profit	22.32	15.51	8.76	10.57	8.44	3.38	2.41	(-)4.03

The profit margin in poultry is largely influenced by prices of feed ingredients. In the feed composition, 60-65% of the ingredients are for supplying energy and, among these; the most important ingredient is maize. Bringing more areas under cultivation of maize, shall definitely help reduce the cost of production of poultry birds. Farmers, especially belonging to North Bengal, may be encouraged to take up maize farming in a greater way. The price of maize during harvesting season is less by more than 33% and, as such, adequate arrangement for procurement, storage and proper distribution thereof will go a long way in increasing profit margin. For this purpose, adequate credit support to poultry farmers is essential.

- As far as production of eggs is concerned, organised layer poultry contributes only 16% and the productivity of these layer chickens stands at only 227 per annum. Most of the eggs (about 50%) are produced by indigenous chicken. Backyard ducks contribute about 34% of the total eggs produced in the state. Backyard farmers in this State produce 84% of the eggs. Productivity of indigenous chickens and ducks is only 99 and 100 respectively. Due to a series of outbreak of Avian Influenza in West Bengal in the recent past in backyard poultry where the main focus area was the free range system of rearing, a sudden resultant drop in egg production was observed. It is to be mentioned here that the contribution of organized sector was only 16% to the total egg production. At present the commercial layer can produce nearly 300 eggs in a laying cycle, while the productivity of Deshi fowl varies from 50-100. It is not possible to make the state self-sufficient in respect of egg production unless special attention is paid for the establishment of big organized commercial layer farms.
- Due to constant threat of Avian Influenza, the rearing system of poultry should be changed. It is considered extremely essential that a transition from traditional to semi-intensive system of rearing be effected as early as possible for ensuring bio-

security. To make these backyard farmers acquainted with the proposed system of rearing and to reduce the health hazards in future, it is proposed that assistance in the form of development of infrastructure, supply of concentrate feed, cost of vaccines and medicines may be extended to them in order to enable them to get over from the age old practice of free range system of rearing.

- Creating good network of diagnosis, treatment and control of diseases is also required

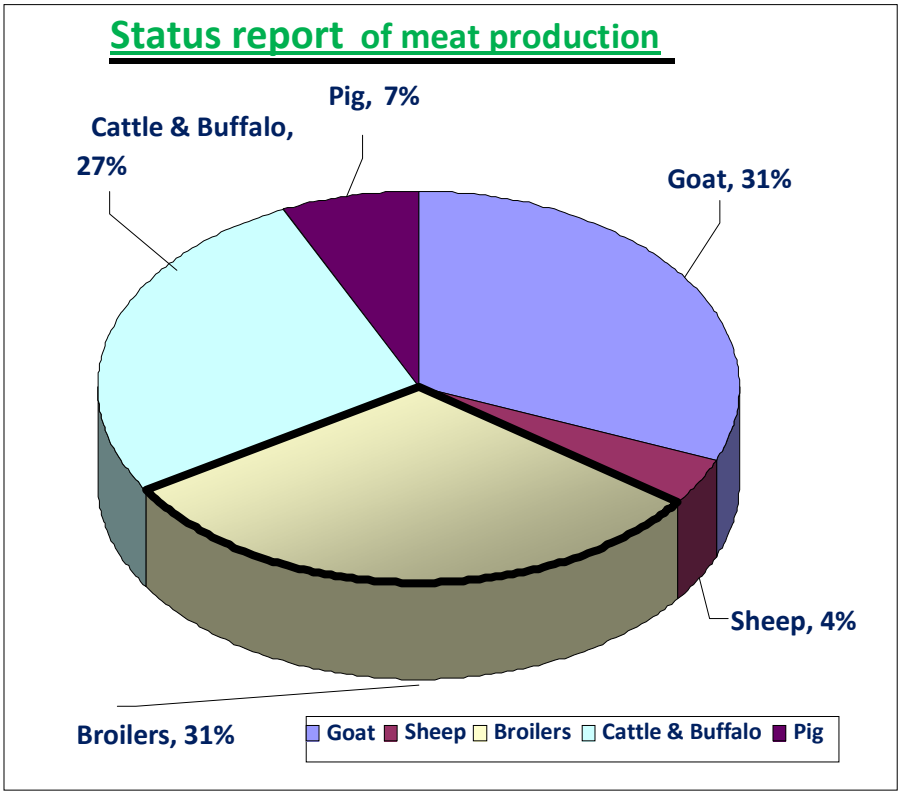
- Capacity Building of farmers through extension, publicity, training, exposure visits

5.4.3 MEAT PRODUCTION IN WEST BENGAL

The State of West Bengal ranks first in the production of meat but there still exists a wide gap between demand and production of meat as the majority of the people in this State are non-vegetarian. The total meat production in the State was 5.14 Lakh M.T. during the year 2007-2008 while the internal requirement had been estimated at 9.00 Lakh M.T. Goat meat and broilers are mainly in demand in the State.

Status Report of Production

Sl. No.	Type of Animal	Production Per cent
1	Goat	31%
2	Sheep	4%
3	Broilers	31%
4	Cattle & Buffalo	27%
5	Pig	7%
TOTAL		**100%**



Available infrastructure

The common infrastructure available in the state for the development of the sector is as follows:-

(i) Sheep

- Sheep Breeding Farms - One at Kalyani (Nadia)
- Sheep farms - Two at Seayeedpur (Midnapur) and Lokpur (Bankura)
- Ram Production Unit - One at Seayeedpur (Midnapur)
- Sheep Extension Centre - One at Ranjitpur (Bankura)

(ii) Goat

- Goat Multiplication Farms - One at Seayeedpur (Midnapur)
- Goat Farms - Five at Baramahulla, Suri (Birbhum), Kalyani (Nadia) - SBF & SLF, Bishnupur (Bankura), Bardhaman
- Buck Production Unit - One at Adina (Malda)

(iii) Rabbits -

- Rabbit Breeding Farms - Fourteen at Contai (Midnapore), Midnapore, Kalyani (Nadia), Gobardanga (North-24-Parganas), Baramahulla, Suri (Birbhum), Bankura, Baliguri (Hooghly), Mohitnagar (Jalpaiguri), Purulia, Beldanga (Murshidabad), Naxalbari (Darjeeling), Bardhaman, Durgapur (Bardhaman), Cooch Behar.

(iv) Processing Facilities for sheep/goat/rabbit products

- There are two modern abattoirs at Durgapur (Bardhaman) and Mourigram (Howrah). The management and supervision of these abattoirs is with West Bengal Livestock Development Corporation.
- Besides this, there are 11 registered slaughter houses at Darjeeling (4) Uttar Dinajpur (1), Murshidabad (1), Kolkata (3); Purulia (1), Bardhaman (1) & 21,063 unregistered slaughter houses (meat shops for animals/birds).

Development initiatives: Under the "National Ram/Buck Production Programme and programme for Rabbit Development", GoI had sanctioned grant for development of these species. Various schemes on the lines of this programme are being implemented in the State. Under the Centrally Sponsored Scheme "Conservation of Threatened Breeds of Livestock", conservation project for four breeds have been sanctioned in favour of Govt.of West Bengal. These include; two projects covering Bonpala and Garole Sheep, one for Black Bengal Goat and one for Ghoongroo Pig. The projects for Bonpala Sheep and Ghoongroo Pig are implemented by West Bengal University of Animal and Fishery Sciences while the Black Bengal Goat and Garole Sheep Projects are under implementation by Animal Resources Development Department. The total GoI assistance available for these projects was to the tune of Rs.1.76 crore. The components under the scheme covered establishment of breeding farm with 500 breedable females of sheep/goat and 40 breedable sows under pig. The project for Black Bengal Goat is being implemented at Kotalpur (Bankura) and for Garole Sheep in Sundarbans area. The taget of meat production from 2010-11 to 2014-15 is detailed below;

TARGET OF MEAT PRODUCTION FROM 2010-11 TO 2014-15							
Year	**No. of additional animals to be generated for meat purpose**			**Additional meat to be produced ('000 MT)**	**Production as per present growth rate ('000 M.T.)**	**Total meat to be produced ('000 M.T.)**	**% of growth rate**
	Goat & Sheep	**Broiler**	**Pig**				
2010-11	133500	1000000	381	2.59	575.77	578.36	0.45%
2011-12	140175	1050000	400	2.72	604.56	607.28	0.45%
2012-13	147184	1102500	420	2.86	634.79	637.64	0.45%
2013-14	154543	1157625	441	3	666.53	669.52	0.45%
2014-15	162270	1215506	463	3.15	699.85	703	0.45%
GROWTH AFTER FIVE YEARS					575.77 (at the start of the 1st year)	703 (at the end of the 5th year)	22.10%
GROWTH PER YEAR							**4.42%**

Strategies for Development

The State is naturally gifted with a good stock of Black Bengal Goat, Garole Sheep and Ghungru Pig. Bengal Goat produces meat with excellent taste and precious leather from its skin. The presence of high fecundity factor makes the breeds like Bengal Goat, Garole Sheep and Ghungru Pig for evolution in any adverse environment. There is tremendous scope for future improvement of these breeds in respect of meat production. Genetic up-gradation programme of Garole Sheep, Bengal Goat and Ghungru Pig involving SHGs in the State of West Bengal has to be given utmost importance.

In view of the aforesaid facts, the following programmes may be taken up for enhancement of meat production, as well as of generation of employment:

- Goat Farming (Bengal Goat)
- Sheep Farming (Garole Sheep)
- Pig Farming (Ghungru Pig/ Improved breed)
- Broiler Farming
- Meat processing plants
- Male exchange programme of Black Bengal goat to arrest inbreeding depression

Up gradation of Veterinary Services in West Bengal

Livestock cannot perform well unless they are maintained in a good state of health. The State Government has been extending Veterinary care services both at institutional level (i.e. Polyclinic, SAHC, BAHC, ABAHC and ADAC) and by organizing Health Camps, Vaccination Programmes, and Fertility Camps etc.

At present in the State of West Bengal, the organizational set up in connection with Veterinary care services includes 19 District Veterinary Hospitals, 91 State Animal Health Centres, 341 Block Animal Health Centres, 271 Additional Block Animal Health Centres, 3247 Animal Development Aid Centres, 36 Veterinary Pathological Laboratories and 4 Veterinary Polyclinics. The State Government has also taken an important decision to establish 1 (one) Polyclinic in each district by way of conversion of District Veterinary Hospitals to Veterinary Polyclinics.

Veterinary Services (2007-08)

Sl. No.	Item	Unit	Achievement (P)
1	Animal & Birds Treated	Lakh	98.65
2	Animals & Birds vaccinated	Lakh	83.84
3	Health Camp Organised	No.	7698
4	Cased treated in health camp	Lakh	16.18
5	Vaccination done in Health camp	Lakh	21.63

For upgrading the existing Animal Health coverage set-up, the following facilities may be created in the state by 2012-13;

1. Establishment of additional 506 numbers Animal health Centres by up-gradation of Animal Development Aid Centres so that 1 (one) Animal Health Centre on every 3 Gram Panchayat area may be available to render treatment and preventive measures of livestock and birds.

2. Establishment of 13 (thirteen) Polyclinics (considering 1 in each district) by way of conversion of District Veterinary Hospitals to Veterinary Polyclinics. This institute will act as Referral Hospital and Diagnostic Centre at district level. It may be stated here that 4 (four) Veterinary Polyclinics have already been established and another 2 (two) will be established taking fund from RIDF.

3. Establishment of additional 19 Pathological Laboratories at existing State Animal Health Centre campus where such laboratories do not exist. These laboratories are very much needed at Sub-Divisional level in connection with Pathological works and disease diagnosis.

4. Up-gradation of existing 91 SAHCs to develop updated treatment facilities.

5.5 FISHERIES DEVELOPMENT IN WEST BENGAL

West Bengal is one of the leading fish producing states in the country and the largest producer of fish seeds in the country. In the inland fishery sector, West Bengal accounts for 30% of the all India fish production. Its share of the all India fish seed production is 62%. Total fish production in the State has increased from 14.71 lakh tonne in 2007-08 to 14.84 lakh tonnes in the year 2008-2009. Fish seed production has increased from 13,475 million in 2007-08 to 14,000 million in the year 2008-09.

There is significant increase in the export earnings from the sector as it grew from Rs. 50 crore in 1987-88 to Rs.725 crore in 2008-09. The major commodity in export is shrimp. The State has already emerged as the fourth largest State in the country's total exports despite having a small coastline of 150 km.

The micro-finance programme under fisheries in the State has also made rapid strides in recent years. Since the year 2003-04, a total of 8125 SHGs have been formed with total members of 85,240. As against 8125 groups, 4250 groups have been credit linked and 3885 groups have taken up economic activities through project lending in fisheries sector.

The significant growth of the fishery sector in the State over the last two and a half decades has been possible primarily because of the development strategy followed by the State Government. The basic strategy has been to bring under scientific pisciculture existing fisheries and also new water bodies. The financial returns from pisciculture have increased. This has encouraged farmers in increasing numbers to take up pisciculture.

Fisheries Resource Potential in West Bengal

Fishery sector	Total Potential Resources (lakh ha)	Under Culture (in lakh ha)	% of Resources (Area under culture)
(a) Inland Sector			
Ponds/Tanks	2.76	2.2	79.71
Beel and Baor	0.41	0.21	51.21
Reservoir	0.16	0.03	18.75
River	1.72	0	0
Canal	0.8	0	0
Sewage Fed Fishery	0.04	0.04	100
(b) Brackish Water Fishery	2.1	0.48	22.85
Total	7.99	2.96	37.04

As evident from the above table, there is still considerable scope for further utilization and exploitation of fisheries resources in the State. There are still large areas of water bodies in the State which are not being utilized to their full potential for pisciculture. West Bengal has the largest impounded brackish water resources in India. The State Government has set up Brackish Water Fish Farmers' Agencies (BFDAs) in the three coastal districts of Purba Medinipur, both North and South 24-Parganas in order to promote scientific pisciculture in the brackish water area, the potential area being 2.10 lakh ha. So far only 0.54 lakh ha has been developed, of which 0.32 lakh ha is under traditional system of 'Bhery" farming. Most of the Bhery farms are located in both North and South 24-Parganas districts whereas improved farming practices are prevalent in Purba Medinipur district. In order to increase productivity in beels, the State Government proposes to develop the beels by desilting and undertake pen culture. Pen culture would allow two crops a year as each culture period vary between 4 to 6 months. Cage culture is also proposed to be introduced for air breathing fishes in reservoirs. These measures are expected to increase productivity significantly in these large water bodies in the coming years. The State Government has formed Fish Farmers' Development Agencies (FFDAs) in each district to promote scientific pisciculture in fresh water bodies like ponds and tanks. FFDAs have promoted and popularized advanced pisciculture methods among fish farmers. FFDAs have also encouraged fish farmers to adopt these methods through arranging of short term credit, providing insurance coverage and imparting training to existing and potential fish farmers. The coverage of water area by FFDA as on 31 March, 2009 is 1,23,900 ha, including 4,237 ha of Jhora fisheries in Hills and 311 ha under ornamental fish farming.

Productivity of water bodies covered by FFDAs water bodies and non FFDAs, presents the following picture:-

Year	Productivity (Kg / year / ha)	
	FFDA Ponds	Non FFDA Ponds
2003-04	3173	1800
2004-05	3275	1850
2005-06	3970	2400

2006-07	4010	2650
2007-08	4205	2790
2008-09	4350	2875

Production in West Bengal

Fish Production: The total fish production from various sectors during last 5 years is presented below:-

Sl No	Fish Production (lakh tons)	2004-05	2005-06	2006-07	2007-08	2008-09
1	Inland Fish	10.350	10.900	12.150	12.530	12.95
2	Marine fish	1.795	1.600	1.540	1.520	1.890
3	Total	12.15	12.50	13.69	14.05	14.84
4	Demand	12.09	12.31	13.00	13.46	14.44
5	Gap	(+)0.06	(+)0.20	(+)0.69	(+)0.59	(+)0.40

Therefore, the production has overtaken the demand since 2004-05 and is steadily increasing.

Fish Seed Production: The total fish seed production from various sectors during last 06 years is presented below:-

Sl.No	Year	Fish Seed production (million)
1	2003-04	10,000
2	2004-05	12,200
3	2005-06	12,500
4	2006-07	12,852
5	2007-08	13,475
6	2008-09	14,000

Although West Bengal contributes about 62% of the total fish seed production in the country, more number of hatcheries and seed banks should be established to ensure availability of fish seeds at the pond site throughout the year.

Shrimp production:

Sl.No	Year	Shrimp Production	
		Brackish water	Marine water
1	2003-04	59040	18840
2	2004-05	59231	20000
3	2005-06	67166	18000
4	2006-07	76254	17894

As evident from above, shrimp production through culture source is steadily increasing, while the capture one is declining.

Export: The export growth of marine products from West Bengal *vis-a-vis* India is presented below:-

Year	India		West Bengal		Share of W. Bengal (%)	
	Quantity (MT)	Value (Crores)	Quantity (MT)	Value (Crores)	Quantity (MT)	Value (Crores)
2003-2004	467297	6881.31	18001.0	562.00	4.02	8.16
2004-2005	461329	6646.69	18492.0	521.13	4.00	8.62
2005-2006	512164	7245.30	18291.0	537.95	3.57	7.42

(Source : MPEDA)

Developmental Initiatives

FFDAs : Around 85 thousand hectares of a total of 2.76 lakh hectares of impounded water bodies in the State are either derelict or semi-derelict. FFDAs have been successful in bringing under fish culture some of these derelict/semi-derelict water bodies. Till 2005-06, FFDAs have covered 1.239 lakh hectares of water bodies.

BFDAs : BFDA have, till date, developed 7520 ha of brackish water area. Fish Farmers under BFDA have adopted improved traditional methods of culture. In most of the farms, shrimps along with other brackish water fish species are also being cultured.

Fishermen Co-operative Societies : There are 1162 Primary Fishermen's Cooperative Societies in the inland fisheries sector of which 485 belongs to Category A (Functional), 214 belongs to Category B (Non functional but having potential to be revived) and 223 are non-functional & inactive. In the marine sector, there are 240 primary fishermen co-operative societies, while 169 functional societies are there undertaking ornamental fish farming. There are also 20 Central Fishermen's Cooperative Societies. In the marine sector, the State Government promotes cooperatives of marine fishermen and arranges for credit under NCDC scheme for procuring mechanized fishing vessels. At the apex of all such fishermen's cooperatives is the West Bengal State Fishermen's Cooperative Federation (BENFISH).

Ornamental fisheries: The State has also taken up a programme of development of ornamental fisheries for culture of what it is commonly known as aquarium fish. Under NCDC programme, three districts namely South 24-Parganas, Howrah and Uttar Dinajpur have been covered. The State Government proposes to promote ornamental fish units in each block in the State. Till the end of 2008-09, 1570 ornamental fish units have been set up.

SHGs: SHGs are playing a very active role in various fishery activities. As on March 2009, there are 6782 SHGs supported under SGSY programme in the fisheries field out of which 5558 numbers have passed Grade I, while 1722 have passed Grade II. There are 3885 groups which have taken up economic activities like composite fish farming, integrated fish farming, crab fattening, waste-water fed fisheries, ornamental fish farming & preparation of ready to eat food etc.

Infrastructure Development: The State Government has been developing the infrastructure for both the inland and the marine fishery sector. Till now, 05 minor fishing harbours, 78 fish landing centres, 04 diesel outlets, 02 cold chain marketing units, one barge jetty, 07 boat building units, 26 RCC bridges, 489 tube wells, 1650 km. of village roads, 70 community halls, 02 auditoriums, 04 fish aquaria, 11 distress shed, 16 flood shelters, 13 ice plants, 24 Fishery Training Centres, 05 fish markets have been constructed. The State Government has also taken up a programme for electrification of fish landing centres and fishermen's villages with the help of West Bengal Renewable Energy Development Agency/RIDF/WBSEB. Around 40 villages have been covered under the programme.

Leasing Policy:

Inland water bodies: Up to 5 ha vested khas pukur (Govt.water bodies) are being leased out by Gram Panchayats/Panchayat Samities to Fish farmers/Fish cooperatives/Fish production groups with a lease period of 3-5 years. Above 5 ha vested khas pukur (Govt.water bodies) are being leased out by Additional District Magistrates of Land & Land Reform to Fishermen/Fish cooperatives/Fish production groups with a lease period of 3-5 years. The lease rent is finalized by Assistant Director of Fisheries on the basis of last five years' potentiality of the water bodies.

Brackish water bodies: No clear-cut land lease policy for leasing out land for aquaculture development has been a bottleneck in the development of potential areas for shrimp culture. Most of those lands, which can be brought under culture, are Government lands. Several thousand hectares of such potential areas, which are suitable for shrimp culture but unfit for agriculture operation, are lying idle. This has resulted in encroachment and development of other areas for shrimp aquaculture.

So far no sincere attempt has been made to survey the available areas to evaluate their parameters and categorize them for shrimp aquaculture purpose.

Infrastructure Requirement (in lakh) : Infrastructure needs to be developed under support from Government as well as through private initiatives. An estimate has been for infrastructure requirement upto the end of 11th Five Year Plan period as listed below:-

A. To be supported by Govt

(Rs. lakh)

Sl.No	Infrastructure	Physical units	Financial requirement
1	Modern Fresh water prawn hatchery	5	67.50
2	Ornamental fish hatchery	5	500.00
3	Mud crab hatchery	1	400.00
4	Modern Aqua feed plant	2	420.00
5	Hi tech soil & water testing laboratory	5	250.00
6	Modern Fish markets	50	300.00
7	Ornamental fish market	5	440.00
8	Trining-cum-information centres	5	2500.00
9	Development of Beels & Baors	500 Ha	1250.00
	Total		**6127.50**

B. To be supported by Private initiative / Bank Credit

(Rs. lakh)

Sl.No	Infrastructure	Physical units (No)	Financial requirement
1	Fish seed hatchery	15	175.00
2	Fish Seed rearing Units	160	240.00
3	Small scale Fresh water prawn Hatchery	15	70.50
4	Small scale Ornamental fish hatchery	5	500.00
5	Ice plants	25	375.00
6	Cold storage	25	150.00
7	Small scale Dry fish units	80	100.80
8	Aqua feed plant	22	220.00
9	Mobile laboratory	10	70.50
10	Vans with insulated boxes	10	150.00
11	Mobile marketing vans	100	100.00
12	Net Making plant	5	50.00
13	EU standard processing plants	2	7500.00
14	Mahua oil extraction plant	2	2.00
	Total		**9703.80**

Govt may initiate suitable actions to meet the above infrastructural requirements indicated at A) above. Banks should come forward to meet the credit requirement assessed at B) above.

Issues & Action Points for Promotion of Fisheries in West Bengal

1. Most of the large fish ponds have been silted up. De silting work may be taken up.

2. Hatcheries for fresh water prawn, mud crab, ornamental fishes need to be set up in the state under both public/ or private sector. Adequate awareness needs to be created among all private hatcheries to follow appropriate breeding protocol to arrest possible inbreeding.

3. The present fish insurance scheme does not take into consideration the partial loss and hence is not very popular among farmers. Absence of attractive fish insurance scheme also hampers the flow of institutional credit. There is need for an attractive insurance scheme as well as willingness of insurance agencies to reach out to the farmers.

4. All technological interventions must be taken advantage by farmers. Towards this end, awareness creation, capacity building measures like regular trainings, exposure visits, promotion of fish farmers' Clubs may be promoted for effective technology transfer.

5. Fisheries, being a seasonal activity, seasonality discipline need to be adhered to, while financing fisheries cases.

6. Non-availability of adequate & timely credit hampers the development of the sector. Coordination between banks and department needs improvement, supported duly by proper review. There is a need at district level to create awareness regarding the alternate credit delivery mechanisms like SHGs and Joint Liability Groups for facilitating small fish farmers who are not in a position to offer adequate collateral securities to avail bank credit.

7. There is need to strengthen Fishermen Cooperative Societies and also promote Fish Producers Group, SHGs and Farmers' Clubs.

8. More thrust needs to be given to the development of seasonal water bodies to undertake air breathing fish culture and raising of advanced fingerlings. Simultaneously, hatcheries of select air-breathing fishes may be established. Seed banks may be set up in the State to ensure steady supply of fish/ prawn/shrimp seeds. Formulation of short duration carp culture scheme involving stunted fish fingerling for flood prone zones, may be popularised

9. Special emphasis for the extension of integrated fish farming especially poultry/duck/pig/dairy/paddy-cum-pisciculture with horticulture and seasonal vegetables on the embankments, may be given. This will encourage organic fish farming and simultaneously utilize and treat a number of organic wastes including domestic sewage thus enabling eco-restoration.

10. Since the farming techniques adopted in the State are based on extensive farming, matching commercial feed at suitable price needs to be made available. Farmers should be trained properly to prepare on-farm feeds using locally available ingredients. An assessment of nutritional input from natural/endogenous food to target species should be made to avoid wastage of prepared on-farm feeds.

11. Diversification of freshwater aquaculture involving high value species such as Magur, Koi, Pabda, Tangra, Pangasius etc, may be undertaken.

12. With a view to supplement the public extension, selected youths may provide farm based extension services relating to breeding, seed raising, soil-water testing, disease diagnostic and other technical services akin to Prani Bandhu in the Animal Resource Department and Krishi Bandhu in the Agriculture Deptt.

13. In brackish water aquaculture farms, the major expenditure is for water intake and outlet channels. The State Government may explore the possibilities of providing such infrastructure.

14. There is scope for improving the fisheries marketing infrastructure in the State. For effective marketing, State Government may establish adequate district wise hygienic fish markets and fix the minimum price of fish. Marketing federation is necessary to equip fish farmers with market related information at par with "Chuapals" in Andhra Pradesh.

5.6 RESEARCHABLE PRIORITIES- ALLIED SECTORS

Horticulture, Animal Husbandry and Fisheries

Strategies for Integrated Nutrient Management

No.	Strategies proposed for extension	Extension	
		Thrust Area	Activity proposed
1	Popularization of concept of INM in vegetable crops for increasing production	Awareness building on concept of INM in vegetable crops.	Mass media campaign Demonstration Training Development of electronic package Exposure visit
1	Production of bio fertilizer for cultivation of vegetable crop for increasing farm income	Promotion of bio fertilizer for enhancing quality of vegetable crops	Mass Media campaign Training Demonstration Development of electronic package Exposure visit
3	Popularization of concept of INM in fruit crops for enhancing quality of fruit crops for increasing farm income	Capacity building on INM in fruit crops	Mass media campaign Demonstration Training Exposure visit

Strategies for Integrated Pest Management

Sl. No.	Strategies proposed for extension	Extension	
		Thrust Area	Activity proposed
1	Popularization of concept of IPM in vegetables for increasing production	Awareness building on IPM in vegetables	Awareness campaign Demonstration Training Formation of farmers groups& Exposure visits Development of electronic package
2	Emphasising standardization of IPM module on brinjal against sap feeder and fruit & shoot borer for increasing production	Standardization of location specific IPM module against sap feeder and fruit & shoot borer of brinjal	On farm trial F.L.D.
3	Emphasizing effective management of bacterial wilt of Solanaceous vegetables for increasing	Standardization of methodology to manage Bacterial wilt disease	On farm trial Front line demonstration Development of electronic package

	production		
4	Emphasizing on effective management of nematode of cucurbitaceous, solanaceous vegetable and tuberose to enhance productivity	Creating awareness on effective management of nematodes	Mass awareness campaign Demonstration Training
5	Popularization of concept of IPM for effective management of Mites in vegetable crops	Creating awareness on effective management of mites through IPM practices	Training Demonstration Mass awareness campaign
6	Emphasizing effective management of soil borne diseases of vegetables to increase production	Creating awareness on effective management of soil borne pathogens through IPM and soil health management practices	Training Demonstration Mass awareness campaign
7	Popularization of concept of IPM for effective management of pest disease of Mango to enhance production as well as quality	Creating awareness on pest and diseases of mango and their effective management	Mass awareness campaign Training Demonstration
8	Increasing production of Banana by effective management of Sigatoka, Panama wilt and Moko diseases through IPM practices	Creating awareness on management of sigatoka, Panama wilt and Moko diseases of Banana	Mass awareness campaign Training Demonstration

Proposed Strategies for Research- Animal Husbandry

No.	Strategies proposed for Research	Thrust Area	Activity proposed
1	Emphasising Research to reduce Infertility and repeat breeding problem of dairy animals.	Identification of etiological factors causing Infertility & repeat breeding, Improvement of quality of dairy animal feed.	Research linkage with W.B.U.A.&.F.Sc F.L.D
2	Emphasizing on reduction of dry period of milk cow.	Standardization of location specific management practices to sustain productivity.	F.L.D
3	Emphasizing on effective management of Intensive Mastitis in dairy animal to increase	Introduction of Preventive and therapeutic measures for control of Mastitis of dairy animals.	F.L.D

	production.		
4	Emphasizing on effective management of ecto and endo parasitism of animals.	Evaluation and up gradation of traditional measure for control of parasitism.	Research linkage with W.B.U.A. &.F.S. F.L.D
5	Reducing cost of production of milk	Introduction of un conventional low cost feed with high nutrient value.	F.L.D.
6	Effective management of diseases caused by seasonal worm infestation for increasing production of meat of sheep & goat.	Worms related disease management.	Research linkage with W.B.U.A. &.F.S. F.L.D
7	Emphasising on development of disease resistant variety of sheep for increasing production of meat and wool	Breeding to develop resistant variety.	Research linkage with W.B.U.A. &.F.S.
8	Emphasizing on effective management of diseases caused by new strain of bacteria & virus to increase production.	Standardization of management practices of bacterial & viral diseases.	Research linkage with W.B.U.A. &.F.S. F.L.D
9	Emphasizing on Gentrification suitable for sustaining productivity	Identification of different livestock varieties resistant to abiotic stresses.	F.L.D
10	Development of Improved processing system for value addition to animal and dairy products at village level.	Development of Improved Processing system of animal & dairy product.	Research linkage with W.B.U.A. &.F.S. F.L.D
11	Reducing mortality of chicks & piglets through standardization of suitable management practices for increasing production	Standard action of effective management practices to reduce chicks & piglet mortality.	F.L.D

Proposed Marketing Strategies for Research

SL. No.	Strategies proposed for extension	Extension	
		Thrust Area	Activity proposed
1	Emphasizing bulk purchasing / selling of produce through formation of FIG/Co – operatives	Creating awareness on formation of farmers group, co-operative for generating income through marketing	Formation of FIG Formation of co- operative
2	Promotion of grading of agri produce for better market price	Creating awareness on grading of agri produce	Mass awareness campaign Training Demonstration
3	Promotion of packaging of agri produce to minimize losses during transit for marketing	Creating awareness for packaging of agri produce to minimize losses during transit for marketing	Mass awareness campaign Training Demonstration
4	Emphasizing up to date market information centre at village level	Development of market information centre at village level	New activity to be determined by govt.
5	Emphasizing development of market infrastructure for flowers	Development of flower market	To be determined by Govt.
6	Encouraging formation of milk – producers' co-operative at village level	Creating awareness on formation of milk producers co-operative for higher market price of milk	Formation of FIG Mass awareness campaign
7	Emphasizing development of milk processing infrastructure at sub-divisional level to avoid loses.	Creating awareness among milk producers co-operative for establishment of milk processing unit	New activity to be determined by Govt.
8	Emphasizing development of processing unit for meat at sub divisional level	Encouraging private farms for establishment of meat processing unit	New activity to be determined by Govt

Proposed Strategies for Research- Vindhya Alluvium Zone

SL	Strategies proposed for	RESEARCH

No	research	Thrust area	Activity proposed
1.	Popularization of organic farming for vegetable, fruit & flowers	Quality improvement and economical viability	on farm trial
2.	Reduction in residual pesticides level in fruits vegetable and flower	Refinement on IPM methodology specially on brinjal & pointed gourd	F.L.D.
3.	Adaptibility of tissue culture in banana and exotic flowers like Zerbera, Anthurium, Gladiolus etc.	Standardization of pavage and practices of Zerbera, Anthurium, Gladiolus etc	F.L.D.
4.	Popularization of shade net technology in flower & vegetables	Use of shade nets in the production of fruit and vegetable	On farm trial
5.	Standardisation of package and practices of exotic vegetables like baby corns, Brussels sprout, sprouting broccoli , gherkin, red cabbage etc.	To develop location specific package of practices	On farm trial

Proposed Research Strategies – Red & Lateritic Zone

Sector	Strategies proposed for Extension	Extension	
		Thrust area	Activity proposed
FPI & Horticulture	Promotion of spices and Aromatic plant	Spices and Aromatic plant - Introduction	Adoptability test of crops
Animal Resource Development	Quail Rearing	Mass Breeding	Standardization of hatching procedure
Fishery	Diversification of fish culture	Cage, Pen fish culture	Standardization of package of practice
Sericulture	Production of quality fibre of Tasar	Other factors to improve quality of Tasar	Identification of factors for this region
Cottage and Small Scale Industries	Promotion of lac culture	Arahar and Flemingia semialata Alternative use of Palash	Adoptability test and Standardization of technology for economic use

4. Proposed Research Strategies – Gangetic Alluvium Zone

SL. No.	Strategy proposed for Research	Thrust Area	Activity Proposed
1	Evolving suitable technology of packing and transportation of fruits, vegetables and flowers for better market value	Post Harvest Management	Replication of research result under adaptive trials, Refinement, validation and Assessment
2	Technology development to eliminate nutritional imbalances in cow and goat	Enhance farmers household income	Organization of issue based workshop For finalizing of research agenda
3	Standardization of fish feed using locally available materials	Promote indigenous technology	Releasing proven technology for general recommendation for the concerned AES
4	Identification and characterization of locally available medicinal plants	Promote indigenous technology	Replication of research result under adaptive trials, Refinement, validation and Assessment
5	Evolving suitable technology for preparation of high quality compost and vermin compost	Promote indigenous technology	Releasing proven technology for general recommendation for the concerned AES

5. Proposed Research Strategies – Tarai Region

Sector	Strategies proposed for research	Thrust area	Activity proposed
Agriculture **A. Crops:** 1. Paddy	☞ Development of drought tolerant short duration cultivar ☞ Development of disease resistant rice variety with yield capacity comparable to MTU 7029 ☞ Development of hybrid rice with good cooking quality ☞ Development of vitamin A enriched rice cultivar (Golden rice) ☞ Formulation of	☞ Varietal improvement ☞ Adaptive trial ☞ Development of acceptable package of practices	☞ Research ☞ Exposure visit and seminar / symposium participation

	acceptable IPM & INM packages for paddy		
1. Jute	☞ Development of acceptable retting technology, involving minimum use of water & keeping the jute sticks intact. ☞ Replacement of popular variety Nabin (JRO 524) with a better cultivar ☞ Development of cultivation practices in sandy loam soil, with special reference to Nematode infestation	Innovation of jute fibre extractor and retting technology. Adaptive research & trial	Research Exposure visits and participation in seminars/symposia
4. Rapeseed & Mustard	☞ Development of short duration high yielding cultivar, replacing Binoy (B – 9) ☞ Development of Club – root resistant variety for acid soil (For AES – II).	1. Varietal improvement 2. Adaptive research & trial	Research Exposure visits and participation in seminars/symposia
5. Pulses	☞ Development of input responsive high yielding variety ☞ Development of variety, which can withstand adverse weather conditions ☞ Varietal development for lentil, which can tolerate *Botrytis* disease infestation.	☞ Varietal improvement ☞ Adaptive research & trial	Research Exposure visits and participation in seminars/symposia
6. Maize	☞ Development of strategy for termite control, especially in sandy loam soil. ☞ Varietal improvement for yield maximization	☞ Development of IPM strategy ☞ Varietal improvement ☞ Adaptive research and trial	Research Exposure visits and participation in seminars/symposia

Animal Resource Development Dairy	1. Introduction of high milk producing breed suitable for hot & humid climate. 2. Production of quality green fodder	Breed up gradation Adaptive research & trial	Research Exposure visits and participation in seminars/symposia
Goatery	1. Formulation of suitable strategy to reduce mortality through improved management, deworming & vaccination schedule.	Adaptive research.	Research Exposure visits and participation in seminars/symposia
Poultry	1. Formulation of suitable strategy to reduce mortality through improved disease management strategy. 2. Strategy for recycling & fortification of poultry wastes for use in agriculture and mushroom industry.		Research Exposure visits and participation in seminars/symposia
Horticulture Fruits (Mango, Litchi, Banana & Guava)	☞ Development of Export oriented production technology for high value residue free fruits. ☞ 2. Export oriented packaging & Post – harvest management technology improvement	Research for technology development acceptable to farmers. Adaptive research & trial.	Research Exposure visits and participation in seminars/symposia
Vegetable	☞ Development of High value & export oriented residue free vegetable crops. ☞ Development of IPM/ IDM strategy for combating sucking & Lepidopteran pests complex, Soil borne plant pathogens with special reference to cucurbits, solanaceous, cucur-bitaceous crops.	☞ Research for technology development acceptable to farmers. ☞ Adaptive research & trial. ☞ 3. Identification of economically feasible bio-pesticide and safer chemicals.	Research Exposure visits and participation in seminars/symposia

Sericulture	Varietal improvement for quality Mulberry leaf production Suitable technology for Hybrid silkworm rearing.	Identification of suitable varieties through adaptive research. Adaptive research	Research Exposure visits and participation in seminars/symposia
Fishery	Development of suitable technology for prawn & ornamental pisciculture. Suitable technology for multiple stocking and Multiple harvesting of species. Technologically improved hatchery establishment for cat fish(Magur) production	Identification of suitable technology through adaptive research.	Research Exposure visits and participation in seminars/symposia

Research Strategies for Short Term Crops

Sector	Strategies proposed for research	Thrust area	Activity proposed
Agriculture			
Aus paddy	Location specific scented rice varieties	Multi locations & multi varieties trial for varietals suitability	Frontline demonstration; On-station demonstration
	Location specific varieties of fine quality rice	Varietals suitability	Frontline demonstration
Kharif paddy			
	Varieties suitability in deep water	Multi locations & multi varieties trial for varietals suitability	Frontline demonstration
	Effectiveness of bio-fertilizers in kharif rice productivity	use & application trials for Azospirilum, azotobactor & phosphobactrin	Frontline demonstration
	Effectiveness of micro nutrients in kharif rice productivity	Zn & other micro nutrients application	Frontline demonstration
	Effectiveness of bio & botanical pesticides	Bio & botanical pesticides for productivity enhancement & pest-	Frontline demonstration

		disease management	
	Management practices of algal weed	Algal weed management	Frontline demonstration On-farm trial
Boro paddy			
	Standardization of package of practices of direct wet seeding by plastic drum seeder	Time of sowing, weed management & nutrient management	Frontline demonstration; On-station trial
Ground nut			
	Fertilizers recommendation incorporating the bio-fertilizers & organic manure without hampering the existing yield	Nutrient management	Frontline demonstration
	Management practices of Heliothis sps. & spodoptera with the help of bio-agent		Frontline demonstration
Mustard			
	Effectiveness of sulphur application in increasing the oil content	Variation of the amount of sulphur for multi locations	Frontline demonstration
	Standardization of the package of practices of mustard under zero tillage cultivation practices	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Potato			
	Standardization of the package of practices of potato under zero tillage	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Lathyrus			
	Standardization of location specific DAP spraying for enhancing the productivity	Stage of crop growth & dose of application for enhancing the productivity	Frontline demonstration

Horticulture crops			
Vegetables	Crop response to soluble fertilizer application	Soluble fertilizers	Frontline demonstration ; On-station trial
	Hormonal effect on fruit setting of cucurbit crops	Hormone application	Frontline demonstration; On-station trial
	Standardization of cultivation practices of vegetables & flowers under shade nets/ greenhouse/ low cost ploy houses	Cultivation practices of vegetables & flowers under shade net/poly sheet/low cost ploy house condition	Frontline demonstration; On-station trial
	Organic production techniques	Organic production techniques	Frontline demonstration; On-station trial
	Standardization of cut flowers under green house condition	Cultivation practices of cut flowers under green house condition	On-station trial
Animal Resource Development			
Cow	Overcoming the low fertility rate of dairy animals	Micro nutrient deficiency; Metritis & hormone level detection in different season	Off-farm trial; On-farm trial
Goat	Prevention of goat disease	PPR	Off-farm trial; On-farm trial
	Sensitization of platehelmenthis	Amphistomlasis	Off-farm trial; On-farm trial
Poultry	Prevention of poultry disease	Bursel disease	Off-farm trial; On-farm trial
Fishery			
	Disease management of fish	Ulcerative disease syndrome; Gil rot; fin rot & white spot of prawn	Off-farm trial; On-farm trial
	Fish species development	Species or varietals development to perform well in domestic pond	Off-farm trial; On-farm trial
	Ideal pond condition	1.Identification of soil & water borne disease 2. pH of soil & water for cultivation of prawn 3.Role of micronutrients in pisciculture	Off-farm trial; On-farm trial

6. Proposed Research Strategies – Coastal Region

Sector	Strategies proposed for research	Thrust area	Activity proposed
Agriculture			
Aus paddy	Suitability of location specific scented rice varieties	Multi locations & multi varieties trial for varietals suitability	Frontline demonstration; On-station demonstration
	Location specific varieties of fine quality rice	Varietals suitability	Frontline demonstration
Kharif paddy			
	Varietals suitability in deep water regime	Multi locations & multi varieties trial for varietals suitability	Frontline demonstration
	Effectiveness of bio-fertilizers in kharif rice productivity	Azospirilum, azotobactor & phosphobactrin use & its proper method of application	Frontline demonstration
	Effectiveness of micro nutrients in kharif rice productivity	Zn & other micro nutrients application	Frontline demonstration
	Effectiveness of bio & botanical pesticides	Bio & botanical pesticides for productivity enhancement & pest/ disease management	Frontline demonstration
	Management practices of algal weed	Algal weed management	Frontline demonstration On-farm trial
Boro paddy			
	Standardization of package of practices of direct wet seeding by plastic drum seeder	Time of sowing, weed management & nutrient management	Frontline demonstration; On-station trial
Ground nut			
	Fertilizers recommendation incorporating the bio-fertilizers & organic manure without hampering the existing yield	Nutrient management	Frontline demonstration

	Management practices of heliothis sps. & spodoptera with the help of bio-agent	Bio agent	Frontline demonstration
Mustard			
	Effectiveness of sulphur application in increasing the oil content	Variation of the amount of sulphur for multi locations	Frontline demonstration
	Standardization of the package of practices of mustard under zero tillage cultivation practices	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Potato			
	Standardization of the package of practices of potato under zero tillage cultivation practices	Time of sowing, weed management, nutrient management & pest-disease management	Frontline demonstration; On-station trial
Lathyrus			
	Standardization of location specific DAP spraying for enhancing the productivity	Stage of crop growth & dose of application for enhancing the productivity	Frontline demonstration
Horticulture crops			
Vegetables			
	Crop response under soluble fertilizer application condition	Soluble fertilizers application	Frontline demonstration ; On-station trial
	Hormonal effect on fruit setting of cucurbit crops	Hormone application	Frontline demonstration; On-station trial
	Standardization of cultivation practices of vegetables & flowers under shade net/poly sheet/low cost ploy house condition	Cultivation practices of vegetables & flowers under shade net/poly sheet/low cost ploy house condition	Frontline demonstration; On-station trial
	Organic production techniques	Organic production techniques	Frontline demonstration; On-station trial

	Standardization of cut flowers under green house condition	Cultivation practices of cut flowers under green house condition	On-station trial
Animal Resource Development			
Cow	Overcoming the low fertility rate of dairy animals	Micro nutrient deficiency; Metritis & hormone level detection in different season	Off-farm trial; On-farm trial
Goat	Prevention of goat disease	PPR	Off-farm trial; On-farm trial
	Sensitization of platehelmenthis	Amphistomlasis	Off-farm trial; On-farm trial
Poultry	Prevention of poultry disease	Bursel disease	Off-farm trial; On-farm trial
Fishery			
	Disease management of fish	Ulcerative disease syndrome; Gil rot; fin rot & white spot of prawn	Off-farm trial; On-farm trial
	Fish species development	Species or varietals development to perform well in domestic pond	Off-farm trial; On-farm trial
	Ideal pond condition	1.Identification of soil & water borne disease 2. pH of soil & water for cultivation of prawn 3.Role of micronutrients in pisciculture	Off-farm trial; On-farm trial

5.7 WATERSHED DEVELOPMENT IN WEST BENGAL

Indian agriculture is dependent on monsoon which is not uniform over the year and because of climate change it has changed the pattern thoroughly. Nearly ¾ th of the cultivable land in India is dependent on monsoon, which is contributing nearly 42% of the total production from agriculture. The productivity of any crop mainly depends on two natural resources – land and water in addition to management practices. Therefore the conservation of two natural resources is essential for the sustainability of rain fed agriculture. This could be done using the watershed method.

Watershed Development projects have been taken up under different programmes launched by the Govt. of India. The Drought Prone Area Program (DPAP) and the Desert Development Program (DDP) adopted the watershed approach in 1987. The Integrated Wasteland Development Projects Scheme (IWDP) taken up by the National Wasteland Development Board in 1989 also aimed at developing wastelands on a watershed basis. The Program now been brought under the administrative jurisdiction of the Dept. of Wastelands Development in the Ministry of Rural Development. The fourth major program based on

watershed concept is the National Watershed Development Program in Rain fed Area (NWDPRA) under the ministry of Agriculture.

So far, these programs have laid down their own separate guidelines, norms, funding pattern and technical components based on their respective and specific aims. While DDP focused on reforestation to arrest the growth of hot and cold deserts, DPAP concentrated on non arable lands and drainage lines for in-situ soil and moisture conservation, agro-forestry, pasture development, Horticulture and alternate land uses. The IWDP on the other hand made silvi pasture, soil and moisture conservation on wasteland. The NWDPRA combines the features of all these three programs with the additional dimension of improving arable lands through better crop management technologies. The components identified in the watershed development are the soil and water conservation, water resource development, Agricultural productivity and most important being the people's participation in development of watershed.

WHAT happens to rain water

- ***60% is lost as SURFACE RUNOFF***
- ***30% is lost due to EVAPORATION***
- ***Only 10% is being harvested out of which***
  - ✓ ***3% percolates on its own to recharge ground water***
  - ✓ ***7% is harvested as surface storage in reservoirs etc.***

HOW to harvest more

- ***Well recharging***
- ***Roof top rain water harvesting***
- ***Collecting surface run off in farm pond***
- ***Obstructing flow by***
  - ✓ ***underground bandh***
  - ✓ ***cement concrete bandh***
  - ✓ ***plastic sheet bandh***

The basic objective of watershed development program is integrated wasteland development based on micro watershed plans. It is a community based natural resource management initiative with focus on treatment of wastelands with people's participation and community mobilization, long term sustainability for poverty alleviation. In West Bengal, the two centrally sponsored programs, i.e. Integrated Wastelands Development Program (IWDP) and Drought Prone Area Program (DPAP) are implemented by the P& RD in the western part of the state in five districts i.e. Purulia, Bankura, Paschim Medinipur, Birbhum and Burdwan. There is another program with support from NABARD as loan and grant which is being implemented in the state. There are 38 watershed projects under assistance from NABARD are being implemented in the State of which 25 projects are in full scale implementation phase. Watershed development being a process intensive program requires long term planning with the active participation of the community throughout the entire stages of formulation, implementation of the project and also maintenance of the assets created. The funding of the IWDP is borne by the Central and State Govt. in the ratio 11:1. In respect of DPAP the same ratio is 75:25. The projects are implemented over a period of five years and the cost of the treatment is Rs 6,000 per ha. An Action plan is prepared for an individual project and as such the projects normally take a considerable period of time for launching full scale implementation.

<u>The Status of Implementation of IWDP as on 31.03.2009:</u>

No. of sanctioned projects	Area (in ha)	Project cost (Rs. in crore)	Release of fund (Rs. in crore)	Expr. (Rs. in crore)	Area treated (in ha.)
29	1,18,046	70.83	22.64	13.52	20,238.27

Status of DPAP under Hariyali Programme as on 31.3.2009:

No. of Micro watersheds	Area (in ha.)	Project cost (Rs crore)	Release of fund (Rs crore)	Expr. (Rs crore)	Area treated (in ha)
304	1,52,000	91.20	23.31	12.42	18,743

5.8 SOCIAL FORESTRY DEVELOPMENT IN WEST BENGAL

There is 11879 sq.km of forest area in West Bengal, which is 13.38% of the total geographical area. The forest area consists of Reserve forest 7054 sq.km , protected forest 3772 sq.km and unclassified forest 1053 sq. Km. The tree cover of the state is 30.74% of the geographical area as per the satellite image survey carried out in 2006.

The National Commission on Agriculture, Government of India, first used the term 'social forestry' in 1976. The need for a social forestry scheme was felt as India has a dominant rural population that still depend largely on fuel wood and other biomass for their cooking and heating requirements. This demand for fuel wood will not only increase but the area under forest will reduce further due to the growing population and increasing human activities.

Social forestry aims at raising plantations by the common man through the concept of village forests to meet the needs of the rural people. It can be done by making use all unused and fallow land through plantation in & around agricultural fields, along railway lines, roadsides, river & canal banks, village common land, Government wasteland and Panchayat land etc,.

With the introduction of this scheme the government formally recognized the local communities' rights to forest resources, and is now encouraging rural participation in the management of natural resources. Through the social forestry scheme, the government has involved community participation, as part of a drive towards afforestation, and rehabilitating the degraded forest and common lands.

The success of social forestry programme on non-forest land has led the people to realize that it is a viable land use system and important tool in development of rural areas where large scale employment is possible through it.

Social forestry scheme can be categorized into four major groups viz., farm forestry, community forestry, extension forestry and agro-forestry.

Farm forestry: Individual farmers are being encouraged to plant trees on their own farmland to meet the domestic needs of the family. In many areas this tradition of growing trees on the farmland already exists. Non-commercial farm forestry is the main thrust of most of the social forestry projects in the country today. It is not only for the farmer to grow trees for fuel wood but also they are interested in growing trees to provide shade for the agricultural crops; as wind shelters as well as for conservation of soil.

Community forestry: Another scheme taken up under the social forestry programme is the raising of trees on community land, aims to provide timber & fuel wood for the entire community. The government has the responsibility of providing seedlings, fertilizer, while the community has the responsibility of protecting the trees. Over the last 20 years, large-scale planting of Eucalyptus, as a fast growing exotic, has occurred in India under the scheme.

Extension forestry: Planting of trees on the sides of roads, canals and railways, as well as planting on wastelands is known as 'extension' forestry. Under this project there has been creation of wood lots in the village common lands, wastelands and panchayat lands.

Agro- forestry: Planting of trees on and around agricultural boundaries, and on marginal, private lands, in combination with agricultural crops is known as agro-forestry.

Arabari – A Successful Case Study: In 1972, an innovative plan to contain the deforestation problem was launched on an experimental basis in the forest fringe villages of Arabari development block in Midnapore district of West Bengal. It involved local villagers in protecting coppices of Sal (*Shorea robusta*) trees in return for free usufructuary right on all non-timber forest timber forest products, additional employment and promise of 25% share of the net cash benefit from the sale of sal poles. About 1270 ha of degraded sal forest was taken up for revival on a pilot basis. Initially, 618 families comprising a population of 3607 were involved thru' Forest Protection Committee. Sal and its associates in forests yield many non-timber forest products like sal leaves & seeds, mushroom , tasar silk, cocoons, medicinal plants, edible roots and tubers etc, which motivates the poor villagers in protecting the coppices during their gestation period.

Encouraged by the experience of Arabari experiment, the State Govt. decided in 1987 to encourage forest fringe population to actively participate in managing and rehabilitating degraded forest all over the West Bengal. This movement spread like a wild fire. Though informal and voluntary at first, it acquired the character of a formal institution when in 1990, the State Govt. officially recognized the Forest Protection Committee (FPC).

The system of free usufructuary was extended in 1991 to regenerate degraded forest of Darjeeling hill areas, Doars and foot hill areas of North Bengal as well as the degraded areas of Sundarban forest in South Bengal. It has now been extended also to the buffer zones and fringe areas of wildlife sanctuaries, natural parks and tiger reserves (under project Tiger). Joint Forest Management for the rejuvenation and development of existing forest as well as wildlife sanctuaries has been adopted as state policy.

About 4100 Joint Forest Management Committees (JFMCs), also known as Forest Protection Committees (FPC) and Eco-Development committees are actively participating for regeneration, protection and conservation of the forest in the state. Nearly 4 lakhs ha of degraded forest land has been resurrected through the joint forest management in West

Bengal during the last two decades. The concept of JFM is successful in West Bengal. The important issues emerging out of the experience are summarised below-

- People's participation in planning and implementation of wasteland development program ,through definitive institutional arrangement involving sharing of benefits can bring about significant improvement in the status of land and forest cover.

- Poverty alleviation program in rural areas play a significant role in greening wasteland and resurrecting degraded forest. Eco-development work for creating long term resources, sericulture, aquaculture, silvipasture, agro forestry etc, help in generating income for the rural poor. Simultaneously, innovative technologies for improving local cottage industries must be developed to boost the economy of the communities in the hinterland so that they do not over exploit the forest.

- A pragmatic land reform policy is imperative to encourage resource poor villagers with state assistance to undertake development of wastelands under their ownership into farm forests, group farm forest, or vegetative cover for meeting their requirements and generating income. Tree farming on such marginal and sub marginal lands are fast emerging as a viable land use option in arid districts of the state. Production of timber, fuel, fodder, fruits etc through such farming meet the people's general needs while relieving the pressure on forest.

- Effective interaction with the Panchayati Raj institution will help in dispelling apprehension, doubt and cynicism from the minds of the villagers about the JFM system and the role of the Forest Department and NGOs which help in conflict resolution at the local level.

- Village women are principal forest users and they suffer most when neighborhood forests are degraded. Without their active involvement forest management's success will be elusive.

5.9 FOOD PROCESSING INDUSTRIES IN WEST BENGAL

The agro and food processing industries sector is one of the largest in terms of production, consumption, export and growth prospects. This sector ranks fifth in the country in size, employs over 1.6 million workers (20% of the nation's labour force) and accounts for 15.19% of total industry output with 5.5% of the GDP. India's growing domestic demand for value-added processed foods and its self-sufficiency in supply is the contributing factors for the growth of this sector. It is estimated that the Food Processing Industry in India will attract phenomenal investment - capital, human, technological and financial- of over Rs. 1,40,000 crore in the next decade.

The state of West Bengal is a significant producer of many horticulture and agriculture produce. The state has achieved significant growth in agriculture production over the past decade (CAGR of 4.5% during 1996-2001). The state accounts for nearly 20% rice, 28% potato & 27% pineapple out of the national production. While there has been a spectacular rise in food grains production over the years, only 1% of the total production is utilized for processing and the post harvest loss accounts for nearly 30%. The State has attained self-sufficiency in food production with reasonable amount of marketable surplus for most of the key crops and fast emerging as the "Food Bowl" of the country. The wide raw material base and market

surplus give the State a natural advantage to invest in Fruit and Vegetable Processing, Spices and Grain Processing Industries. Besides this, the state also produces other Food Products like fish, meat and poultry products in abundance, which also has enormous processing prospects. The Eastern & Northeastern regions have an easy access to bordering countries like Bangladesh, Nepal, Myanmar and Asia-Pacific region for exports. West Bengal has also the advantage in floriculture because of conducive agro-climatic condition. The potential for investment in food processing sector in the state of West Bengal has been assessed at Rs.15451 crore (over next 10 years period) and the state has been ranked as third best potential state after Maharastra and Tamil Nadu for investment in the sector.

The trends in investment in food processing sector in the State during past five years are indicated below:

Year	No. of Project approved	Investment Rs. Crore	Employment Generated (No.)		
			Direct	Indirect	Total
2002-03	118	212.22	2814	11256	14070
2003-04	115	327.00	9492	37968	47460
2004-05	204	524.00	3999	15996	19995
2005-06	443	380.90	6300	25200	1500
2006-07	95	451.58	4032	16128	20160

Potential Sectors for Investment

Food Grain Processing:

The state being the largest producer of rice offers scope for investing especially in

☞ Rice milling units including modernization of rice mills

☞ Processing of rice which includes products like pre and parboiled rice, rice powder, puffed rice, rice flakes (Indian dried & flattened rice) and rice crisps.

☞ Solvent extraction units for production of rice bran oil. The state also has significant presence in the oilseed sector indicating the scope of investment in oilseed processing.

Fruit & Vegetable Processing

West Bengal with diverse agro-climatic condition is conducive for growing a wide variety of horticultural crops. Amongst the fruit crops, mango occupies the highest area (42% of area under fruits). The other important fruit crops are Pineapple, Banana, Papaya, Guava, Mandarin, Orange, Jack fruit, Litchi, etc. The total area under fruit crops in the state is 1.942 lakh ha with a production of 27.67 lakh MT (2007-08). The State is the largest producer of and vegetables in the country producing traditional vegetables like brinjal, tomato, cabbage, cauliflower, Cucurbits and lady's finger and nontraditional vegetables like broccoli, gherkin, baby corn, Brussels sprout, celery etc. The total area under vegetables (excluding potato) is 9.124 lakh ha with annual production of 125.56 lakh MT (2007-08). Despite having a wide raw material base, a majority of fruits and vegetables produced in the State are being marketed fresh. Seasonal gluts and consequent price fall are the common marketing problems being encountered in the State as is the case elsewhere in the country. However, considering the comparative advantage that the State offers in terms of production of fruits and vegetables, initial efforts for processing has gone for a few crops such as pineapple and potato.

Availability of Fruits and Vegetables in West Bengal

	Period of Availability	Major Production Areas
Fruits		
Mango	May - July	Malda, Murshidabad, Nadia, Hooghly, 24 Parganas(N)
Pineapple	Apr-Nov	Siliguri and Chopra area of N. Dinajpur
Banana	Year round	Hooghly, 24 Pgns (S),Nadia,Murshidabad
Papaya	Year round	Hooghly, 24 Pgns(N&S), Nadia, Murshidabad
Orange	Dec to Feb	Darjeeling
Guava	July to Sept	Murshidabad & 24 Pgns(S)
Jackfruit	June to Aug	Jalpaiguri & Coochbehar
Litchi	May/June	Murshidabad, Malda & 24 Pgns(S)
Cashewnut		Midnapore East
Coconut	Year round	24 Pgns(N) & Midnapore
Sapota	May-June	24 Pgns(S)
Watermelon	Mar-May	Midnapore East & 24 Pgns(N&S)
Vegetables		
Potato	Feb-Apr	Hooghly, Burdwan
Tomato	Jan-Apr	24 Pgns(N&S),Nadia
Cabbage	Sept-Mar	24 Pgns, Nadia, Burdwan, Murshidabad, Hooghly
Cauliflower	Nov-Mar	24 Pgns, Nadia, Burdwan, Murshidabad, Hooghly
Radish	Oct-Feb	24 Pgns, Nadia, Burdwan, Murshidabad, Hooghly
Pea	Jan-Mar	24 Pgns, Nadia, Hooghly
Brinjal	Year round	Burdwan, Hooghly
Onion	Mar-Apr	Burdwan, Hooghly
Lady's Finger	Apr-Nov	24 Pgns, Nadia, Burdwan, Murshidabad, Hooghly

Source: Dept. of Food Processing Industries & Horticulture, GoWB

The above details clearly suggest the availability of different fruits and vegetables in different production periods making the state a potential area especially for setting up multi- product based fruit and vegetable processing industry for ensuring better capacity utilization during a major part of the year. Despite having a wide raw material base, a majority of fruits and vegetables are sold in fresh/ raw form. Seasonal gluts and consequent price fall are the common marketing problems being encountered. Some of the potential products which have good domestic and export demand which can be produced in the state includes:

- ☞ Frozen/ Dehydrated fruits and vegetables
- ☞ Jams, Jellies, Juices, Squashes
- ☞ Potato Granules/ Flakes/ Fries/ Chips/ Dehydrated potato cubes/ Slices
- ☞ Processed Mushroom

Dairy & Poultry Processing

The consumer preferences & consumption patterns in West Bengal offer greater prospects for livestock & dairy products than in any other parts of the country. Leaving aside a fraction, the entire population is non-vegetarian. With rising income levels & the increasing middle class, more and more people are able to afford consumption of animal proteins. While fish continues to hold centre-stage (as a source of animal proteins), the price differential between fish and livestock products is tilting consumer

preferences towards animal and bird meat and towards eggs. Meat products like chicken, mutton, etc., were not a part of the Bengali daily meal even a few decades ago but today the demand for these products is widespread and on the increase. There is also an increasing awareness towards consuming different types of dairy products (besides the traditional preference for 'chhana' - the cottage cheese), encouraging the dairy sector.

Despite significant progress having been achieved in this sector, West Bengal still remains a deficit state with respect to availability vis a vis requirement of livestock products. The daily demand for milk is so huge that large quantities of milk powder, liquid milk, butter, ghee, cheese etc. are imported from other parts of the country. The rising demand for eggs too has forced import of eggs from Andhra Pradesh, Tamil Nadu and Punjab into West Bengal to meet the state's requirements. The indigenous meat availability is supplemented by sourcing the same from Bihar, Uttar Pradesh and other states. With such a ready & huge market for milk & milk products, eggs, meat and poultry in West Bengal (now being met by supplies from outside the State), livestock rearing in the state has an immense potential to become a large and profitable industry.

Poultry and Meat Products

The state has favourable climatic conditions for poultry breeding & a large non-vegetarian population, including the captive North-Eastern states to generate sufficient demand for these products. The state enjoys second position in cattle and poultry population and production leadership across several items like duck meat, and total meat production including poultry. The state is considered to be one of the most attractive poultry markets in India accounting for 13% of the country’s consumption. The state also consumes significant amount of sheep and goat meat. All these above features identify the potentials for investing in poultry and meat processing, which have both domestic and international market demand.

Milk & Milk Products

The state of West Bengal offers extensive scope in the area of processed milk products as a major part of the demand for value-added milk products is presently met by imports from other States. The annual consumption of dairy products in the State is as under;

Annual Consumption of Dairy Products in West Bengal

Item	Consumption	Imports from other states
Milk Powder	30,000 MT (Total) 15,000 MT (by organised Dairy Plants)	30000 MT
Buffalo-Milk Ghee	1,800 MT	90%
Cow-Milk Ghee	5400 MT	90%
White Butter	3000 MT	3000 MT
Table Butter	2190 MT	95%
Cheese	160 MT	99%
Khoa	11680 MT	60%
Chhana	40000 MT (involves 7 lpd of Milk)	
Paneer	3500 MT	
Chhana, Khoa and Paneer	Annual Value of all Milk Products manufactured within the State - Rs.	Annual Value of all Milk Products Imported into West

	5420 million	Bengal - Rs.3231.9 million

Considering the wide gap between demand and supply within the State, investments in the dairy sector will be extremely profitable, if properly synchronised and organised. Key areas of investment under the sector include:

☞ **Liquid milk** production and marketing to the urban and semi-urban consumers. There is also scope for supplying milk to the local sweetmeat industry, as this sector requires a huge quantity of milk.

☞ **Processed milk**: products like butter, cheese, milk powder, baby food and condensed milk.

☞ **Indian Sweetmeat**: West Bengal is considered to be the hub of Indian sweetmeats for its favourite 'Rosogolla' and 'Sandesh'.

☞ **Ice Cream manufacturing**: One of the most lucrative of all value added dairy products. But for manufacturing ice creams, the state requires investment in the form of better cold storage and transportation facilities. The state, being one of the few power surplus states in the country, enjoys an advantage in these aspects.

Fish Processing Industry

There is considerable scope for processing of marine products considering the present scenario wherein merely 8% of the total marine harvest is being processed and frozen. The ratio would be much lower if inland fish production is also taken into (1.66%) consideration. The state being the highest producer of fish needs to pay more attention towards prevention of post harvest losses, value addition and address the issues related to seasonality in supply through processing and longer storage. As per the available data, there are 99 exporters of sea food in the State and the total number of processing plants is 37 with an installed freezing capacity of 340 MT/day. There are 30 cold storage units with the total storage capacity of 3500 MT. With the expanding base of aquaculture, it may not be difficult to meet the raw material requirement of the industry. However, the present status of the processing units leaves lot to be desired in terms of meeting export standards and regulations. Only 5 processing plants are able to meet the EU standards for export. In addition there are 4 units which are approved under National Standard while the rest of the units are below standard and lack essential components such as pre-preprocessing facilities, Ice plants etc.

Present Scenario of Food Processing Industry in West Bengal

The particulars of investment and employment generation under food processing sector in the state during the period 2002-07 are as under:

Trends in Food Processing Industry in West Bengal and Employment Generation during 10th Plan Period

Year	No. of project	Investment in	Employment

	approved	(Rs. crore)	Direct	Indirect	Total
2002 - 03	118	212.22	2814	11256	14070
2003 - 04	155	327.00	9492	37968	47460
2004 - 05	204	524.00	3999	15996	19995
2005 - 06	443	380.90	6300	25200	31500
2006 - 07	95	451.58	4032	16128	20160
Total	**1015**	**1895.70**	**26637**	**106548**	**133185**

Source: Department of Commerce and Industry, Govt. of West Bengal.

The main objective is to create infrastructure facilities to preserve and reduce wastage of agro food raw materials, facilitate promotion of Food Processing Industries, export of fresh and processed food materials and to create entrepreneurship. The Department of Food Processing Industry and Horticulture has adopted following strategies to realize the above objectives:

- ✓ Establishment of pack house with multipurpose cold storage and refrigerated transport;
- ✓ Establishment of Food Park;
- ✓ Establishment of Quality Control Laboratory;
- ✓ Establishment of perishable goods cargo complex;

Establishment of Pack House

The Department has set up a State-of-the-art pack house with multipurpose cold storage at English Bazar, Malda through West Bengal State Food Processing & Horticulture Development Corporation Ltd. This pack house has the facilities for post harvest handling and value addition through washing, cleaning, sorting, grading and packaging integrated with cold storage and refrigerated transport.

Establishment of codex cell in the Department of Food Processing Industries & Horticulture, Government of West Bengal

In the absence of appropriate guidance and technical support, a majority of food processing Industries in the State are not in a position to adhere to stringent quality norms, hygiene standards. To motivate and guide the industry the Department has initiated action to establish codex cell in the department to maintain up-to-date codex information, codex documents, compile codex standards, codes of practices etc. The information will be transferred to the food processing units to enable them to adopt total quality management to manufacture good quality products, which can compete in the global market.

Suggested Interventions

Infrastructure

- ✓ Identifying potential zones for establishing multipurpose cold storage facilities and food processing units either through private sector investment or PPP mode with government providing basic infrastructure.
- ✓ Performance of a few processing units across the wide spectrum may be studied to know the problems being encountered.
- ✓ Expansion and modernization of cold storage facilities for potato especially for process grade varieties and seed potato.
- ✓ Strengthening logistics support through better connectivity and refrigerated transport facilities where ever feasible for the benefit of small and marginal farmers.

Technology

- ✓ Awareness creation among farmers and processors on quality aspects and requirements with respect to Sanitary & Phyto- sanitary measures (SPS), CODEX, HACCP and facilitate modernization of existing processing units in the above context.
- ✓ Establishment of food safety and standard testing facilities, etc, possibly through PPP mode.

Credit

- ✓ Adequate & timely availability of credit for the processing units is extremely vital. The lending institutions may take advantage of the Credit Guarantee Fund Trust for Small Industries (CGTSI), which was launched to facilitate the flow of collateral free credit to the SSI sector and encourage lenders to shift from collateral based or security oriented lending to project based lending. CGTSI guarantees up to 75% of the credit risk subject to loan cap of Rs. 25 lakh and guarantee cap of Rs. 18.75 lakh per borrower.
- ✓ Realistic assessment of credit needs of the processing units with special reference to technology adoption / up gradation and working capital needs.
- ✓ Special financing package for the “Food Parks” through consortium financing may be resorted to.

Marketing

- ✓ Farmer-user industry tie-up with the latter facilitating supply of quality inputs especially seed and buy back at remunerative prices.
- ✓ Promoting Farmers marketing cooperative or Farmers Producer Companies, facilitating collective marketing and linkages with the Food Processing Industries.

5.10 DEVELOPMENT OF RURAL INDUSTRIES

Development of Rural Industries i.e. both Agro-based and non-farm industries have an important role in development of the state. Rural industries include Micro and Small Industries, Khadi and Village Industries, Handicrafts and Handloom & Textile industries. Around 80% of Small and Medium (SMEs) industries fall under Rural Industries segment. The employment generated in this sector is highest after Agriculture. The growth in employment generation of rural based small scale & cottage industries is much more than in large and medium scale sector. Considering the acute unemployment problem, within the youths of

landless labour and small & marginal families, growth of rural industries is the appropriate intervention forum to create employment opportunities, as the cultivated land is limited. Rural non-farm sector accounts 22% of rural employment. Nearly 60% of industrial output in the state is from the cottage & small scale industries sector, which accounts for 50% of the state's overall exports. The employment scenario of the sector is as under:

- ✓ Micro & Small enterprise : 30.67 lakhs / 11.81 lakhs
- ✓ Khadi & Village Industries : 2.57 lakhs
- ✓ Handicraft sector : 5.50 lakhs
- ✓ Handloom & Textile sector : 3.35 lakhs

Priority Areas should be:-

- ☞ Development of SHGs for the micro units of village industries (specially for handicrafts / food processing industries)
- ☞ Strengthening linkages for institutional credit facilities for micro & small enterprises.
- ☞ Intensification of small industries cluster development programme.
- ☞ Development of infrastructure through Private – Public Partnership.

Handloom & Textile Industries

Textile sector includes handloom, Power looms, Hosiery and Readymade garments enterprises. With over 6.60 lakh people directly or indirectly associated with handloom activities, the sector assumes significance as an employment provider. Out of these only 10% are in the co-operative fold, while remaining are outside of it mostly in unorganized sector. Besides there are nearly 2.5 lakhs nos. of people directly or indirectly associated with power looms, hosiery readymade garment and other textile related activities. Annual handloom production in 2007 – 08 in the state is about 921.20 million metres.

No of Units and Employment Scenario in Textiles Industries

Textile Industries	No. of units	Persons Employed (lakh)
Handloom	351000	6.67
Power loom	6765	0.28
Hosiery	17900	1.10
Readymade Government	21,200	2.00

Efforts have been made to provide information related to current fashion, design, color combination, etc. There are approximately 6.67 lakh hand loom weavers in the co-operative. Many social security and promotional schemes are under the implementation for the handloom weavers, such as Health Insurance schemes, Mahatma Gandhi Bima Yojana (MGBBY), Old age Pension Scheme, Siksha Sahayog Yojana (SSY), Deen Dayal Hath Kargha Protsahan Yojana (DDHPY), Handloom Export Promotion Scheme, etc. In this sector, implementations of two nos. of cluster based interventions are already under progress. Detailed diagnostic studies in these 25 handloom clusters are underway. 43 nos. of handloom clusters have been so far identified in the State

Handicraft Industries

Handicraft sector has tremendous potentiality in West Bengal because of its vast natural resource base and for a superior cultural atmosphere. This sector has potentiality to engage rural youths and woman in individual capacity or SHGs to revenue generation process. Help is required to standardize product and marketing linkages by Govt. or NGOs or any other agencies. Training is another important part for the artisans or SHG members to add value to their business plan. Now Govt. is conducting state level Expo. in Kolkata and Siliguri and Directorate participate in different melas across the state to spread knowledge about the market. There are so many welfare schemes for the artisans such as payment of pension to old age Handicraft artisans, re – imbursement of TA / DA carrying cost etc. for attending Expos. etc. Govt. is planning to set up four urban haats for marketing of handicrafts product manufactured by the artisans of West Bengal at Bolpur, Durgapur, Berhampur and Siliguri. The arrisans will get space in these urban haats so that they can sell their product directly to the customers.

Coir Industries

The State has good potential for development of coir industries. There are 40 registered and 370 unregistered SSI units in Coir Industries in the state providing employment to 3184 people. The availability of coconut husk and skilled person in the Howrah and South 24 Parganas districts have encouraged setting intensive development programme in the coir industries in these districts. The artisans / units manufacturing coir products are selling their product directly through the retail outlet situated in different urban areas.

Lac Industries

The basic raw material is cultivated in the mono crop and drought prone areas of Purulia, Bankura, Midnapur, Murshidabad, and Malda. The processing Units are mainly in Purulia district. Their yearly raw material requirement is nearby 15 MT to 17 MT. The total stick lac production of the state only caters to 10 – 15% of the requirement. However lac and lac based items has a very good export potential. On an average, 16 million dollar of foreign exchange is earned annually from the export of lac & lac based item. Steps have to be taken to increase the production of raw materials in drought prone areas and up gradation of finished products to market it more aggressively in the local and international market.

Khadi & Village Industries

Under the sector more than 2.57 lakhs people are employed at present and there is a scope to upscale it many fold. Both the Central and State Govt. is putting efforts to make this sector competitive at the time of free market economy .Lots of schemes envisage to

- ☞ provide trainings to the unemployed youth (mainly women) in beekeeping,
- ☞ Marketing assistance is rendered to the certified K& VI institutions / sales centres.
- ☞ Development of infrastructure of khadi producing centres, construction of Khadi Museum, setting up of Baluchari Saree Complex.
- ☞ Re-organization of handmade paper centre.

- ☞ Renovation of Sales outlets of K & VI Board (Gramin).
- ☞ Proper promotion and modern outlook is highly required to re define this sector which is already showing the signs of revival.

5.11 BIO FUEL ENERGY

Rising cost of fossil fuels, energy security concerns, increased awareness of climate change and potentially positive effects for economic development have led to considerable public attention to bio energy. Bio energy includes traditional biomass to produce electricity, light and heat.

Primarily due to a lack of affordable alternatives, millions of people in developing countries depend on traditional bio energy (e.g. wood fuels) for their cooking and heating needs, especially in sub-Saharan Africa and South Asia. This reliance on traditional bio energy can pose considerable environmental, health, economic and social challenges. New efforts are needed to improve traditional bio energy and accelerate the transition to more sustainable forms of energy.

First generation bio fuels consist predominantly of bio ethanol and biodiesel produced from agricultural crops (e.g. maize, sugarcane). Production has been growing fast in recent years, primarily due to bio fuel support policies since they are cost competitive only under particularly favorable circumstances. The diversion of agricultural crops to fuel can raise food prices and pose a threat to food security.

Next generation bio fuels such as cellulosic ethanol and biomass-to-liquids technologies allow conversion into bio fuels of more abundant and cheaper feed stocks than first generation. This could potentially reduce agricultural land requirements per unit of energy produced and improve lifecycle GHG emissions, potentially mitigating the environmental pressures from first generation bio fuels. However, next generation bio fuels technologies are not yet commercially proven and environmental and social effects are still uncertain. For, example, the use of feedstock and farm residues can compete with the need to maintain organic matter in sustainable agro ecosystems.

Bioelectricity and bio heat are important forms of renewable energy that are usually more efficient and produce less GHG emissions than liquid bio fuels and fossil fuels. Digesters, gasifiers, and direct combustion devices could be successfully employed in certain settings, e.g., off-grid areas. There is potential for expanding these applications but AKST is needed to reduce cost and improve operational reliability. For all forms of bio energy, decision makers should carefully weigh full social, environmental and economic costs against realistically achievable benefits and other sustainable energy options. Food crop bio fuel is economically viable only when food price are low and fuel price are high.

5.12 INSTITUTIONAL CREDIT

BANKING PROFILE

Banking services to the people of West Bengal are provided through Commercial Banks (CBs), Regional Rural Banks (RRBs) and Cooperative Banks. Kolkata is the headquarters of three commercial banks, viz., United Bank of India, Allahabad Bank and UCO Bank. United Bank of India is the convener of State Level Bankers' Committee (SLBC) in the State. The cooperative credit structure in the State is following a mixed pattern. Under the Short-term structure, while the District Central Cooperative Banks (DCCBs) are functioning in 15 districts, branches of West Bengal State Cooperative Bank (WBSCB) are operating in three districts. Under the Long term structure, while the 24 Primary Cooperative Agriculture and Rural Development Banks (PCARDBs) are functioning in 16 districts, branches of West Bengal State Cooperative Agriculture and Rural Development Bank (SCARDB) are operating in two districts. West Bengal State Finance Corporation (WBSFC) is another financing agency operating in the State. United Bank of India is the lead bank in ten (10) districts, UCO Bank in four (04), whereas Central Bank of India and Allahabad Bank are lead banks in three (03) and one (01) district respectively. As per GOI instructions, the process of amalgamation of RRBs which started in 2005 in consultation with State Government and Sponsor Banks was completed in the state in February 2007. In West Bengal, the total number of RRBs after amalgamation stood at three including one standalone RRB. Five RRBs sponsored by UBI have been amalgamated into Bangiya Gramin Vikash Bank and three RRBs sponsored by UCO Bank have been amalgamated into Paschim Banga Gramin Bank. Uttarbanga Kshetriya Gramin Bank, which operates in three North Bengal districts and is sponsored by CBI, continues to function as a standalone RRB. With the amalgamation, the RRBs have larger area of operation, large branch network, enhanced resources, enhanced single exposure limit and a pool of experienced staff.

Branch Network

Total Number of bank branches in the state as on 31 March 2009 is 5359, of which Commercial Banks, RRBs, Cooperative banks and Private Banks have 3829 branches, 885 branches, 417 branches and 228 branches respectively. Number of Rural Branches in the state is 2599, which is 48.50% of total bank branches in the State.

Branch Network in West Bengal

Agency	No. of Branches as on 31 March 2009				
	Rural	Semi-urban	Urban	Metropolitan	Total
CBs	1577 (41.1)	558 (14.6)	680 (17.8)	1014 (26.5)	3829 (100)
RRBs	746 (84.3)	103 (11.6)	36 (4.1)	0 (0.0)	885 (100)
Coops	269 (64.5)	50(12.0)	82(19.6)	16 (3.9)	417 (100)
Private Banks	7(3.0)	45(19.8)	83(36.4)	93(40.8)	228 (100)
Total	**2599 (48.5)**	**756 (14.1)**	**881 (16.4)**	**1123 (21.0)**	**5359 (100)**

Note: Figures in brackets represent percentage to row total.

Deposits

The total deposits of all banks in West Bengal has increased from Rs.174946 crore in 2007-08 to Rs.221212 crore in 2008-09 registering a growth of 26.5%.

Agency-wise Deposits in West Bengal

(Rs. Crore)

Agency	2006-07	2007-08	2008-09	Growth (%)
CBs	116444	139702	174506(78.9)	24.9
RRBs	5071	6006	6962 (3.1)	15.9
WBSCB	5833	6383	8590 (3.9)	34.6
WBSCARDB	122	125	130 (0.1)	4.0
Private Banks	16959	22730	31024(14.0))	36.5
Total	**144429**	**174946**	**221212 (100)**	**26.5**

Note: Figures in brackets represent percentage to total.

The total deposits of the commercial banks in West Bengal were Rs.174506 crore as on 31 March 2009, which showed a growth of 24.9% over the previous year. The total deposits of RRBs in the State amounted to Rs.6962 crore as on 31 March 2009, registering a growth of 15.9% over the previous year. Major share in the deposits was that of commercial banks (78.9%), followed by RRBs (3.1%), WBSCB (3.9%) WBSCARDB (0.1%) and private banks (14.0%).

Loans and Advances

The total loans and advances of all agencies in West Bengal increased from Rs.113689 crore during 2007-08 to Rs.141325 crore during 2008-09, registering a growth of 24.3% during 2008-09.

Agency-wise Loans and Advances in West Bengal

(Amount Rs. in Crore)

Agency	2006-07	2007-08	2008-09	Growth %
CBs	73123	88910	112718 (79.8)	26.8
RRBs	2318	2644	2980 (2.1)	12.7
WBSCB	4077	4710	5237 (3.7)	11.2
WBSCARDB	179	467	625 (0.5)	33.9
Private Banks	15132	16958	19765(13.9)	16.6
Total	**94829**	**113689**	**141325 (100)**	**24.3**

Note: Figures in brackets represent percentage to total.

The Commercial Banks have registered a growth of 26.8% followed by RRBs at 12.7% during 2008-09. In case of WBSCB, WBSCARDB and Private Banks the growth rate was 11.2%, 33.9% and 16.6% respectively.

Credit Deposit (CD) Ratio

The CD ratio of all the financing agencies in the State which stood at 65% as on 31 March 2008 has been reduced to 64% as on 31 March 2009. CD ratio of RRBs has come down to 43 compared to previous year's 44. Appropriate action needs to be taken by RRB to improve their position.

Agency-wise CD ratio in West Bengal

Agency	CD Ratio at the end of		
	2006-07	**2007-08**	**2008-09**

CBs	66	65	64
RRBs	46	44	43
SCB	70	74	61
SCARDB	147	375	485
Private Banks	89	75	64
West Bengal State	**66**	**65**	**64**

Ground Level Credit (GLC) Flow in West Bengal

There was a growth of 15.73% in the total GLC flow in West Bengal during 2008-09 over the previous year as GLC had increased from Rs.13541 crore in 2007-08 to Rs.15672 crore in 2008-09. The share of agriculture and allied activities in total GLC flow during 2008-09 worked out to 40%. The GLC flow in agriculture and allied activities increased to Rs.6207 crore in 2008-09 from Rs.4662 crore during the last year registering an increase of 33%. Sector-wise GLC flow during the last five years is given in the following table.

Sector wise GLC flow in West Bengal - 2004-05 to 2008-09

(Rs. crore)

Sector	2004-05	2005-06	2006-07	2007-08	2008-09
Agri-Allied	1963	2968	3580	4662	6207
SSI	683	1130	1513	2207	2978
Services	1958	2488	3083	3386	3269
NPS	1779	2146	2602	3286	3218
Total	**6383**	**8733**	**10778**	**13541**	**15672**

NPS - Non-Priority Sector

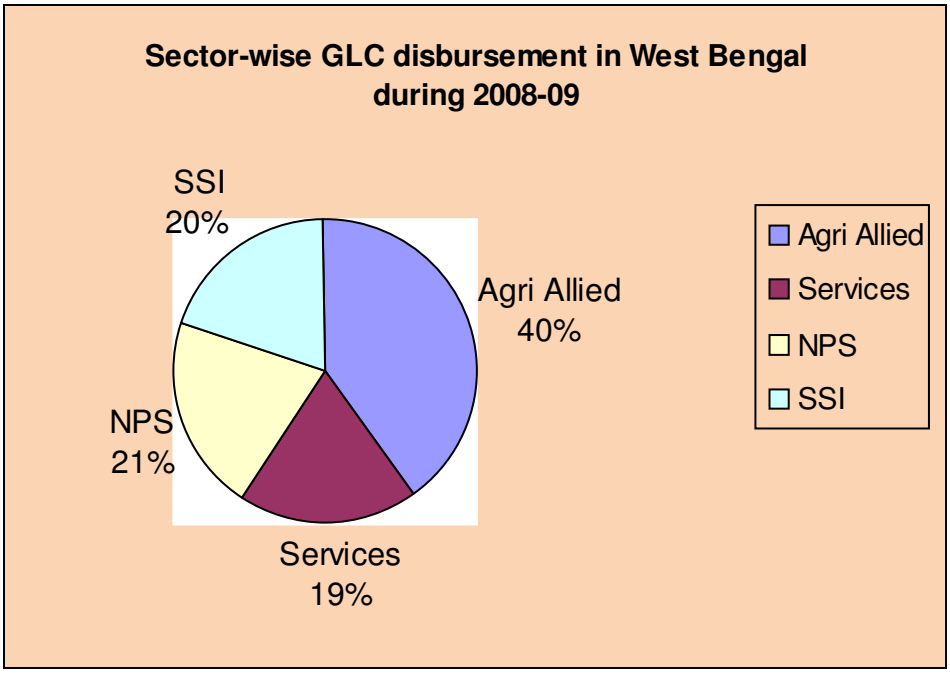
Sector-wise GLC target and achievement during the year 2008-09 is given in the following table. It may be seen from the table that the credit disbursement touched Rs.15672 crore in 2008-09 against the target of Rs.15860 crore achieving 99% of the target. Credit disbursement in respect of priority sector in West Bengal during 2008-09 was Rs.12454 crore against the target of Rs.13388 crore (93% of the target). Under agriculture and allied sector the credit disbursement during 2008-09 was Rs.6207 crore against the target of Rs.6693 crore (93% of the target).

Sector-wise GLC Disbursement in West Bengal during 2008-09

(Rs. crore)

Sectors	Target	Achievement	% Achievement
Agri-Allied	6693	6207 (40)	93
SSI	3216	2978 (19)	93
Services	3479	3269 (21)	94
Total Priority Sector	13388	12454 (80)	93
Non-priority Sector	2472	3218 (20)	130
Total	**15860**	**15672(100)**	**99**

Note - Figures in the brackets show percentage to total



Credit flow to Agriculture Sector

In order to ensure that agriculture sector grows at an annual rate of 4% as announced by the Hon'ble Finance Minister, strategies to be adopted are twofold: credit deepening method and credit widening method. Under the former method, revision of scales of finance and upward revision of KCC limit are done. Similarly, financing of new farmers, new projects, agriclinics & agri-business, lending to tenant farmers, etc., have been adopted for credit widening.

The position of agricultural credit has improved in West Bengal over the last 6 years. As per the latest available data in 2008-09 total disbursement of credit was Rs. 6207 crores against the target of Rs. 6693 crores. Thus, the achievement percentage is 93% against only 68% in 2003-04 and 80% in 2004-05. The year-wise credit flow to agriculture vis a vis the target is indicated below;

Year	Target (Rs. Crore)	Achievement (Rs. Crore)	% of Achievement
2003-04	2001	1357	67.82
2004-05	2439	1963	80.48
2005-06	3573	2970	83.12
2006-07	4000	3580	89.50
2007-08	5000	4662	93.24
2008-09	6693	6207	93.05

Other than the banks, Microfinance institutions (mFIs) have also become active during the last few years especially in the eastern part of the country. They have been providing loans to farmers, especially small loans. However, data regarding their exact numbers and the amount of loan they are providing into the agriculture sector is not clear but the business is significantly increasing in the rural areas.

Issues in Agricultural Credit:

Despite the significant strides achieved in terms of spread, network and outreach of rural financial institutions, the quantum of flow of financial resources to agriculture continues to be inadequate. One of the major impediments constraining the adoption of new technological practices, land improvements, building up of irrigation and marketing infrastructure has been the inadequacy of farm investment capital. Farmers seem to borrow more short-term credit in order to meet input needs to maintain continuity in agricultural operations without much worrying about long-term capital formation in agriculture. It might be the case from supply side that short-term credit bears low credit risk, lower supervision and monitoring costs, and a better asset liability management. The flow of investment credit to agriculture is constrained by host of factors such as high transaction costs, structural deficiencies in the rural credit delivery system, issues relating to credit worthiness, lack of collaterals in view of low asset base of farmers, low volume of loans with associated higher risks, high man power requirements, etc. The large proportion of population in the lower strata, which is having major share in the land holdings, receives much less credit than its requirements. The growing disparities between marginal, small and large farmers continue to be a cause for concern. This observed phenomenon may be attributed, inter alia, to the "risk aversion" tendency of the bankers towards small and marginal farmers as against the large farmers, who are better placed in offering collaterals.

The share of marginal and small farmers in the total credit (both disbursed and outstanding) has been shrinking. The need to augment the credit flow to the lower strata of the farming community, which has more shares in the total operational land holdings, becomes all the more important. This underscores the scope for supplementing the land inputs of marginal and small farmers with the non-land inputs such as credit with a view to enhancing the productivity and thereby the production performance of Indian agriculture. In this context, the need for linking credit supply to input use assumes importance. There is also a need for exploring new innovations in product design and methods of delivery, through better use of technology and related processes. The SHG-Bank Linkage model is an outstanding example of an innovation leveraging on community-based structures and existing banking institutions. In future, concerted efforts have to be made for enhancing the flow of credit to critical infrastructure areas such as irrigation, marketing and storage, etc., and also to areas such as watershed/ wasteland development, wind energy, allied activities such as poultry, horticulture, dairying, fisheries etc. With regard to KCCs, there is a need to upscale its outreach to cover all the eligible farmers by creating greater awareness and giving greater publicity to the scheme. Updation of land records and sensitisation of bank staff through training programmes will further add to the spread of the scheme. The exercise of preparing special agricultural credit plans with higher component of direct finance with a special thrust on small and marginal farmers should also receive high priority. High value agriculture needs higher working capital and also entails higher risks. Facilitating credit through processors, input dealers, NGOs that are vertically integrated with the farmers, including through contract farming, for providing them critical inputs or processing their produce, could increase the credit flow to agriculture significantly.

The co-operative credit structure needs revamping to improve the efficiency of the credit delivery system in rural areas. In case of co-operatives, the Vaidyanathan Committee concluded that having regard to its outreach and potential, recapitalisation could be undertaken so that the credit channels for agricultural credit which are presently choked

could be declogged. The Committee has, however, made it clear that recapitalisation should only be considered if it is preceded by legal and institutional reforms by State Governments aimed at making co-operatives democratic and vibrant institutions running as per sound business practices, governance standards and regulated at the upper tiers by the RBI. The implementation of the Vaidyanathan Committee Package is under way in the state. NABARD has been entrusted with the responsibility to oversee the implementation of the package. Special Audit has been completed in 5310 PACS out of a total 5457 working PACS in the state as on 31 December 2009. Recapitalisation assistance (GOI Share) of Rs.134.96 crore has been released to 3157 'A' category PACS. Financial assistance to the tune of Rs.381.25 crore in respect of 440 'B' Category PACS have been sanctioned by SLIC and recommended to NABARD for release of GoI's share of Rs.331.42 crore. Special Audit of DCCBs has also been completed.

The competition and search for higher returns has made commercial banks to explore profitable avenues and activities for lending such as financing of contract farming, extending credit to the value chain, financing traders and other intermediaries, which needs to be encouraged. While the institutional systems and products such as futures markets, and weather insurance have great potential to minimise the risk of lending, the process of their development needs to be carried forward. Merging and revamping of RRBs that are predominantly located in tribal/backward regions is seen as a potentially significant institutional arrangement for financing the hitherto unreached population. The experience of micro finance proved that the "poor are bankable" and they can and do save in a variety of ways and the creative harnessing of such savings is a key success factor. The SHG-Bank linkage programme is built upon the existing banking infrastructure. It has obviated the need for the creation of a new institutional set-up or introduction of a separate legal and regulatory framework. Policy making bodies have an important role in creating the enabling environment and putting appropriate policies and interventions in position, which enable rapid up scaling of efforts consistent with prudential practices. There is also a need to explore the possibility how SHGs can be induced to graduate into matured levels of enterprise. The SHG Bank-Linkage programme also needs to introspect whether it is sufficient for SHGs to only meet the financial needs of their members, or whether there is a further obligation on their part to meet the non-financial requirements necessary for setting up business and enterprises. In this process, ensuring the quality of SHGs warrants priority attention. State Governments have to make critical assessment of the manpower and skill sets available with them for forming, nurturing groups, handholding and maintaining them over time. There is a need to study the best practices in the area and evolve a policy by learning from them. Since, the access of small and marginal farmers to credit has been constrained by their inability to offer the collaterals, micro finance, which works on social collaterals, can go a long way in catering to their requirements. Hence, there is need to promote micro finance more vigorously on a widespread basis. To conclude, an assesment of agriculture credit situation brings out the fact that the credit delivery to the agriculture sector continues to be inadequate. It appears that the banking system is still hesitant on various grounds to purvey credit to small and marginal farmers. The situation calls for concerted efforts to augment the flow of credit to agriculture, alongside exploring new innovations in product design and methods of delivery, through better use of technology and related processes.

Financial Inclusion

A committee was formed under the chairmanship of Dr. C. Rangarajan to study the extent of financial inclusion of rural households and suggest measures to improve it. The Committee came out with startling figures which has also been substantiated in the NSSO 59th Round (2003). The extent of exclusion is as under:-

General

- ✓ 51.4% of farmer households are financially excluded from both formal / informal sources.
- ✓ Of the total farmer households, only 26% access formal sources of credit; one third of these groups also borrow from non-formal sources.
- ✓ Overall, 73% of farmer households have no access to formal sources of credit.

Region-wise

- ✓ Exclusion is most acute in Central, Eastern and North-Eastern regions – having a concentration of 64% of all financially excluded farmer households in the country.
- ✓ Overall indebtedness to formal sources of finance alone is only 19.66% in these three regions.

Occupational Groups

- ✓ Marginal farmer households constitute 66% of total farm households. Only 45% of these households are indebted to either formal or non-formal sources of finance.
- ✓ About 20% of indebted marginal farmer households have access to formal sources of credit.
- ✓ Among non-cultivator households nearly 80% do not access credit from any source.

Social Groups

Only 36% of ST farmer households are indebted (SCs and Other Backward Classes 51%) mostly to informal sources.

The Committee has strongly recommended the informal credit delivery mode of Business Facilitators and Business Correspondents to bring into the formal financial fold, this large section of excluded population. The major facets of financial inclusion are:-

- ✓ Providing opportunity to Savings/ thrift
- ✓ Providing access to credit
- ✓ Providing micro insurance
- ✓ Credit Counseling
- ✓ Financial Literacy
- ✓ Remittance
- ✓ Doorstep service as opposed to service at the branch

Most of the above facets can be taken care of by the informal credit delivery mode, as the number of people to be covered is very large. Importance have also been assigned to

financial literacy part as it will propagate different aspects of finance and help the borrowers to have informed choice. The above report has put the number of indebted farmer households in eastern India at 84.22 lakh out of a total 210.66 lakh households which indicates that nearly 60% of the farmer households in eastern India are non-indebted to both the formal and informal sources of finance. In West Bengal, the number of non-indebted farmer households is put at 34.53 lakh, i.e., 49.90%.

Chapter – VI

State Plan

6.1 INTRODUCTION

The State Agricultural Plan (SAP) aims at projecting the physical and financial requirements for development of Agriculture and allied sector of the State. This plan is going to present the vision for agriculture & allied sectors within the overall development perspective of the state. The major objective of State Agriculture Plan (SAP) is to consolidate and integrate all Comprehensive–District Agriculture Plans (C-DAP). It has also taken into consideration the recommendations of State Agriculture Commission. C-DAPs have been prepared based on participatory action plan for the development of agricultural & allied sectors. While preparing C-DAPs, the planning process have been initiated at grass root level i.e. at village / GP level. As State Agriculture Plan (SAP) is the consolidated form of all C-DAPs, an integrated and participatory mode of approach is the key success factor (KSF) of the State Agriculture Plan (SAP).

6.2 GROWTH DRIVERS & INNOVATIONS

The growth drivers and innovations required for the development of agriculture & allied sectors have been identified based on genuine felt needs of farming community, trend analysis, need assessment, environmental concerns and overall growth perspective of the state. Such growth drivers are presented below.

AGRICULTURE

- Diversification and intensification of agriculture as well as improvement of productivity of all the major crops through adoption of newer and sustainable technologies, use of better inputs, adoption of organic farming.

- Creation of irrigation facilities in un irrigated areas especially in western part of the state.

- Diversifying the cropping pattern from rice based cropping system to bringing additional land under cultivation of millets, maize, pulses and oilseeds.

- Emphasis on soil Health Management through soil testing infrastructure and adoption of a time bound strategy for soil survey and soil analysis with specific reference to the micro nutrients and introduction of Soil Health Cards. Developing location specific and soil status specific INM practices and propagating the same among the farming community.

- Promotion of Integrated Farming System model having food grain, vegetable, flower, fruit plants, medicinal plants along with cattle, duck, goat, fish etc, for maximum return.
- Identification of crop specific seed production zones based on agro climate, soil and water resources availability.
- Emphasizing on decentralized production of TL/certified seeds through ***"seed village concept"*** with active involvement of progressive farmers, farmers' clubs, PACs/societies, SHGs.
- Active involvement of KVKs both in production as well as extending technical support to farmers/other agencies involved in seed production
- Establishment of centralized seed processing infrastructure at potential blocks/district level
- Encouraging PPP mode in existing government seed farms for better utilization of resources.
- Adoption of fully organic Bio-seed villages in each block where an integrated approach have to be taken for overall livelihood development.
- Promotion of System of Rice Intensification (SRI) technology in the State in general and more specifically in Western part of the State. This can be adopted in other upland condition also and in hilly areas.
- Institutional support through skill up gradation of extension workers, farmer to farmer extension, public-private partnership, strengthening ATMA, participatory research, credit support, marketing & post-harvest management, risk management, price support system
- Convergence & synergy between state and central initiatives, role and accountability in implementing the schemes
- Improved farmers income (diversification, agricultural marketing, agro-processing and value addition, contract farming)
- Strengthening of the extension mechanism through both formal and informal channels, introduction of training and visit with assured timely supply of critical inputs at the farmers' door step.
- Promoting organic farming, large scale production and application of FYM, vermin compost etc., to improve soil health.
- Promotion of productivity enhancing and environment friendly technology through channel partners like KVKs, NGOs, Farmers Clubs etc.

- Increase in seed replacement ratio of various crops (paddy 30%-40%, wheat 100%, mustard 16%, and potato 50%)
- Formation & strengthening of SHGs and Farmers' Clubs
- Crop insurance to all farmers growing different types of crops

HORTICULTURE

- Increased land coverage under horticulture crops through micro irrigation practices
- Attaining self sufficiency in production of quality planting materials of various horticulture crops such as vegetables, fruits and tuber crops through the programs of National Horticulture Mission
- Increased area under floriculture by encouraging cultivation of Marigold, Jasmine, Rose and Tube rose etc.
- Development of at least one progeny orchard in each district.
- Farmers in West Bengal continue to depend on other states like Punjab, Himachal Pradesh, UP for meeting seed potato requirements. Identifying potential pockets for commercial potato seed production including True Potato Seed (TPS) and strengthening seed production infrastructure are necessary. The location specific seed production technologies need to be developed and standardized. Such initiatives will open avenues for private sector investment in potato seed production.
- Biotechnological interventions in vegetable breeding programme particularly in characterization of diversity and tagging of novel genes and using molecular markers and development of resistant varieties.
- To develop at least one model nursery in each district with advanced technologies and modern equipments.
- Encouraging re plantation of existing old tea gardens for productivity improvement at a suggestive rate of 2%. With a view to encouraging systemic re plantation, the Tea Board has launched a new subsidy cum loan assistance programme under the Special Purpose Tea Fund (SPTF) constituted for the purpose.
- Training in small scale processing to self-help groups and marketing of processed products by creating cooperatives at village level
- Improved management of waste land and degraded land
- Augmenting the soil & water conservation of the areas through watershed programs
- Agriculture extension services to farmers growing fruit bearing plants
- Initiation of more local research program for improvement of fruits production & productivity
- Diversification of crops by bringing more area under vegetables. Incentives for farmers in growing vegetables and link them with collective retail facilities in block and district
- Promotion of tissue culture plants of, citrus, large cardamom, banana, etc., to enhance productivity
- Introduction of varieties specifically cater the need of processing varieties
- Creating reliable information/database on production, procurement, processing and marketing channels for promotion of medicinal & aromatic plants (MAPs).

- Addressing the problem of inadequacies in input supply including plant material, technical / extension support for MAPs.
- Strengthening the extension network through recruitment of more field functionaries in potential districts. The initial emphasis could be in the focus districts identified under NHM.
- Promote Informal extension channel like Farmers' Clubs, Farmers' Interest Groups and educated/ progressive youth and training them as technology transfer agents with active involvement both formal (department) and informal (NGOs, Farmers' Clubs) extension agencies
- Innovations like Prani Bandhu scheme, which is a proven success in the development of AH/Dairy sector to be replicated in Horticulture/Agriculture sectors as well – like Krishi Bandhu.
- Nursery being a highly viable activity, there exist very good scope for promotion of private nurseries for production of perennial horticultural crops especially in districts like Malda, Murshidabad. The programme can be dovetailed with the LoI scheme of NHB or NHM in consultation with the Department concerned for the benefit of prospective entrepreneurs.
- Well equipped Soil testing facilities at district and block level for comprehensive soil analysis and introduction of soil health card based Integrated Nutrient Management
- Establishment of Farmer markets to remove middle men in the vegetable trade
- Encouraging agro-processing and value addition to agricultural and horticultural products.
- Strengthening of post harvest handling and marketing mechanisms and infrastructure for storage and timely supply to the markets.
- Investment in developing cold chains and encouraging retail marketing organizations.
- Assessment of credit needs (activity specific and crop specific) and preparation of credit plans and dovetailing the same with the District Credit Plans followed by a Coordinated approach to operationalize the credit plans, necessary
- The *"Producer (farmer) – Consumer markets"* (Farmers' markets) introduced in some states like AP, Tamil Nadu and Karnataka were found to be successful and beneficial to both farmers and consumers. The State Government may consider introducing the concept in the state especially in major vegetable producing and consuming centers.
- Being a major producer of vegetables, the State Government could consider establishing exclusive auction centers for fruits and vegetables on the lines of "NDDB Model" (Bangalore).
- Suitable modification of the present Agricultural Produce Market Act to facilitate the private sectors taking initiatives in setting up modern market infrastructure involving high investment, entrepreneurial skills and managerial capacities as well as direct purchase from farmers.

ANIMAL HUSBANDRY AND DAIRY

- The State doesn't have recognised breed of cattle or buffalo. The indigenous cattle produce 61% of the total milk production of the state with low milk yield. The share of CB breedable females is only around 19%. Hence up-gradation of indigenous cows / buffaloes through provision of AI service is required. At least one AI service unit should be there for every 800 breedable females.
- Demand for milk is increasing at a faster rate. The present demand –supply gap is 16.70 lakh MT and is expected to widen to 23.78 lakh MT. Hence it is necessary to adopt special measures and bring in huge investments for a period of five years to eliminate the shortfall and to maintain steady production thereafter.
- Pranibandhus have done pioneering work in providing door step AI services in the rural areas. More number of Pranibandhus may be promoted (at least one in every gram panchayat)
- Improving the productivity of livestock resources through better feed practices, by extending animal care services, and breeding facility
- Veterinary extension services to farmers, Health camps, fodder supply camps and stock points for fodder need be developed.
- The State is a fodder deficit State. The fodder requirement is around 615 MT/ year against which the availability is only 248 MT (40%). There is also acute shortage of good quality fodder seeds in the State. Establishment of fodder seed farm in all block and in private lands may be promoted
- The two main feed ingredients viz., maize and soybean are required to be imported from other States as the production in the state is insignificant vis a vis the demand. More & more farmers should grow maize, especially in North Bengal region.
- Milk collection network should be strengthened so that milk chilling centres can function with better capacity utilisation.
- Promotion of calf rearing among farmers
- Developing appropriate strategies for progeny testing of the cross-bred bulls under field conditions.
- Exploitation of opportunities for export of meat and meat products from the State.
- Establishment of zonal goat breeding centres in six-agro climatic zones.
- Special breeding program and strategy for Garole (Sundarbani) breed.
- Establish avian disease, surveillance, forecast and monitoring cell to prevent exotic disease like swine flu.
- Organised layer poultry contributes only 16% of state's egg production. Special effort may be paid for the establishment of big organized commercial layer farms.
- Creating good network of disease diagnosis, treatment and control of diseases for poultry birds
- Establishment of Central Grower Units (CGUs) for supply of Day Old Chicks
- Capacity Building of farmers through extension, publicity, training, exposure visits
- Promotion of backyard poultry in minority, backward class & tribal dominated areas of the state

- Productivity of meat producing animals is very low with one goat contributes 7 kg meat, a sheep 7.7 kg and a pig 20.9 kg. Hence supply of quality animals required for better meat yield
- Inbreeding is quite common among goats and hence male exchange programme should be taken up to arrest inbreeding depression
- Improvement in existing cold storage/ cold chain facilities for storage of meat, meat products and eggs.

FISHERIES

- There is scope for increasing the productivity of fish ponds in state from the present level of 3500 Kg/ Ha / year to 7500 Kg/ Ha / year. Capacity building of fish farmers through training on scientific farming is required to augment fish productivity.
- Create and promote investment infrastructure for fishermen and diversification of fish and fish farming for increasing production
- Hatcheries for fresh water prawn, mud crab, ornamental fishes need to be set up in the state under both public/ or private sector.
- Adequate awareness needs to be created among all private hatcheries to follow appropriate breeding protocol to arrest possible inbreeding.
- De silting of derelict tank, biological and manual control measures for weed infested ponds/ tanks, possibly through NREGS program
- All technological interventions must be taken advantage by farmers. Towards this end, awareness creation, capacity building measures like regular trainings, exposure visits, promotion of fish farmers' Clubs may be promoted for effective technology transfer.
- Establishment of more number of seed banks for year round supply of fish seeds to farmers raising table fish.
- Coordinated development of crop, animal husbandry and fisheries through integrated farming offers a good scope for sustainable farming leading to higher production, particularly in the drought prone areas.
- Since the farming techniques adopted in the State are based on extensive farming, matching commercial feed at suitable price needs to be made available. Farmers should be trained properly to prepare on-farm feeds using locally available ingredients. An assessment of nutritional input from natural/endogenous food to target species should be made to avoid wastage of prepared on-farm feeds.
- With a view to supplement the public extension, selected youths may provide farm based extension services relating to breeding, seed raising, soil-water testing, disease diagnostic and other technical services akin to Prani Bandhu in the Animal Resource Department and Krishi Bandhu in the Agriculture Deptt.
- Capacity building of women SHGs to prepare value added products like boneless meat, fish pickles, dry fish, fish curry in sachets etc,.
- Establishment of extension service and setting up of diagnostic centre for detection and prevention of fish and shrimp diseases

- Leasing out of the suitable community water bodies to fish producer groups/ SHGs/ co-operatives on a long term basis (at least for 7 years)
- Existing defunct/ weak fish farmer societies should be revived and they may be linked up with the banks
- Non-availability of adequate & timely credit hampers the development of the sector. Coordination between banks and department needs improvement, supported duly by proper review. There is a need at district level to create awareness regarding the alternate credit delivery mechanisms like SHGs and Joint Liability Groups for facilitating small fish farmers to avail credit support easily who are not in a position to offer adequate collateral securities to avail bank credit.
- Fisheries, being a seasonal activity, seasonality discipline need to be adhered to, while financing fisheries cases by both department and banks.
- The present fish insurance scheme does not take into consideration the partial loss and hence is not very popular among farmers. Absence of attractive fish insurance scheme also hampers the flow of institutional credit. There is need for an attractive insurance scheme as well as willingness of insurance agencies to reach out to the farmers.
- There is scope for improving the fisheries marketing infrastructure in the State. For effective marketing, State Government may establish adequate district wise hygienic fish markets and fix the minimum price of fish. Marketing federation is necessary to equip fish farmers with market related information like in “Chuapals” of Andhra Pradesh.
- Promote the welfare of the fish farmers through investments in housing, education, health, insurance, saving scheme for their social security

WATERSHED DEVELOPMENT & SOIL CONSERVATION

- In the context of soil and water conservation, most vulnerable areas are the lateritic tracts of western districts (Purulia, Bankura, Birbhum and Paschim Medinipur), the hilly areas of Darjeeling district, coarse sandy areas of Tarai region in Jalpaiguri, Coochbehar, Darjeeling districts and coastal saline zone comprising of 24-Parganas (North) and 24-Parganas (South) districts.
- Out of the total reported area of 86.84 lakh ha in West Bengal, 22.14 lakh ha constituting nearly 25% is affected by different problems associated with land degradation. Development of these areas possible through soil and water conservation measures by adopting watershed approach
- NABARD is implementing watershed development through a fund called ‘Watershed Development Fund (WDF)’. The unique feature of WDF in West Bengal is that the Project Implementing Agencies (PIAs) are Panchayat Samities and the role of NGOs is to facilitate the programme by mobilising the people. A total of 28129 ha under 38 watershed projects, covered so far. State Govt. may come out with a massive programme, on the lines of WDF to bring the degraded lands into farming.
- The new technologies like 30:40 models (30’x40’ plots with seepage pits) and 5% model for midlands falling in western plateau and hills region, Small Water Harvesting Structure with water supply pipe in hills in cardamom plantations and vegetable cultivated areas of Darjeeling hills, may be popularised.

- Awareness should be created among farming community about the usefulness of soil and water conservation measures on the soil fertility, improvement in soil productivity, possible ground water recharge and availability of soil moisture for the better growth of crops.

FORESTRY

- Encourage farmers to use waste land for growing forestry species like Neem, Karanja, jatropha etc,

- Awareness may be created among the tribal communities for soil conservation measures for protection of forest
- Protection of forest by empowering local community through Joint Forest Management (JFM)
- Effective implementation of compensatory plantation activities with local participation and micro-planning
- Effective implementation of regular forest management/silvicultural activities with community involvement.
- Improvement of eco tourism facilities and identification of new sites of tourist attraction
- Minimization of diversion of forest land with local support
- Active involvement of citizen's groups and NGOs in pollution control measures
- Enforcement of comprehensive environmental impact assessment prior to establishment / opening of new industries/mines
- Ensuring solid waste management and hospital waste management

AGRICULTURAL MARKETING

- Allowing establishment of private markets by making suitable amendment to APMC Act, in line with the model Act prepared by Govt. of India
- Encouraging contract farming in the state
- Establishing cold storages, refrigerated vans for agricultural product marketing both under public and private sector
- Facilitating SHGs, cooperatives, Farmers Association, Producers Group for organised marketing
- Establishing market linkages and market networking for the high value products
- Establishment of Central Zonal Markets (6 nos) with export oriented quality control facility
- Regulated market with all information related to crop production and animal welfare services.
- Specialised regulated market with training facility on post harvest technology and informations about prices of different commodity in different market using ICT.

6.3 TARGET, PRODUCTION & PRODUCTIVITY

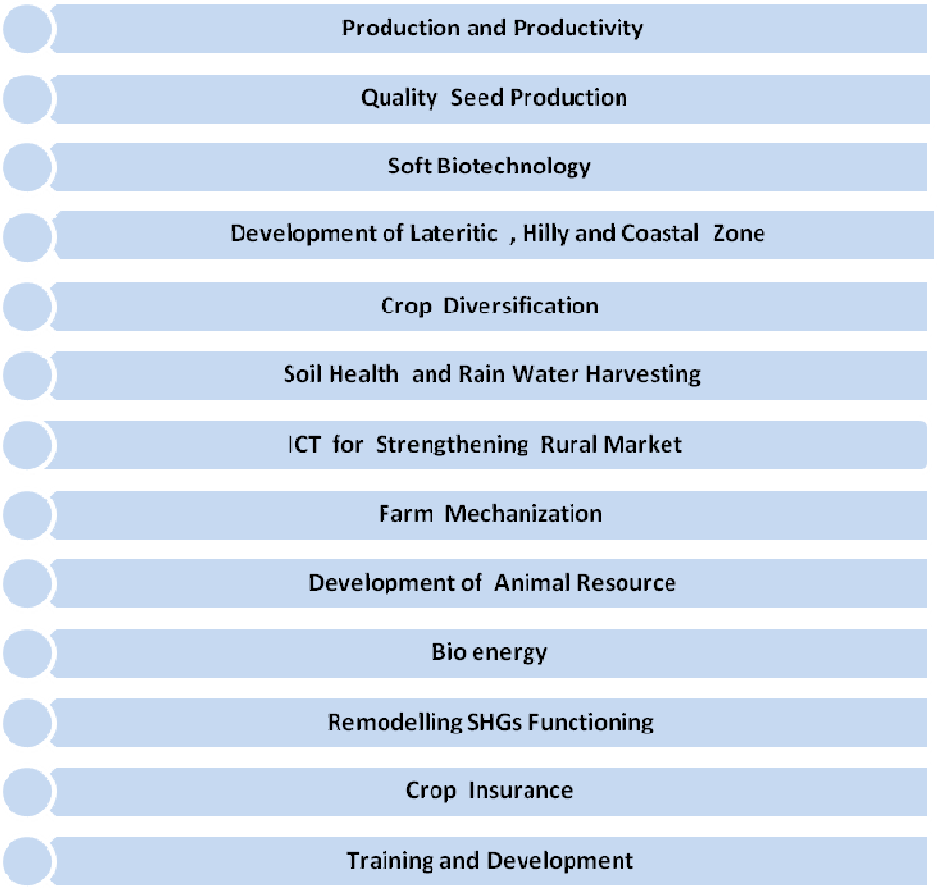
The following table depicts the area, production, productivity of major crops during the period 2007-08 to 2009-10. Keeping in view the concerted development of agriculture through various interventions under RKVY, it is expected that area, production and productivity of the major crops shall increase by the end of the 11th FYP and accordingly the projections have been made in the following table;

Sl No.	Crops	AYP	2007 – 08 (Achievement)	2008 – 09 (Achievement)	2009 – 10 (Achievement-Provisional)	2010 – 11 (Projection)	2011 – 12 (Projection)
1	Aus Rice	Area	325.1	326.7	328.4	330.0	331.7
		Yield	2346	2440	2538	2639	2745
		Prod	762.8	797.3	833.3	871.0	910.4
2	Aman Rice	Area	4096.2	4116.7	4137.2	4157.9	4178.7
		Yield	2476	2575	2678	2785	2897
		Prod	10143.1	10601.6	11080.8	11581.6	12105.1
3	Boro Rice	Area	1398.1	1405.1	1412.1	1419.2	1426.3
		Yield	3250	3380	3516	3656	3802
		Prod	4544.4	4749.8	4964.5	5188.9	5423.4
4	Total Rice	Area	5819.4	5848.5	5877.8	5907.1	5936.7
		Yield	2655	2761	2872	2986	3106
		Prod	15450.3	16148.7	16878.6	17641.5	18438.9
5	Wheat	Area	391.7	393.6	395.6	397.6	399.5
		Yield	2289	2381	2476	2575	2678
		Prod	896.5	937.2	979.5	1023.7	1070.0
6	Other Cereals	Area	106.6	107.1	107.6	108.2	108.7
		Yield	2421	2518	2619	2724	2833
		Prod	258.0	269.6	281.9	294.6	308.0
7	Total Cereals	Area	6317.6	6349.2	6381.0	6412.9	6444.9
		Yield	2628	2733	2848	2957	3075
		Prod	16604.8	17355.5	18139.9	18959.8	19816.8
8	Total Pulses	Area	235.9	239.5	243.1	246.7	250.4
		Yield	791	830	872	915	961
		Prod	186.5	198.8	211.9	225.8	240.7
9	Food Grains	Area	6553.6	6588.7	6624.0	6659.6	6695.3
		Yield	2562	2664	2770	2881	2996
		Prod	16791.3	17554.3	18351.8	19185.7	20057.5
10	Rape Seeds & Mustard	Area	445.0	453.9	463.0	472.2	481.7
		Yield	899	935	972	1011	1051
		Prod	400.0	424.4	450.0	477.4	506.2
11	Teel	Area	180.0	183.6	187.3	191.0	194.8

		Yield	861	895	931	968	1007
		Prod	155.0	164.3	174.4	184.9	196.2
12	**Other Oilseeds**	**Area**	75.0	76.5	78.0	79.6	81.2
		Yield	1467	1526	1593	1656	1726
		Prod	110.0	116.7	124.3	131.8	140.1
13	**Total Oilseeds**	**Area**	700.0	714.0	728.3	742.8	757.7
		Yield	950	988	1028	1069	1112
		Prod	665.0	705.4	748.7	794.1	842.6
14	**Sugarcane**	**Area**	20.0	22.0	25.0	27.0	30.0
		Yield	75000	76000	77000	78000	80000
		Prod	1500.0	1672.0	1925.0	2106.0	2400.0
15	**Potato**	**Area**	349.8	367.3	385.7	405.0	425.2
		Yield	22922	24068	25271	26535	27861
		Prod	8018.9	8840.9	9747.0	10746.1	11847.6
16	**Jute***	**Area**	598.9	601.9	604.9	607.9	610.9
		Yield	14.21	14.64	15.08	15.53	16.00
		Prod	8512.3	8811.6	9121.3	9441.9	9773.8
17	**Vegetables**	**Area**	913.0	924.0	937.0	952.0	970.0
		Yield	14107	14919	15831	16845	18000
		Prod	12880.0	13785.0	14834.0	16036.0	17460.0
A = Area in '000 ha, Y = Yield Rate in Kg/ha, P = Production in '000 tonnes							
T = Target, Ach = Achievement							
*** Y in bales /ha and Production in '000 bales**							

Analysis of the above table reflects that the area coverage under rice is expected to increase by 2%, while the productivity is expected to go up by 17% at the end of 11th FYP over that of 2007-08. Special thrust needs to be given for cultivation of pulses as the state is deficit in production of pulses. With focused attention, the area coverage under pulses is targeted to be increased by 6%, while the productivity and production are expected to be increased by 21% and 29% respectively. Diversifying the cropping pattern in the state by bringing additional land under cultivation of oil seeds is also required as like pulses, there is mismatch in the demand-supply in oil seeds. The area is projected to be increased by 8% with commensurate enhancement of the productivity by 21%. Sugarcane is another cash crop needing push. Accordingly, the 50% increase in area is envisaged with increased yield by 7%. Production of potato is expected to increase from 80.18 lakh tones to 118.47 lakh tones by the end of 11th FYP.

6.4 STRATEGIC FOCUS POINT



1. Promote application of ICT for strengthening rural market network.

2. Improve farm mechanization drive for small and marginal farmers.

3. Emphasis has to given on Dairy & other Animal Resource development. Cow dung & excreta should be use for Cyber gas generates & organic manure.

4. Enhance the possibility of alternate Green/ Bio energy generation in villages to meet the local demand.

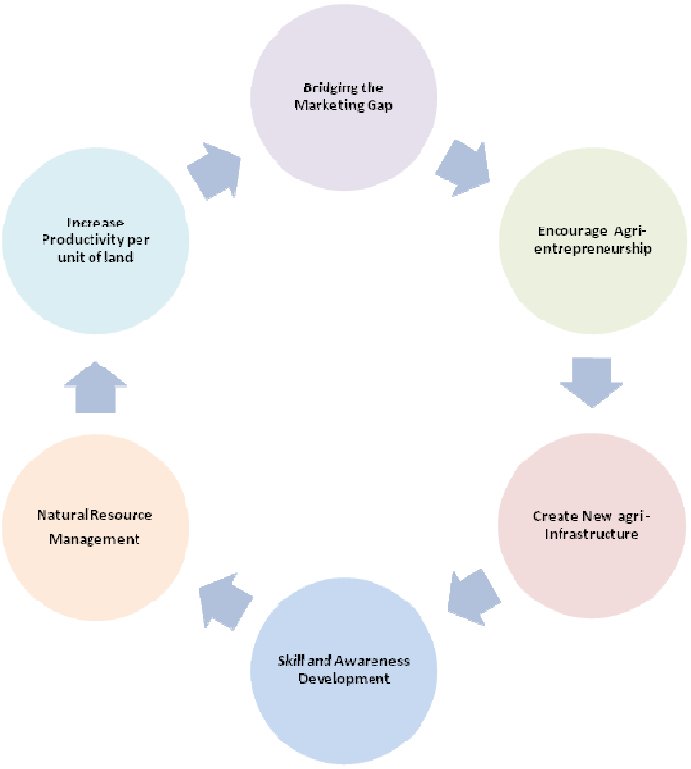
5. Remodeling SHG's/ Farmer's club functioning by proving proper training and market linkages.

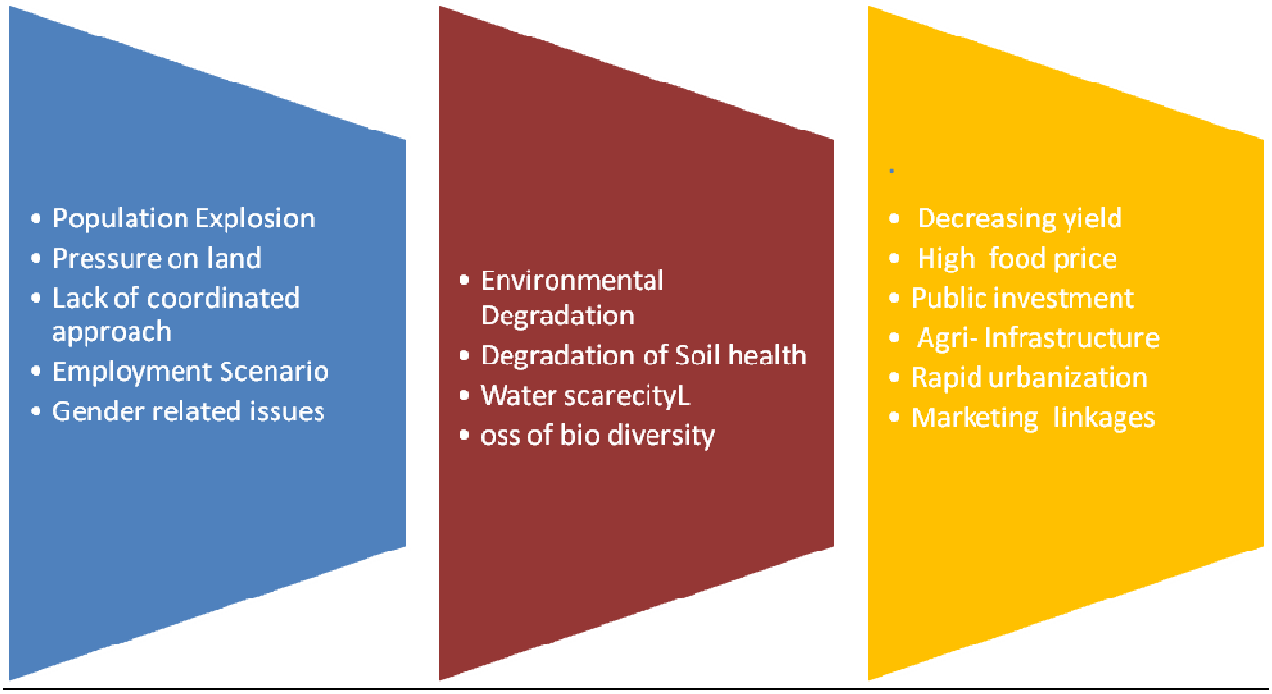
6. Crop Insurance need immediate attention to save farmers from immediate from extreme weather fluctuation.

7. Skill development of all section of farming community & extension officers so that codex compliances can be meeting by 2017.

Key Focus Point:

1. Rejuvenation and restoration of natural resources.
2. Increase productivity per unit of land.
3. Bridging Marketing Gap.
4. Encourage Agri – entrepreneurship.
5. Create new Agri – Infrastructure.
6. Skill & Awareness development.





6.5 CERTAIN CONCERNS

- Population and population growth rate in coming year in West Bengal is going to put presuure on the available land. Low land: man ratio may hamper the process of development. Population of West Bengal is going to be 9.14 crore at the end of 2011-12 and 10.16 crore at the end of 2019-20. (growth projection @1.33 % compounded annually).

- Nutritional Requirement: Per day requirement of nutrition especially BPL category people is not meeting the requirement. Employment situation is getting worse, food grain consumption and cloth consumption were falling, average calorie intake as well as protein intake showed decline and there was considerable agrarian distress.

- Climate Change and its effect on agriculture - Climate change ,which taking place at a time of increasing demand for food ,feed, fibre and fuel has the potential to irreversibly damage the natural resource base on which agriculture depends and also our entire livelihood. The relationship between climate change and agriculture is a two way process- agriculture contributes to climate change in several ways and climate change in general adversely affect the agriculture. Climate change is affecting the distribution of plants, invasive species, pests, and disease vector and the geographic range and incidence of many human, animal and plant diseases is likely to increase.

- Soil heath is going to deteriorate first unless urgent attention is paid. At present 25% land (out of net sown area) in West Bengal is falling under degraded quality. Fertility status of the soil is falling very sharply because of injudicious and unbalanced use of chemical inputs in all over the state. Shortage of water for agriculture is on the card and nothing much have been done on rain water harvesting.

- Employment scenario in rural areas- rural employment and more importantly employability of the rural youth has to increase because 60% of state's population is less than 30 years of age.

- Socio–economic condition of the farmers is not satisfactory because of low per capita income and not so developed rural infrastructure. Farmers are required to be associated with value addition process of their produce and claim a more share of the value chain to improve their present socio-economic condition.

- Present production and productivity status of different crops and vegetables needs improvement.

- Present position of post harvest technology of crops and value addition is not up to the mark in comparison to any developed country. Only 3% of fruits and vegetables have been processed in our state what should be at least 30%. So there is huge scope for improvement.

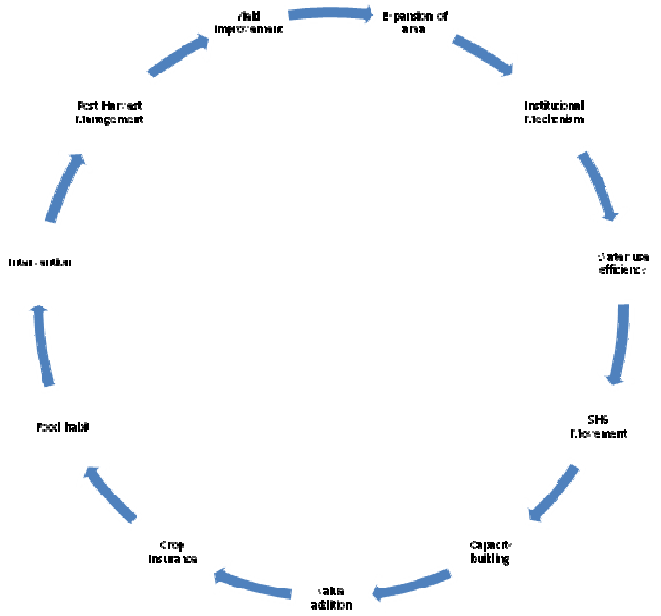
- Infrastructure development through programs like RIDF, ADMI etc.

- On going programs of respective departments need an integrated and well coordinated approach among the line departments, otherwise repetition of efforts ends up with wastage of money and energy.

- Different stimulus offered for the farming community by State and Central Govt. not reaching to the target beneficiaries.

Pointers for Development

- Expansion of area by improving degraded land
- Increasing water use efficiency and use rain water for non rainy seasonal crops
- Yield improvement and breed improvement
- Improvement of institutional mechanism for research and extension
- Improved farmers income from value addition of agricultural produce

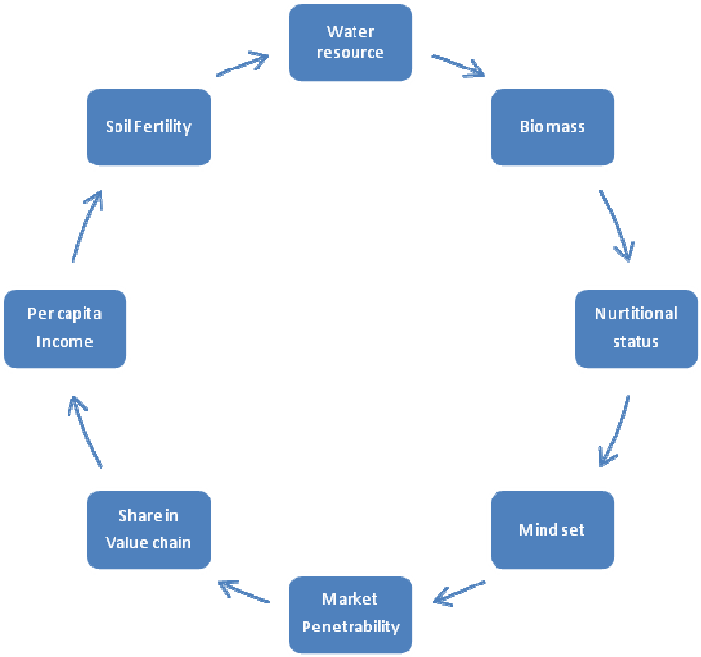


- Strengthening SHG/farmer's club movement
- Continuous training and awareness campaign of latest developed technologies for capacity building
- Crop insurance could be economically viable tool to combat climate change
- Improved post harvest techniques and infrastructure including cold chain facilities
- Value addition to raw agricultural produce
- Speedy and programmatic intervention
- Assess consumers' food habit through market research and form extension strategy

Strategic Indicator

- Condition of soil fertility
- Availability of water resource

- Availability and proper utilization of biomass
- Per capita income of the farmers
- Yield and nutritional status of the agril. produce
- Farmers mindset to accept new eco-friendly technology
- Farmers share in the Value chain
- Market penetrability of the produce



6.6 SECTOR-WISE THRUST AREAS

Agriculture

- Stepping up of the annual average agricultural growth rate.
- Capacity building among farm women.
- Prioritizing food security.
- Enhancing average productivity of food grains.
- Production of quality seeds and other bio agricultural inputs.
- High priority on crop diversification, integrated crop management, integrated pest management (IPM) and Non Pesticide Management (NPM).
- Revitalizing Government seed farms, research stations, meteorological observatories
- Research – extension-marketing linkage and extension reforms.
- Increased credit flow to marginal farmers and landless labors.
- Irrigation facilities and Rainwater harvesting.

Horticulture

- To provide holistic growth of the horticulture and food processing industrial sectors based on strategies which include research and development, technology promotion, extension, pre and post harvest management, processing and marketing through an effective blend of traditional Wisdom, effective planning, modern management and technology.
- Promote off season vegetable production both native and exotic
- Promotion of high value exotic flower production in different agro climatic zones
- Promotion of export to earn foreign currency

Forest Department

- Priority to be attached to alternate livelihood for forest fringe population.
- A cost effective system to be devised for collection, processing and marketing of timber produced.
- Panchayati Raj Institutions to involve in Farm Forestry.
- Interface between tree growing farmers and industrialists
- Rejuvenation of Forest Management Committees
- Transparent Environmental Protection Policy
- Training and orientation of forest workers for capacity building and value addition.

Animal Husbandry

- Production of required amount of milk and eggs, bridging the gap between demand and production.
- Genetic up gradation of different livestock and poultry breed.
- Extension of animal health coverage in rural areas.
- Production of quality feed and fodder
- Milk procurement and processing through milk cooperatives and dairies,
- Reduction of income inequality through transfer of resources to poorer people
- Improvement in standard of education and training in animal sciences.
- Production of vaccines and facilities for referral diagnostic services.
- Programs for farmer's training
- Animal health & welfare.

Cooperation

- Extended credit for short term as well as long term to the SHGs, marginal and land less labors for agriculture and nonfarm purpose to achieve 100% financial inclusion.
- Formation of Farmers Service Society and Large Sized Multipurpose Cooperative Societies (LAMPS).
- Revive and establish new marketing co-operatives
- Linkage credit with agricultural extension to improve production, productivity and crop intensity.
- Introduction of Management Information System (MIS) and computerization of cooperative infrastructure.
- Writing off bad debts through ' One Time Settlement' (OTS)

- Issue of Kisan Credit Cards (KCC) to across the farming community.

Rural Development Department

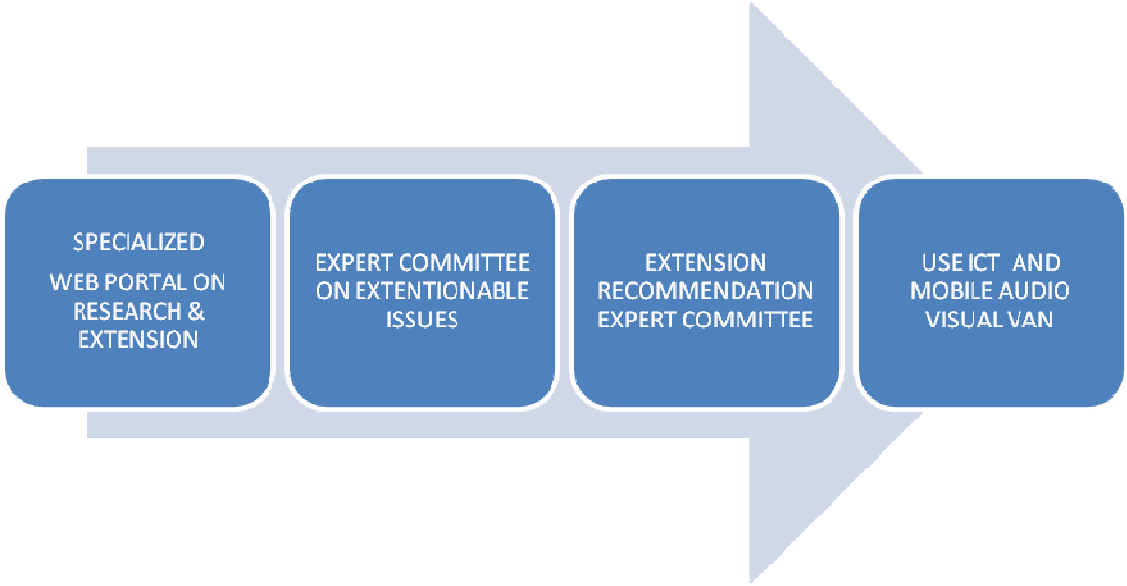
- The position of beneficiaries in the backward villages have to monitored through special arrangements and per capita expenditure as well as income must be assessed.
- Improving the yardsticks for assessing the implementation of the NREGA Programme with an eye on improving the condition of the backward beneficiaries in the rural areas.
- Data collection and sharing with different stake holder of the society

Agricultural Marketing

- Marketing system restructuring for advanced & improved marketing system.
- Developing marketing infrastructure for better post harvest management and capacity building.
- Market information and intelligence system to be provided to farmers with real time information.
- Credit flow to agriculture sector to meet the increasing demand for capital expenditure.
- Information technology usage to generate useful database and information packages for expanding marketing opportunities.
- Extension and training to assist small and marginal farmers for better marketability of their produce.

6.7 STRATEGY FOR BRIDGING GAP OF RESEARCH & EXTENSION

- Govt. / SAU should make consolidate all research findings going on in different agricultural universities, colleges and institutions by floating a web portal.
- An Expert Committee should be formed to identify important extensionable research findings which are important for farming community of the state.
- Emphasis has to give not only “Lab to Land” work but also on “Land to Lab” findings.



- Forming an "Extension Recommendation Expert Committee" by the officers from Govt. establishment- Universities- Commercial organizations –NGOs to oversee and make consensus on different content and process of extension.
- This expert committee should check all the audio-video medium use by different commercial establishment as a product promotion tool.
- Make extension process simple and more attractive using latest developed electronic gadgets and ICT.
- To introduce mobile extension van (at least one in each district), equipped with all audio-visual aids for promotion of latest agro technology in remote villages.

6.8 PUBLIC – PRIVATE PARTNERSHIP

1. Production of good quality seed and planting material for field crops, vegetables, fruits and flowers. Tissue culture lab for raising disease free planting material for medicinal plants and flowers.
2. Establishment of Agri-Clinic at gram panchyat level.
3. Promotion of Agri-Business centre at Village level using ICT.
4. Establishment of Kiosks based on e-choupal model.
5. Establishment of small scale processing unit at District/Block level to minimize post harvest loss.
6. Establishment of retail outlets of Organic products in urban areas for higher farm income.
7. Promotion of export agencies at District/Block level for taking opportunities of AEZ to increase farm income.
8. Establishment of hatcheries at block level to increase availability of good quality chicks and ducklings at Village level.
9. Establishment of animal feed making industries in district level.
10. Setting up of diagnostic laboratory for identification of diseases of live stocks.
11. Establishment of fish hatcheries at block level (including ornamental fish).
12. Setting up of diagnostic laboratory for identification of disease of live fishes.
13. Setting up of fish meal production Unit at District level.
14. Development of Modern transport facility at village level to minimize quality deterioration of fish during transit of Marketing.
15. Making available farm implements suitable for local farming practices.
16. Organic manure and bio-fertilizers production unit at block level

17. District based Agri-insurance venture.

18. Green-energy production Units.

19. Logistics support hub with cold chain facility for all agricultural produce. Multipurpose storage, grading and packaging facility for different agricultural produce.

20. Development of Agro-tourism centre in different agro climatic region.

6.9 CONVERGENCE OF FINANCIAL RESOURCES

There is scope to bring all the different schemes and on going development programmes running by the different line departments under the umbrella of flagship RKVY. Convergence of financial resources will help to take more integrated approaches which can stop wastage of financial resources and utilize the man hour in a more positive way. The indicative areas of such convergence are as under –

- Rural infrastructure development programs like making land shaping structures for rain water harvesting in Govt. and private lands, excavation of new ponds and water reservoirs, desilting of beels and rivers, derelict of ponds can be taken up under **NREGA**. This 100 days employment guarantees schemes can be utilised for not only making rural roads but for other purposes also as indicated above.
- Extension services support programmes which included training, capacity building and awareness creation programmes and infrastructural development including research and development of agril. universities and Govt. institutions to cover under RKVY/ATMA.
- Specific components of irrigation development infrastructure to be posed under ADMI.
- National Food Security Mission (NFSM) should converge with RKVY.
- Storage infrastructure specially cold storage units , storage facilities for grains which has commercial prospects can be developed through total private investments or Public-Private Partnership mode

6.10 MONITORING MECHANISM

Constant Monitoring of the implementation process is crucial not only for achieving the set goals under the plan but also in identifying operational problems and take-up necessary mid-term correction in time. An effective monitoring mechanism should be put in place comprising:

a. Internal monitoring of the progress by the district /block level in-charges of respective line departments

b. An inter-departmental coordination mechanism for joint implementation and monitoring of plan components involving more than one department

c. Constituting a State level Review & Monitoring Committee (RMC) to review the progress through structured meetings

d. Introduction of plan specific MIS as an integral part of monitoring through Plan Plus software specifically developed for the RKVY programme

e. Independent monitoring by an outside agency of repute and expertise

f. Social audit of the physical and financial components of the programme and its achievements through prominent display at public places like block/Panchayat offices which are frequented by the benefitting community.

6.11 HIGHLIGHTS OF RKVY IN WEST BENGAL

	2007 - 08	2008 – 09	2009 – 10
SLSC approval outlay (Rs. in crore)	59.37	147.38	147.59
For preparation of C - Dap	1.50		
Fund sanctioned & released by GOI	54.93	147.38	95.36 (1st installment)

	2007 - 08	2008 - 09	2009 - 10
Stake holder departments	6 (Six) - Agriculture, Animal Resources Development, Fisheries, Agri. Marketing, Forest, FPI & Horticulture	9 (Nine)-Agriculture, Animal Resources Development, Fisheries, Agri. Marketing, Forest, FPI & Horticulture, Cooperation, Water Resources Development, P & RD, SAU & NGOs	8 (Eight)- Agriculture, Animal Resources Development, Fisheries, Agri. Marketing, Forest, FPI & Horticulture, Cooperation, P & RD, SAU & NGOs
Achievement	100%	100%	Work started

Financial Outlay of RKVY- District-wise/ Sector-wise- 2008-09

Districts	Agri	ARD	Fishery	Agril. Mktg.	Forest	Horti	Water Res. Invg. & Dev.	P & RD	Co-op	SAU/ ARS	Ad. Cost	Total	%
Kolkata	_	571.8	200.8	_	_	_	_	_	_			**772.59**	5.2
Darjeeling	_	_	_	_	20.00	_	_	_	_			**20.00**	0.1

Siliguri Mahakuma Parishad	29.9	29.8	4.3	_	_	_	_	_	_			**63.92**	0.4
Jalpaiguri	320.9	109.1	_	80.0	28.0	32.9	_	_	_			**571.00**	3.9
Coochbehar	348.2	90.3	18.4	323.9	2.0	110.5	_	_	141.0			**1034.29**	7.0
Uttar Dinajpur	131.6	79.7	60.8	_	1.0	105.5	_	56.3	46.0			**480.85**	3.3
Dakshin Dinajpur	126.1	79.3	24.5	_	1.0	23.9	360.0	46.0	34.6			**695.32**	4.7
Malda	150.2	96.7	26.7	_	1.0	190.6	_	74.0	52.3			**591.42**	4.0
Murshidabad	171.2	296.8	57.0	40.0	1.0	136.3	_	69.1	66.0			**837.35**	5.7
Nadia	264.2	368.2	35.3	_	1.0	205.2	350.0	13.8	20.0			**1257.47**	8.5
North 24-Parganas	285.1	140.3	13.0	10.0	1.0	49.9	102.6	14.2	189.6			**805.65**	5.5
South 24-Parganas	203.6	194.6	_	160.0	120.3	25.4	264.0	10.3	10.5			**988.62**	6.7
Howrah	142.2	97.8	20.0	11.3	_	11.5	_	13.0	16.0			**311.73**	2.1
Hooghly	351.5	118.4	34.7	198.5	_	90.6	32.6	10.0	76.0			**912.37**	6.2
Burdwan	410.8	222.8	23.4	_	51.1	74.1	_	21.8	89.3			**893.25**	6.1
Birbhum	369.2	160.0	39.9	20.0	20.0	73.7	284.3	65.1	141.8			**1173.94**	8.0
Bankura	241.2	126.1	28.1	11.5	50.0	_	_	18.4	90.0			**565.26**	3.8
Purulia	340.1	143.7	50.0	84.3	125.1	16.0	_	69.4	97.5			**926.09**	6.3
Paschim Mednipur	282.9	372.6	16.3	38.0	50.0	_	_	_	_			**759.70**	5.2
Purba Mednipur	109.1	107.2	471.1	119.4	5.0	38.0	_	10.0	17.0			**876.77**	5.9
SAU/ARS										74.4		**74.45**	0.5
Admin. Cost											126.0	**125.97**	0.9
Total	**4277.93**	**3405.34**	**1123.96**	**1097.00**	**477.41**	**1183.97**	**1393.48**	**491.00**	**1087.48**	**74.40**	**125.97**	**14737.95**	**100**
Percentage	29.0	23.1	7.6	7.4	3.2	8.0	9.5	3.3	7.4	0.5	0.9	**100.0**	

Financial Outlay of RKVY- District-wise/ Sector-wise- 2009-10

SL. No.	Districts	Agriculture Deptt.	ARD Deptt.	Fisheries Deptt.	FPI & Hort. Deptt.	Agril. Mkg. Deptt.	Co-op Deptt.	P & R Dev. Deptt.	Forest Deptt.	Grand Total	%
1	**Darjeeling**				100.00					**100.00**	**0.69**
2	**Jalpaiguri**	403.0	192.0	7.5	25.7	103.5	128.0	32.1	83.1	**974.89**	**6.68**
3	**Coochbehar**	337.5	81.5		64.7	190.5	51.0	32.1	64.9	**822.20**	**5.64**
4	**Uttar Dinajpore**	123.3	61.5	9.7	109.9	28.5	49.0	35.1	_	**416.92**	**2.86**
5	**Dakshin Dinajpore**	158.4	86.7	9.7	55.7	8.5	45.0	_	_	**363.98**	**2.49**
6	**Malda**	133.2	189.2	128.1	5.7	96.5	43.0	0.8	7.0	**603.38**	**4.14**

7	Murshidabad	268.2	496.6	59.6	20.7	56.5	49.0	51.5	_	1001.98	6.87
8	Nadia	524.5	474.0	328.8	133.7	43.5	58.0	37.0	_	1599.50	10.96
9	North 24-Parganas	357.8	172.1	49.1	120.3	99.6	58.0	_	52.3	909.20	6.23
10	South 24-Parganas	356.9	208.1	169.0	9.5	11.2	71.0	2.3	53.6	881.61	6.04
11	Howrah	121.5	102.2	18.3	95.0	37.9	49.0	25.5	_	449.41	3.08
12	Hoogly	159.6	144.2	24.3	1.0	239.7	151.0	_	_	719.74	4.93
13	Burdwan	401.7	148.1	18.4	65.7	26.0	98.0	41.1	0.6	799.65	5.48
14	Birbhum	143.4	87.2	16.9	75.0	23.2	50.0	52.5	0.6	448.72	3.08
15	Bankura	501.1	255.5	10.2	66.2	23.2	50.0	63.7	71.0	1040.75	7.13
16	Purulia	512.1	122.2	9.7	46.1	100.9	39.0	62.7	75.5	968.22	6.64
17	Paschim Medinipur	587.9	273.6	11.6	70.0	20.8	75.0	59.5	68.3	1166.69	8.00
18	Purba Medinipur	105.4	98.9	263.4	48.0	11.2	64.0	37.6	_	628.48	4.31
19	Kolkata	71.6	423.7				200.0		_	695.30	4.77
Grand Total		5266.90	3617.47	1134.31	1112.94	1121.00	1328.00	533.00	477.00	14590.62	100.00

Financial Outlay of RKVY- District-wise- 11th FYP

District wise – Year wise Allotment of RKVY Funds and Projections

Rs In Lakhs

Districts	2007-08(A)	2008-09(A)	2009-10 (S)	2010-11(P)	2011-12(P)
Coochbehar	*	1034.29	822.20	4952.79	5154.95
Jalpaiguri		571.00	974.88	8966.37	9505.58
Uttar Dinajpur		480.84	416.92	4123.14	4278.54
Dakshin Dinajpur		695.31	363.98	5784.81	6469.10
Malda		591.42	603.37	3383.20	3676.17
Murshidabad		837.35	1001.99	6532.61	7999.76
Birbhum		1173.94	448.72	5958.44	6109.34
Nadia		1257.47	1599.50	20691.06	21392.79
North 24-Parganas		805.65	909.20	4075.42	3860.60
South 24-Parganas		988.62	881.61	11661.15	12732.35
Howrah		311.73	449.40	3900.57	4634.46
Burdwan		893.25	799.66	14439.09	15311.81
Hoogly		912.37	719.74	8045.09	8001.11
Purba Medinipur		876.77	628.48	20463.70	23155.88
Paschim Medinipur		759.70	1166.69	7092.24	8028.60

Bankura		565.26	1040.76	122422.10	98464.92
Purulia		926.09	968.23	8070.18	8649.63
Kolkata		772.59	695.30	0.00	0.00
Darjeeling		20.00	100.00	0.00	0.00
Siliguri M. Parisad		63.92	0.00	0.00	0.00
SAUs		74.45	0.00	0.00	0.00
Admin. Cost		125.97	0.00	0.00	0.00
Total	**5816.20**	**14737.99**	**14590.63**	**260561.96**	**247425.58**

A - Actual , S- Sanctioned, P – Projection

*** - Districtwise figures not received from Agriculture Dept. (RKVY Cell)**
**** - Actual (A) and Sanctioned (S) figures are as per the data provided by RKVY Cell, Dept.of Agriculture, GOWB. Projection (P) figures are as per the data available in C-DAP reports.**

Financial Outlay of RKVY- Sector-wise- 11th FYP

Department Wise Budget and Future Provision Under RKVY (Rs in lakhs)

Sectors	2007 - 08 (A)		2008 - 09 (A)		2009 - 10 (S)		2010 - 11 (P)		2011 - 12 (P)	
	Project Outlay	Share (%)	Project Outlay	Share (%)	Project Outlay	Share (%)	Project Outlay	Share (%)	Project Outlay	Share (%)
Agriculture	2225.4	38.3	4277.94	29.03	5266.90	36.10	48569.86	18.65	53185.02	21.50
Animal Resource Development	1603.1	27.6	3405.34	23.11	3617.47	24.79	11014.64	4.23	11374.23	4.60
Fisheries	562.0	9.6	1123.96	7.63	1134.31	7.77	21599.73	8.29	22596.54	9.13
FPI & Horticulture	675.8	11.6	1183.97	8.03	1112.94	7.63	17889.26	6.87	21711.17	8.78
Agril. Marketing	485.6	8.4	1097.00	7.44	1121.00	7.68	4893.85	1.88	5241.61	
Co-operation	0	0	1087.48	7.38	1328.00	9.10	7273.06	2.79	8335.26	3.37
Panchayat & Rural Development	0	0	491.00	3.33	533.00	3.65	105956.00	40.66	79513.00	32.14
Forest	264.3	4.5	477.41	3.24	477.00	3.27	2234.87	0.85	2598.29	1.05
Water Res. Invg. & Development	0	0	1393.48	9.46	0	0	21903.75	8.40	23331.83	9.42
Others	0	0		0.00	0	0	19226.94	7.38	19538.63	7.89
SAU / ARS	0	0	74.40	0.50	0	0		0.00	0	0.00

Admin. Cost	0	0	125.97	0.85	0	0	0	0.00	0	0.00
Grand Total	**5816.2**	**100**	**14737.95**	**100.00**	**14590.62**	**100.00**	**260561.96**	**100.00**	**247425.58**	**100.00**

A - Actual , S- Sanctioned, P – Projection

N.B: Actual (A) and Sanctioned (S) figures are as per the data provided by RKVY Cell, Dept. of Agriculture, GOWB. Projection (P) figures are as per the data available in C-DAP reports.

Hence, the projections made under SAP for the year 2010-11 and 2011-12 stood at Rs. 260561.96 lakh and Rs. 247425.58 lakh respectively. The district-wise/activity-wise projections are indicated in Appendices 1-18.

6.12 EXPECTED OUTCOME OF STATE AGRICULTURE PLAN

The expected outcome through various interventions contemplated under SAP has been analyzed and presented under respective sectors in chapters 4 & 5. The overall outcome at macro level and also at the ultimate beneficiary i.e., the farmer level is summarized here under:

a. At macro level

The annual growth rate at the end of XI Plan period for major crops/ activities is estimated as under:

- 19% in respect of paddy production due to productivity improvement and marginal increase in area coverage. The expected rice production shall be to the tune of 184.39 lakh Ha. The productivity (Kg/ Ha) is expected to rise by 17% over the base year of 2007-08.
- 29% increase in production of pulses from 1.86 lakh MT in 2007-08 to 2.40 lakh MT by the end of 11th FYP. This will be made possible through improving the yield from 791 kg/ ha to 961 kg/ ha during the corresponding period.
- 48% increase in production under potato from 80.18 lakh MT in 2007-08 to 118.47 lakh MT by the end of 11th FYP. The productivity during the corresponding period is expected to increase by 22% (from 22,900 kg/ ha to 27,860 kg/ ha).
- The production of oilseeds also needs to be pushed up. With better farming practice and more area under it, the production is expected to be increased from 6.65 lakh MT to 8.42 lakh MT.
- 36% increase in production of vegetables from the base level of 128.80 lakh MT to 174.60 lakh MT by the end of 11th FYP.
- 19% increase in milk production
- 15% increase in poultry broiler meat production
- 16% increase in fish production

b. At micro level (farmer level)

The total annual income under different cropping seasons from a unit area of 2 acres or 0.66 ha (average land holding) has been quantified at the prevailing stage and also through various interventions contemplated under RKVY. The comparative analysis is presented in the following table which is self explanatory.

Table: 38 Comparative Analysis of Pre & Post SAP income at farmer level

Cropping sequence	*Present Net income (pre-SAP)*	*Income after SAP interventions*	*Incremental income after SAP implementation*	*% increase in net income*
Rice+Potato	12450	15576	3126	25%
Rice+Potato+Sesamum	13972	21021	7049	**50%**
Rice+Ptato+groundnut	13372	18092	4720	35%
Rice+Ptato+Jute	14898	21055	6157	41%
Rice+vegetables	14760	17655	2895	**20%**
Rice+Rice+vegetables	20418	29783	9365	46%
Rice+Wheat+Jute	11659	17121	5462	47%
Rice+Potato+vegetables	20700	26301	5601	27%

6.13 CONCLUSION

The State Agriculture Plan (SAP) has been prepared based on the assessment and quantification of felt needs and unfelt needs identified through the process of interactions at district /block/GP level, during the process of preparation of CDAPs. The gaps in present level of technology adoption and interventions necessary to address the same including strengthening of related infrastructure have also been analyzed. The priorities have been defined and the road map is drawn for the same. With an effective implementation and monitoring strategy, the process is expected to influence the much needed production and productivity enhancement both at individual farmer level and ultimately at macro level.

APPENDIX I					
AGRICULTURE					
					Rs. in lakh
Sl No	**District**	**2009 -10**	**2010-11**	**2011-12**	**Total**
1	BANKURA	3481.29	3694.73	3749.31	10925.33
2	BARDHAMAN	6101.37	7616.95	8509.82	22228.14
3	BIRBHUM	923.13	970.12	1002.42	2895.67
4	COOCHBEHAR	210.86	193.00	219.25	623.12
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	971.28	1394.87	1819.21	4185.35
7	HOOGHLY	899.56	1020.76	1107.38	3027.70
8	HOWRAH	1318.22	1456.03	1608.15	4382.40
9	JALPAIGURI	1370.61	1538.93	1554.49	4464.03
10	MALDA	504.69	824.33	615.12	1944.14
11	MURSHIDABAD	1479.47	2007.50	2584.85	6071.82
12	NADIA	7930.43	7846.55	8178.38	23955.36
13	NORTH 24 PARAGANAS	924.96	1429.96	1223.06	3577.98
14	PASCHIM MEDINIPUR	1654.11	1989.66	2240.72	5884.49
15	PURBA MEDINIPUR	2678.17	4516.27	6047.47	13241.91
16	PURULIA	5570.00	5705.00	6170.00	17445.00
17	SOUTH 24 PARAGANAS	490.04	521.15	559.17	1570.36
18	UTTAR DINAJPUR	1759.48	1776.71	1809.92	5346.11
	TOTAL	**38267.67**	**44502.53**	**48998.71**	**131768.91**

APPENDIX II

SOIL CONSERVATION

Rs. in lakh

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA(extn+DPAP+DDA)	204.72	231.67	240.19	676.58
2	BARDHAMAN	64.93	70.08	80.89	215.90
3	BIRBHUM	28.65	31.80	42.61	103.06
4	COOCHBEHAR	1963.92	2025.34	2096.16	6085.42
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	0.00	0.00	0.00	0.00
7	HOOGHLY	0.00	0.00	0.00	0.00
8	HOWRAH	0.00	0.00	0.00	0.00
9	JALPAIGURI	447.92	457.54	418.31	1323.77
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA	0.00	0.00	0.00	0.00
13	NORTH 24 PARAGANAS	0.00	0.00	0.00	0.00
14	PASCHIM MEDINIPUR	0.00	0.00	0.00	0.00
15	PURBA MEDINIPUR	0.00	0.00	0.00	0.00
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	1191.41	1250.91	1308.15	3750.47
18	UTTAR DINAJPUR	0.00	0.00	0.00	0.00
	TOTAL	**3901.55**	**4067.34**	**4186.31**	**12155.20**
	(Note: This Sector included under 'Agriculture' for Broad Sector Totalling.)				

APPENDIX III					
HORTICULTURE					
					(Rs. In lakh)
Sl No	**District**	**2009 -10**	**2010-11**	**2011-12**	**Total**
1	BANKURA	4357.63	5917.75	8962.13	19237.51
2	BARDHAMAN	197.91	65.37	65.47	328.75
3	BIRBHUM	305.98	118.37	118.47	542.82
4	COOCHBEHAR	183.39	207.69	218.39	609.46
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	125.90	133.49	138.48	397.87
7	HOOGHLY	699.18	948.98	975.68	2623.84
8	HOWRAH	119.95	34.68	37.83	192.45
9	JALPAIGURI	2793.80	3706.85	3696.44	10197.09
10	MALDA	1183.00	1025.83	1142.17	3351.00
11	MURSHIDABAD	96.75	119.21	142.81	358.77
12	NADIA	1746.22	1773.66	1831.77	5351.65
13	NORTH 24 PARAGANAS	12162.25	166.00	157.65	12485.90
14	PASCHIM MEDINIPUR	676.92	652.17	209.17	1538.26
15	PURBA MEDINIPUR	615.78	531.42	1150.06	2297.26
16	PURULIA	890.70	891.88	941.88	2724.46
17	SOUTH 24 PARAGANAS	254.19	267.78	277.32	799.29
18	UTTAR DINAJPUR	170.60	214.20	239.98	624.78
	TOTAL	**26580.15**	**16775.33**	**20305.69**	**63661.16**

APPENDIX IV

ANIMAL RESOURCE DEVELOPMENT

(Rs. in lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	729	674	519	1922
2	BARDHAMAN	695.28	421.9	538.3	1655.48
3	BIRBHUM	169.83	169.83	169.83	509.49
4	COOCHBEHAR	1363.49	1358.39	1409.04	4130.92
5	DARJEELING	0	0	0	0
6	DAKSHIN DINAJPUR	113.19	105.31	109.8	328.3
7	HOOGHLY	1076.26	1041.26	1041.26	3158.78
8	HOWRAH	926.89	578.65	574.69	2080.23
9	JALPAIGURI	139.08	187.56	225.66	552.3
10	MALDA	210.15	212.12	242.3	664.57
11	MURSHIDABAD	1054.95	1160.95	1276.45	3492.35
12	NADIA	2200.15	2048.65	2245.94	6494.74
13	NORTH 24 PARAGANAS	62.271	68.205	71.64	202.116
14	PASCHIM MEDINIPUR	466.73	296.1	291.1	1053.93
15	PURBA MEDINIPUR	802.74	1668.25	1582.66	4053.65
16	PURULIA	236.15	236.15	246.15	718.45
17	SOUTH 24 PARAGANAS	279.74	296.46	324.35	900.55
18	UTTAR DINAJPUR	503.088	490.85	506.06	1499.998
	TOTAL	**11028.99**	**11014.64**	**11374.23**	**33417.85**

APPENDIX V

FISHERIES

(Rs. in lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	29.00	29.00	40.00	98.00
2	BARDHAMAN	484.90	39.70	37.74	562.34
3	BIRBHUM	81.89	81.89	81.89	245.67
4	COOCHBEHAR	429.12	445.91	457.67	1332.70
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	592.74	524.06	544.90	1661.69
7	HOOGHLY	2391.92	2438.17	2539.90	7369.99
8	HOWRAH	511.84	632.61	759.02	1903.47
9	JALPAIGURI	142.99	167.93	197.97	508.89
10	MALDA	171.07	152.34	242.25	565.66
11	MURSHIDABAD	1346.25	2065.44	2599.67	6011.36
12	NADIA	285.07	285.07	285.07	855.21
13	NORTH 24 PARAGANAS	693.60	808.60	871.60	2373.80
14	PASCHIM MEDINIPUR	510.00	696.00	792.50	1998.50
15	PURBA MEDINIPUR	12239.76	12455.76	12307.76	37003.28
16	PURULIA	119.62	129.85	130.10	379.57
17	SOUTH 24 PARAGANAS	248.90	249.90	276.00	774.80
18	UTTAR DINAJPUR	362.50	397.50	432.50	1192.50
	TOTAL	**20641.17**	**21599.73**	**22596.54**	**64837.43**

APPENDIX VI

AGRICULTURE MARKETING

(Rs. In lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	417.50	542.50	429.00	1389.00
2	BARDHAMAN	151.44	74.62	74.62	300.68
3	BIRBHUM	74.62	74.62	74.62	223.86
4	COOCHBEHAR	68.72	75.40	83.42	227.54
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	531.25	531.25	531.25	1593.75
7	HOOGHLY	290.00	455.00	600.00	1345.00
8	HOWRAH	975.58	633.14	641.46	2250.18
9	JALPAIGURI	240.00	140.00	90.00	470.00
10	MALDA	244.00	404.00	594.00	1242.00
11	MURSHIDABAD	487.00	682.50	795.00	1964.50
12	NADIA	76.82	76.82	76.82	230.46
13	NORTH 24 PARAGANAS	200.00	200.00	160.00	560.00
14	PASCHIM MEDINIPUR	377.70	351.90	389.95	1119.55
15	PURBA MEDINIPUR	377.70	351.90	389.95	1119.55
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	0.00	0.00	0.00	0.00
18	UTTAR DINAJPUR	298.80	300.20	311.52	910.52
	TOTAL	**4811.13**	**4893.85**	**5241.61**	**14946.59**

APPENDIX VII

AGRI IRRIGATION & WATER RESOURCES

(Rs in lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	2475.00	2310.00	2363.00	7148.00
2	BARDHAMAN	5389.43	5352.43	5145.43	15887.29
3	BIRBHUM	4111.43	4111.43	4111.43	12334.29
4	COOCHBEHAR	0.00	0.00	0.00	0.00
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	1350.14	1350.57	1518.01	4218.72
7	HOOGHLY	876.67	1461.08	991.55	3329.30
8	HOWRAH	2855.85	0.00	412.45	3268.30
9	JALPAIGURI	1124.00	1242.50	1323.50	3690.00
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA	0.00	0.00	0.00	0.00
13	NORTH 24 PARAGANAS	1078.60	1078.60	1078.60	3235.80
14	PASCHIM MEDINIPUR	472.05	661.02	949.31	2082.38
15	PURBA MEDINIPUR	357.00	624.00	936.00	1917.00
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	3644.01	3553.31	4330.80	11528.12
18	UTTAR DINAJPUR	154.31	158.81	171.75	484.87
	TOTAL	**23888.49**	**21903.75**	**23331.83**	**69124.07**

APPENDIX VIII

SOCIAL FORESTRY

(Rs in lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	0.00	0.00	0.00	0.00
2	BARDHAMAN	26.00	26.00	26.00	78.00
3	BIRBHUM	26.00	26.00	26.00	78.00
4	COOCHBEHAR	0.00	0.00	0.00	0.00
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	334.64	354.74	372.89	1062.27
7	HOOGHLY				0.00
8	HOWRAH	14.20	13.70	15.00	42.90
9	JALPAIGURI	42.70	84.53	96.80	224.03
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA	1.60	1.60	1.60	4.80
13	NORTH 24 PARAGANAS	103.15	106.50	65.50	275.15
14	PASCHIM MEDINIPUR	1274.00	1281.50	1629.00	4184.50
15	PURBA MEDINIPUR	0.00	0.00	0.00	0.00
16	PURULIA	323.25	340.30	365.50	1029.05
17	SOUTH 24 PARAGANAS (other agri)	0.00	0.00	0.00	0.00
18	UTTAR DINAJPUR	0.00	0.00	0.00	0.00
	TOTAL	**2145.54**	**2234.87**	**2598.29**	**6978.7**

APPENDIX IX

SERICULTURE

(Rs in lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	82.05	80.52	81.61	244.18
2	BARDHAMAN	63.00	63.00	63.00	189.00
3	BIRBHUM	69.58	69.58	69.58	208.74
4	COOCHBEHAR	53.69	52.06	51.02	156.77
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	0.00	0.00	0.00	0.00
7	HOOGHLY	0.00	0.00	0.00	0.00
8	HOWRAH	0.00	0.00	0.00	0.00
9	JALPAIGURI	120.48	96.50	348.07	565.05
10	MALDA	317.14	324.58	335.33	977.05
11	MURSHIDABAD	162.80	158.88	178.25	499.93
12	NADIA	76.50	70.50	77.50	224.50
13	NORTH 24 PARAGANAS	0.00	0.00	0.00	0.00
14	PASCHIM MEDINIPUR	158.10	185.10	182.10	525.30
15	PURBA MEDINIPUR	0.00	0.00	0.00	0.00
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	11.82	13.21	19.02	44.05
18	UTTAR DINAJPUR	0.00	0.00	0.00	0.00
	TOTAL	**1115.16**	**1113.93**	**1405.48**	**3634.57**

(Note: This sector included under "Horticulture' in Broad Sector Totaling)

APPENDIX X					
COOPERATION					
					(Rs in lakh)
Sl No	**District**	**2009 -10**	**2010-11**	**2011-12**	**Total**
1	BANKURA	1150.00	1200.00	1314.00	3664.00
2	BARDHAMAN	663.20	709.04	770.54	2142.78
3	BIRBHUM	2871.50	299.00	406.50	3577.00
4	COOCHBEHAR	0.00	0.00	0.00	0.00
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	320.57	416.62	442.70	1179.89
7	HOOGHLY	338.50	479.68	505.18	1323.36
8	HOWRAH				0.00
9	JALPAIGURI	105.50	137.00	168.50	411.00
10	MALDA	395.00	440.00	505.00	1340.00
11	MURSHIDABAD	252.74	338.13	422.73	1013.60
12	NADIA	1317.50	1428.00	1535.50	4281.00
13	NORTH 24 PARAGANAS	284.41	217.55	232.55	734.51
14	PASCHIM MEDINIPUR	657.22	978.79	1344.75	2980.76
15	PURBA MEDINIPUR	254.00	195.50	238.50	688.00
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	199.07	213.43	227.54	640.04
18	UTTAR DINAJPUR	214.17	220.32	221.27	655.76
	TOTAL	**9023.38**	**7273.06**	**8335.26**	**24631.70**

APPENDIX XI					
OTHERS-KVK					
					(Rs in lakh)
Sl No	**District**	**2009 -10**	**2010-11**	**2011-12**	**Total**
1	BANKURA	135.44	71.23	7.88	214.55
2	BARDHAMAN	0.00	0.00	0.00	0.00
3	BIRBHUM	0.00	0.00	0.00	0.00
4	COOCHBEHAR	0.00	0.00	0.00	0.00
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR (Cottage & small scale + food process)	0.00	0.00	0.00	0.00
7	HOOGHLY	0.00	0.00	0.00	0.00
8	HOWRAH(KV Kendra)	18.53	1.74	1.68	21.95
9	JALPAIGURI (kvk)	87.16	170.03	153.84	411.03
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA	1.55	1.55	1.55	4.65
13	NORTH 24 PARAGANAS	0.00	0.00	0.00	0.00
14	PASCHIM MEDINIPUR	0.00	0.00	0.00	0.00
15	PURBA MEDINIPUR	0.00	0.00	0.00	0.00
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	0.00	0.00	0.00	0.00
18	UTTAR DINAJPUR(warehouse)	0.00	0.00	0.00	0.00
	TOTAL	**242.68**	**244.55**	**164.95**	**652.18**
	(Note: This sector included under 'Others' in Broad Sector Totalling.)				

APPENDIX XII

OTHERS- KHADI, COTTAGE INDUSTRIES & DIC

(Rs in lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	466.80	615.60	477.30	1559.70
2	BARDHAMAN	0.00	0.00	0.00	0.00
3	BIRBHUM	0.00	0.00	0.00	0.00
4	COOCHBEHAR	0.00	0.00	0.00	0.00
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR (COTTAGE & small scale + food process)	701.68	734.90	742.87	2179.45
7	HOOGHLY	166.80	200.16	240.16	607.12
8	HOWRAH(KVI)	105.00	140.00	150.00	395.00
9	JALPAIGURI (dic)	650.00	817.00	1092.00	2559.00
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA	0.00	0.00	0.00	0.00
13	NORTH 24 PARAGANAS	0.00	0.00	0.00	0.00
14	PASCHIM MEDINIPUR	0.00	0.00	0.00	0.00
15	PURBA MEDINIPUR	0.00	0.00	0.00	0.00
16	PURULIA (cottage & small scale)	491.00	542.00	566.00	1599.00
17	SOUTH 24 PARAGANAS	0.00	0.00	0.00	0.00
18	UTTAR DINAJPUR	285.27	297.15	311.04	893.46
	TOTAL	**2866.55**	**3346.81**	**3579.37**	**9792.73**
	(Note: This sector included under 'Others' in Broad Sector Totaling)				

APPENDIX XIII					
PANCHAYAT					
					(Rs in lakh)
Sl No	**District**	**2009 -10**	**2010-11**	**2011-12**	**Total**
1	BANKURA	79333.00	105811.00	79368.00	264512.00
2	BARDHAMAN	2.00	4.00	6.00	12.00
3	BIRBHUM	3.00	6.00	9.00	18.00
4	COOCHBEHAR	4.00	8.00	12.00	24.00
5	DARJEELING	5.00	10.00	15.00	30.00
6	DAKSHIN DINAJPUR	6.00	12.00	18.00	36.00
7	HOOGHLY	7.00	14.00	21.00	42.00
8	HOWRAH	145.00	145.00	145.00	435.00
9	JALPAIGURI	0.00	0.00	0.00	0.00
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA	0.00	0.00	0.00	0.00
13	NORTH 24 PARAGANAS	0.00	0.00	0.00	0.00
14	PASCHIM MEDINIPUR	0.00	0.00	0.00	0.00
15	PURBA MEDINIPUR	0.00	0.00	0.00	0.00
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	0.00	0.00	0.00	0.00
18	UTTAR DINAJPUR	0.00	0.00	0.00	0.00
	TOTAL	**79505**	**106010**	**79594**	**265109**

APPENDIX XIV					
OTHERS-MISCELLANEOUS					
					(Rs in lakh)
Sl No	**District**	**2009 -10**	**2010-11**	**2011-12**	**Total**
1	BANKURA (lac)	23.90	26.10	0.00	50.00
2	BARDHAMAN	0.00	0.00	0.00	0.00
3	BIRBHUM (agri-allied training)	6.59	5.80	5.99	18.38
4	COOCHBEHAR	570.00	595.00	620.00	1785.00
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR (food process)	229.00	239.00	249.00	717.00
7	HOOGHLY				0.00
8	HOWRAH(handloom)	284.26	265.03	289.18	838.47
9	JALPAIGURI (tea+eco cluster)	200.00	220.00	140.00	560.00
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA (terminal mkt, int fish, banana, duckery& agro-tourism, capacity building undr AADMI)	7158.66	7158.66	7158.66	21475.97
13	NORTH 24 PARAGANAS	0.00	0.00	0.00	0.00
14	PASCHIM MEDINIPUR	0.00	0.00	0.00	0.00
15	PURBA MEDINIPUR (agri-mechanical)	120.60	120.60	503.48	744.68
16	PURULIA (food process)	210.00	225.00	230.00	665.00
17	SOUTH 24 PARAGANAS (other	5240.00	5295.00	5410.00	15945.00

	agri.)				
18	UTTAR DINAJPUR(public health engg)	260.94	267.40	274.50	802.84
	TOTAL	**14303.95**	**14417.58**	**14880.81**	**43602.34**
	(Note: This sector included under 'Others' in Broad Sector Totalling.)				

APPENDIX XV

OTHERS - NFS & SERVICE SECTOR

(Rs in lakh)

Sl No	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	913.50	1218.00	913.50	3045.00
2	BARDHAMAN	0.00	0.00	0.00	0.00
3	BIRBHUM	0.00	0.00	0.00	0.00
4	COOCHBEHAR	0.00	0.00	0.00	0.00
5	DARJEELING	0.00	0.00	0.00	0.00
6	DAKSHIN DINAJPUR	0.00	0.00	0.00	0.00
7	HOOGHLY	0.00	0.00	0.00	0.00
8	HOWRAH	0.00	0.00	0.00	0.00
9	JALPAIGURI	0.00	0.00	0.00	0.00
10	MALDA	0.00	0.00	0.00	0.00
11	MURSHIDABAD	0.00	0.00	0.00	0.00
12	NADIA	0.00	0.00	0.00	0.00
13	NORTH 24 PARAGANAS	0.00	0.00	0.00	0.00
14	PASCHIM MEDINIPUR	0.00	0.00	0.00	0.00
15	PURBA MEDINIPUR	0.00	0.00	0.00	0.00
16	PURULIA	0.00	0.00	0.00	0.00
17	SOUTH 24 PARAGANAS	0.00	0.00	0.00	0.00
18	UTTAR DINAJPUR			0.00	0.00
	TOTAL	**913.5**	**1218**	**913.5**	**3045**

(Note: This sector included under 'Others' in Broad Sector Totaling.)

APPENDIX XVI

CONSOLIDATION OF CDAPS IN DISTRICTS ACROSS THE STATE

(Rs lakh)

	District	2009 -10	2010-11	2011-12	Total
1	BANKURA	93798.83	122422.10	98464.92	314685.85
2	BARDHAMAN	13839.46	14443.09	15317.81	43600.36
3	BIRBHUM	8672.20	5964.44	6118.34	20754.98
4	COOCHBEHAR	4847.19	4960.79	5166.95	14974.93
5	DARJEELING	5.00	10.00	15.00	30.00
6	DAKSHIN DINAJPUR	5276.38	5796.81	6487.10	17560.29
7	HOOGHLY	6745.89	8059.09	8022.11	22827.09
8	HOWRAH	7275.32	3900.57	4634.46	15810.35
9	JALPAIGURI	7464.24	8966.37	9505.58	25936.19
10	MALDA	3025.05	3383.20	3676.17	10084.42
11	MURSHIDABAD	4879.96	6532.61	7999.76	19412.33
12	NADIA	20794.50	20691.06	21392.79	62873.69
13	NORTH 24 PARAGANAS	15509.24	4075.42	3860.60	23445.26
14	PASCHIM MEDINIPUR	6246.83	7092.24	8028.60	21367.67
15	PURBA MEDINIPUR	17445.75	20463.70	23155.88	61065.33
16	PURULIA	7840.72	8070.18	8649.63	24560.53
17	SOUTH 24 PARAGANAS	11559.18	11661.15	12732.35	35952.68

18	UTTAR DINAJPUR	4009.16	4123.14	4278.54	11517.37
	Total	**239234.89**	**260615.95**	**247506.58**	**746459.32**
	Total for 10-11 & 11-12 in Rs lakh		**499850.84**		
	Total for 10-11 & 11-12 in Rs crore		**4998.51**		

Annexures

Annexure-1 : Population in West Bengal and India (in crores)					
Particulars	**Male**	**Female**	**Total**	**Rural**	**Urban**
West Bengal	4.14	3.87	8.01	5.77	2.24
India	53.22	49.65	102.87	74.26	28.61
Source : Census Reports : Economic Review 2008-09 Government of West Bengal					

Annexure -2 : Age Groupwise Pecentage of Population in West Bengal					
SL. No	**Age - group**	**Percentage to Total Population**			
		1971	**1981**	**1991**	**2001**
1	**0 - 4**	15	12	12	9
2	**5 - 9**	15	14	13	12
3	**10 -14**	13	13	12	12
4	**15 - 19**	9	11	9	9
5	**20 - 24**	8	10	9	9
6	**25 - 29**	8	8	9	9
7	**30 - 34**	7	6	7	8
8	**35 - 39**	6	6	7	7
9	**40 - 44**	5	5	5	6
10	**45 - 49**	4	4	4	5
11	**50 - 54**	3	3	3	4
12	**55-59**	2	2	3	3
13	**60 and above**	5	6	7	7
Source : Census Reports ; Economic Review 2008 - 09, Government of West Bengal					

Annexure - 3 : Growth of Population, Density and Literacy in West Bengal and India							
Sl No.	**Particulars**	**1981**		**1991**		**2001**	
		India	**West Bengal**	**India**	**West Bengal**	**India**	**West Bengal**
1	**Population (in lakhs)**	6833.29	545.81	8463.03	680.78	1028.37	801.76
2	**Decennial percentage variation of population**	24.66 (1971-81)	23.17 (1971-81)	23.85 (1981-91)	24.73 (1981-91)	21.56 (1991-2001)	17.77 (1991-2001)
3	**Density of population (per sq km.)**	216	615	273	767	325	903
4	**Percentage of urban population to total population**	23.34	26.47	26.13	27.48	27.81	27.97
5	**Literacy (per cent)**	43.56	48.64	52.19	57.7	64.82	68.64
6	**Sex Ratio (Number of females per 1000 males)**	933	911	927	917	933	934
Source : Census Reports ; Economic Review 2008 - 09, Government of West Bengal							

Annexure - 4 : Total Main Workers and its percentage distribution in West Bengal									
Category	Rural			Urban			Total		
	Person	Male	Female	Person	Male	Female	Person	Male	Female
Main wokers	16106580	13551865	2554715	6217003	5943106	973897	23023583	19494971	3528612
Percentage distribution of Main Workers									
I. Cultivators	19.53	17.95	1.58	0.25	0.21	0.09	19.79	18.17	1.62
II. Agicultural labourers	19.3	15.48	3.32	0.34	0.29	0.05	19.64	16.26	3.38
III. Household industries	4.72	2.42	2.30	1.52	0.96	0.56	6.24	3.38	2.86
IV. Other workers	26.40	22.51	3.09	27.92	24.35	3.52	54.32	46.95	7.47
Source : Census of India ; Economic Review 2008 - 09, Government of West Bengal									

Annexure -5 : Some Important Demograpic Features of West Bengal as Revealed in the Last Four Census					
SL. No.	**Items**	**1971**	**1981**	**1991**	**2001**
1	**Total population (in lakhs)**	443.12	545.81	680.78	801.76
2	**Number of male population (in lakhs)**	234.36	285.61	355.11	414.66
3	**Percentage of male population to total population**	52.89	52.33	52.16	51.72
4	**Number of female population (in lakhs)**	208.76	260.2	325.67	387.1
5	**Percentage of female population to total population**	47.11	47.67	47.84	48.28
6	**Urban population (in lakhs)**	109.67	144.47	187.08	224.27
7	**Percentage of Urban population to total population**	24.75	26.47	27.48	27.97
8	**Rural population (in lakhs)**	333.45	401.34	493.7	577.49
9	**Percentage of Rural population to total population**	75.25	73.53	72.52	72.03
10	**Population of Kolkata Urban Agglomerations (in lakhs)**	70.31	91.94	110.22	132.06
11	**Percentage of population of Kolkata Urban Agglomerations to total urban population**	64.11	63.64	58.92	58.88
12	**Number of main workers (in lakhs)**	123.69	154.24	205.81	230.24
13	**Number of cultivators (in lakhs)**	39.55	45.91	58.45	0
14	**Number of agricultural labourers (in lakhs)**	32.72	38.92	50.55	0
15	**Percentage of cultivators to main workers**	31.97	29.76	28.4	0
16	**Percentage of agricultural labourers to main workers**	26.45	25.23	24.56	0
Source : Census of India ; Economic Review 2008 - 09, Government of West Bengal					

Annexure -6 : Some basic Economic Indicators during recent years in West Bengal and India								
Particulars	**2002 - 03**		**2006 - 07**		**2007 - 08**		**2008 - 09**	
	India	**West Bengal**	**India**	**West Bengal**	**India**	**West Bengal**	**India**	**West Bengal**
1. Percentage rise (+)/fall in NNP/NSDP (at year 1999 - 00 prices) over previous year	3.60	3.50	9.77	8.80	9.13 (Q)	7.89 (Q)	7.11 (A)	7.62 (A)
2. Percentage rise (+)/fall in per capita income (at 1999 - 00 prices) over previous year	2.03	1.99	8.2	7.62	7.60 (Q)	6.73 (Q)	5.62 (A)	6.58 (A)
3. Percentage increase (+)/decrease (-) in the index number of agricultural production over previous year (crop year July to June)	-15.88	-6.32	2.87	-2.53	_	10.84	_	0.76+
4. Percentage increase (+)/decrease (-) in the consumer price index number for industrial workers over previous year	4.10	5.13	6.83	6.57	6.22	8.69	9.00 (c)	7.43 (c)

5. Percentage increase (+)/decrease (-) in the consumer price index for agricultural labourer over previous year (crop year July to June)	3.84	0.66	8.38	6.73	7.47	8.22	10.73 (b)	10.05 (b)
6. Percentage increase (+)/decrease (-) in the index number of industrial production over previous year								
(i) General	5.75	9.34	11.56	5.70	8.46	4.04	4.93 (d)	3.41 (d)
(ii) Manufacturing	6.02	9.81	12.51	6.31	8.99	4.41	5.22 (d)	3.83 (d)
Sources : Economic Review, 2008 - 09, Government of West Bengal								
A = Advance ; Q = Quick + Anticipated ; b = upto December 2007 (6 months) ;								
c = upto December (9 months) ; d = upto December 2007 (6 months)								

Annexure -7 : Annual Growth in NSDP of West Bengal at constant 1999 - 00 prices (per cent)							
Sectors	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**Annual average growth during 10th Plan**	**2007-08**
Primary	-2.30	3.42	2.08	1.74	2.77	1.54	4.91
Secondary	9.80	8.68	10.48	4.85	13.53	9.47	8.41
Tertiary	5.25	6.44	7.97	7.68	10.33	7.53	9.08
Total NSDP	3.50	5.88	6.63	5.53	8.80	6.07	7.89
Per capita income	1.99	4.59	5.4	4.36	7.62	4.79	6.78
Sources : Bureau of Applied Economics & Statistics, Government of West Bengal							
Economic Review 2008 - 09, Government of West Bengal							

Annexure -8 : Percentage share of different sectors in Total NSDP (at constant 1999 - 2000 prices)								
Sectors	**1999-00**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**Annual Average Growth during 10th Plan**	**2007-08**
Primary	32.77	30.17	29.47	28.22	27.2	25.69	28.15	24.9
Secondary	14.64	15.59	15.99	16.57	16.46	17.18	16.36	17.26
Tertiary	52.59	54.24	54.54	55.21	56.74	57.13	55.49	57.76
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Sources : Break of Applied Economics & Statistics, Government of West Bengal								
Economic Survey 2008 - 09, Government of West Bengal								

Annexure -9 : Estimates of Net State Domestic Product of West Bengal				
Sl No.	**Industry**	**2006 - 07 (P)**	**2007 - 08 (Q)**	**% change**
1	**Agriculture**	38905.40	40904.72	5.14
2	**Forestry**	1653.31	1835.34	11.01
3	**Fishing**	5316.75	5681.83	6.87
4	**Mining & Quarrying**	2062.03	1868.36	-9.39
	Primary	47937.49	50290.25	9.91
5	**Manufacturing**	16661.21	15911.53	1.6
5.1	**Manufacturing (Regd.)**	5723.91	5844.73	2.11
5.2	**Manufacturing (Un Regd.)**	9937.3	100660.80	1.30
6	**Construction**	14291.64	16660.92	16.58
7	**Electricity,Gas & Water supply**	2090.84	2166.68	3.63
	Secondary	32043.69	34739.13	8.41
8	**Transport, Storage & Communication**			
8.1	**Railways**	2973.35	3228.73	8.59
8.2	**Transport by other means the storage**	8729.70	9185.71	5.22
8.3	**Communication**	5396.19	6438.74	19.32
9	**Trade, Hotel & Resturants**	30780.25	32947.64	7.04
10	**Banking & Insurance**	13663.16	15310.22	12.06
11	**Real Estate, Ownership of Dwelling & Buisness services**	19999.6	22649.26	13.25
12	**Public Administration**	7256.44	7718.64	6.37
13	**Other Services**	17789.45	18789.25	5.62

	Tertiary	106588.14	116268.29	9.08
	Total	186569.32	201297.67	
	Growth over previous year (per cent)	8.80	7.89	
	Per capita income (Rs.)	21752.79	23228.71	
	Growth in Per capita income (per cent)	7.62	6.78	
Sources : Break of Applied Economics & Statistics, Government of West Bengal				
Economic Survey 2008 - 09, Government of West Bengal ; P = Provisional ; Q = Quick				

Annexure -10A: Agro - climatic Regions in West Bengal				
Zone	**Region**	**Sub Region**	**Districts Covered**	**Charecteristics**
Zone II	**Eastern Himalayan Region**	**Hills**	Darjeeling	Mainly brown forest soil, acidic in nature (pH 3.5-5.0), annual rainfall varies from 2500-3500mm., high humidity, less sunshine hours, poor soil depth and quality limits crop productivity. Pre-monsoon showers commences from March.
		Terai	Jalpaiguri Coochbehar	Soils are mostly sandy to sandy loams, porous, low in base content, poor in available nutrients; acidic(pH 4.2 to 6.2); rainfall varies from 2000-3200mm; high water table, low water holding capacity, high humidity, less sunshine hours during the monsoon months and marginality of lands in some parts limit crop productivity. Chronically deficient in micronutrients, like Boron, Molybdenum and Zinc, in particular.
Zone III	**Lower Gangetic Region**	**Old alluvium**	North and South Dinajpur	Soils are lighter in higher situations and heavier in lower situations, mildly acidic to neutral in reaction (Ph 5.2 to 7.0); fairly fertile over most of the sub region; rainfall 1500-2000mm. in upper and 1300-1500mm. in lower parts, considerable area is flood prone due to infeded river flow.
		New alluvium	Murshidabad, Nadia, Hoogly, Burdwan, North 24 Parganas	Soils are deep, mostly neutral in reaction (Ph 5.5 to 7.0) and fertile; rainfall 1350-1450mm.
		Coastal saline	South 24 Parganas, Howrah and Midnapore(E)	Soils are mostly heavy clay containing higher salts of sodium, magnesium, potassium with organic matter at different stages of decomposition. Mostly neutral soils (pH 6.5 to 7.5). Electrical conductivity varies from 3.0 to 18.0 mm., rainfall 1600-1800mm.;salinity and water congestion limit good crop productivity.
		Red laterectic	Birbhum, Bankura, Midnapore (W)	Soils are coarse in texture, highly drained with honeycomb type of ferruginous concentration at a depth of 15 to 30cm.; erosion prone; acidic in nature (pH 5.5 to 6.2); poor available nutrients; average rainfall 1100-1400mm., low moisture holding capacity and poor nutrient status limit crop productivity.

Zone VII	**Eastern Plateau & Hill Region**		Purulia	Soils shallow modulated gravely, coarse textured, well drained with low water holding capacity. Upload soils are highly susceptible to erosion; acidic in reaction (pH 5.5 to 6.2). Rainfall varies from 1100 to 1400mm. which is spread over only three months, mid June to mid September.

Annexure 10B : Soil and climate parameters of different agroclimatic zones in West Bengal				
Area	**Temperature (0C)**		**Rainfall (cm)**	**Soil**
	Min.	**Max.**		
Hilly zone	1.9	24.2	220-400 (high relative humidity)	Light,acidic,deficient in micronutrient
Terai zone	10.5	31.1	300 (high relative humidity)	Light,acidic
Alluvial zone	10.0	38.0	120-150 (moderate to high relative humidity)	Deep loam, neutral
Red & latericitic zone	9.0	45.0	110-130 (low relative humidity)	Red,acidic,low water holding capacity
Coastal zone	15.0	27.6	150-200 (moderate to high relative humidity)	Acidic to alkaline,good water holding capacity

Annexure -11 : Utilization of Land In West Bengal

(Area in '000 ha)

Classification	1985-86		1995-96		2004-05		2005-06		2006-07	
	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage
(i) Net area sown	5262	59.5	5462	62.8	5375	61.9	5295	61.0	5296	61.0
(ii) Current fallows	65	0.7	220	2.5	314	3.6	319	3.7	341	3.9
(iii) Forests	1186	13.4	1196	13.8	1175	13.5	1175	13.5	1174	13.5
(iv) Area not available for cultivation	1730	19.6	1642	18.9	1699	19.6	1753	20.2	1754	20.2
(v) Other uncultivated land excluding current fallows	606	6.8	175	2.0	124	1.4	141	1.6	119	1.4
Total Reporting Area	**8849**	**100.0**	**8695**	**100.0**	**8687**	**100.0**	**8683**	**100.0**	**8684**	**100.0**

Sources : (1) Directorate of Agriculture, Evaluation Wing, Govt. of West Bengal;

(2) Bureau of Applied Economics & Statistics , Government of West Bengal, 2007

*** Excluding Kolkata Municipal Metropolitan District**

Annexure -12 : Estimated Number and Area of Operational Holdings according to Size Class in West Bengal				
Size	**Class**	**1980-81**	**1990-91**	**2000-01**
Marginal (Below 10 ha)	No. of Holdings	4096001	4639055	5462089
	Area of Holdings (Ha)	1619657	2064440	2758843
Small (1.0 - 2.0 ha)	No. of Holdings	1148936	1107006	1009328
	Area of Holdings (Ha)	1733512	1694000	1606686
Semi-medium (2.0- 4.0 ha)	No. of Holdings	519445	457150	282992
	Area of Holdings (Ha)	1403246	1269052	783773
Medium (4.0 - 10.0 ha)	No. of Holdings	111859	79284	34797
	Area of Holdings (Ha)	594883	425530	178298
Large (10.0 ha or above)	No. of Holdings	1408	1291	785
	Area of Holdings (Ha)	203484	202668	218976
All Size	No. of Holdings	5877649	6283786	6789991
	Area of Holdings (Ha)	5554782	5655690	5546576
Average Size of Holdings (Ha)		0.94	0.90	0.82
Source : Agricultural Census, Directorate of Agriculture, Government of West Bengal				
Bureau of Applied Economics & Statistics, Statistical Abstract, Government of West Bengal 2005				

Annexure -13 : Percentage distributions of operational holdings, ownership households area owned over five broad classes of holding in India and West Bengal					
Particulars	**Marginal (Below 1.0 ha)**	**Small (Below 1.0 - 2.0 ha)**	**Semi medium (2.01 - 4 ha)**	**Medium (9.0 - 10.0 ha)**	**Large (Above 10 ha)**
All India					
Operational Holdings %	69.8	16.2	2.0	4.2	0.8
Ownership Holdings %	79.6	10.8	6.00	3.00	0.60
Area owned %	23.05	20.38	21.98	23.08	0
West Bengal					
Operational Holdings %	88.8	8.9	2.10	0.20	0.00
Ownership Households %	92.06	5.70	1.40	0.2	0.00
Area owned %	58.23	25.71	1.88	4.02	0.00
Source : Bureau of Applied Economics & Statistics , Government of West Bengal, 2007					

Annexure -14 : Index Number of Agriculture Area, Production and Productivity in West Bengal
(Base : Triennium ending crop year 1981 - 82 = 100)

Sl No.	Index	1985 - 86		1990 - 91		1995 - 96		2000 - 01		2005 - 06		2006 - 07		2007 - 08		2008 - 09 (A)	
		C	AC	C	AC	C	AC	C	AC	C	AC	C	AC	C	AC	C	AC
1	Area	98.9	102.2	111.6	109.8	114.8	11.8	106.8	110.3	112.6	114.5	110.9	115.3	111.3	115.7	114.7	119.2
2	Production	126.0	129.9	160.4	162.7	184.2	187.2	195.9	210.2	224.9	232.9	229.5	227	230.4	251.6	240.9	253.5
3	Productivity	127.4	127.1	143.7	148.2	160.5	167.4	183.4	190.6	199.7	203.4	207.0	196.9	207.0	217.5	209.6	212.7

P = Provisional, A = Anticipated, C= Cereal , AC= All Combined

Source : Bureau of Applied Economics & Statistics , Government of West Bengal,

Economic Review 2008 - 09, Government of West Bengal

Annexure -15 : Index Number of Agricultural Area, Production, Productivity, Cropping Pattern, Cropping Intensity, Productivity per Hectare of Net Area Sown of selected crops and Net Area Sown in West Bengal (Base : Triennium ending Crop Year)

Year	Index of 1981 - 82 = 100						
	Area	Production	Productivity	Cropping pattern	Cropping intensity	Productivity per ha. of net sown area	Net area sown
1985-86	102.2	129.9	127.1	105.7	108.1	137.5	94.5
1990-91	109.8	162.7	148.2	114.2	111.8	165.7	98.2
1995-96	111.8	187.2	167.4	121.8	114.0	190.3	98.1
2000-01	110.3	210.2	190.6	128.8	113.4	216.0	97.3
2005-06	114.5	232.9	203.4	130.7	120.4	244.9	95.1
2006-07	115.3	223.0	196.9	133.8	121.2	238.7	95.1
2007-08	115.7	251.6	217.5	134.7	121.7	264.6	95.1

P = Provisional

Source : Bureau of Applied Economics & Statistics , Government of West Bengal

Economic review 2008 - 09, Government of West Bengal

None :

(i) Index of Cropping pattern in the j th year = $\frac{\sum Cij\ Yio\ Pio \times 100}{\sum Cij\ Yio\ Pio}$

Where Cio = $\frac{aio}{\sum aio}$ **= Proportion of area under the ith crop in the base period**

Cij = $\frac{aij}{\sum aij}$ **= Proportion of area under the ith crop in the jth year period**

Yio = Yield per hectare of the ith crop in the base period

Pio = Price per unit area of the ith crop in the base period

(ii) Index of Cropping Intensity = $\frac{\text{Index of area under crops} \times 100}{\text{Index of net area sown}}$

Annexure -16 : Area under Principal Crops in West Bengal (A in '000 ha ; P in 000 tonnes)								
Sl No.	**Crops**	**1980-81**	**1990-91**	**2000-01**	**2004-05**	**2005-06**	**2006-07**	**2007-08**
	FOOD GRAINS :							
	Cereals -							
1	Rice	5176.2	5812.9	5435.3	5783.6	5782.9	5687.0	5719.8
	(i) Aus	615.1	610.3	394.0	320.8	288.1	283.9	281.6
	(ii) Aman	4214.6	4306.5	3639.5	4086.4	4112.9	4001.9	3926.6
	(iii) Boro	346.5	896.1	1401.8	1376.4	1381.9	1401.2	1511.6
2	Wheat	283.0	269.1	426.0	400.1	366.7	350.6	352.6
3	Barley	35.4	10.3	3.5	2.4	2.4	2.9	2.0
4	Maize	52.6	64.6	35.3	64.6	71.8	85.4	77.2
5	Other Cereals	27.8	24.9	18.3	17.7	17.4	17.9	17.9
	Total Cereals	5575.0	6181.8	5918.4	6268.4	6241.2	6143.8	6169.5
	Pulses -							
6	Gram	96.2	25.6	54.7	38.0	40.0	31.2	25.1
7	Tur (Arhar)	22.6	5.8	8.9	1.5	1.8	2.0	1.1
8	Mung	29.2	15.5	1.2	11.7	11.5	12.6	16.5
9	Masur	94.6	73.8	76.0	62.7	61.5	64.2	58.7
10	Khesari	134.7	44.8	40.4	35.0	33.3	32.2	33.5
11	Other Pulses	147.0	148.5	83.3	77.5	74.5	77.4	66.0
	Total Pulses	524.3	314.0	274.5	226.4	222.6	219.6	200.9
	Total Foodgrains	6099.3	6495.8	6192.9	6494.8	6463.8	6363.4	6370.4

	NON - FOOD GRAINS :							
	Oilseeds -							
12	Rapeseed and Mustard	131.1	378.1	436.0	457.5	421.5	421.5	407.5
13	Linseed	67.8	8.5	11.9	5.3	6.7	5.0	5.9
14	Sesame (Til)	108.1	99.3	107.2	148.3	148.6	200.4	203.1
15	Sunflower	2.2	0.6	0.2	8.5	12.5	13.7	16.0
16	Other Oilseeds	8.2	26.7	43.3	53.5	54.2	62.8	74.9
	Total Oilseeds	317.4	513.2	598.6	673.1	643.5	703.4	707.4
	Fibres -							
17	Jute	610.4	500.2	613	569.2	558.9	594.9	609.8
18	Mesta	44.4	9.1	10.9	8.6	10.4	9.6	7.4
19	Other Fibres	2.1	2.0	2.7	2.5	2.8	7.0	9.3
	Total Fibres	656.9	511.3	626.6	580.3	572.1	611.5	626.5
	Miscellaneous Crops :							
20	Sugarcane	14.3	12.2	21.6	15.6	15.0	16.6	16.9
21	Potato	115.6	194.5	299.7	320.6	354.5	407.9	400.8
22	Tobacco	18.9	12.7	10.5	15.1	13.9	12.0	11.7
23	Tea	93.5	101.2	107.5	114	114.5	114.8 (P)	114.8 (P)
Sources : (1) Directorate of Agriculture, Evaluation Wing, Govt. of West Bengal								
(2) Tea Board								
(P) Provisional ; (a) '000 bales of 180 kg each ; (c) '000 kg ; (b) Figure related to calender year								

Annexure -17 : Yield Rates of Some Selected Crops in West Bengal and India													
SL. No.	**Crops**	**1980-81**		**1990-91**		**2000-01**		**2005-06**		**2006-07**		**2007-08**	
		WB	**India**	**WB**	**India**	**WB**	**India**	**WB**	**India**	**WB**	**India**	**WB**	**India**
1	**Rice**	1442	1336	1795	1740	2287	1901	2509	2102	2593	2131 (R)	2573	2203
2	**Wheat**	1672	1630	1970	2281	2485	2778	2109	2619	2281	2708 (R)	2602	2785
3	**Gram**	578	657	584	712	917	744	1024	815	768	845 (R)	983	780
4	**Jute**	1310	1245	1978	1833	2182	2026	2572	2362	2545	2342 (R)	2425	2246
5	**Rapeseed and Mustard**	605	560	889	904	956	935	909	1117	803	1099 (R)	888	1009
6	**Potato+**	17	13	23	16	26	18	21	17	12	15	25	_
7	**Tea**	1424 (b)	1491 (b)	1480 (b)	1794 (b)	1689 (b)	1682 (b)	1899 (R)	1708 (R)	2091 (P)	1716 (P)	1983 (P)	1664 (P)
Sources : Economic survey 2008 - 09 , Govt. of West Bengal													
(b) = Figures relate to calendar year													
P = Provisional													
R = Revised													

Annexure -18 : Net Cropped Area, Gross Cropped Area and Cropping Intensity In West Bengal				
SL. No.	**Year**	**Net cropped area (in hectares)**	**Gross cropped area (in hectares)**	**Cropping intensity (in percent)**
1	**1990-91**	5463424	8662286	159
2	**1995-96**	5461925	8972544	164
3	**2000-01**	5417382	9116597	168
4	**2005-06**	5294702	9532607	180
5	**2006-07**	5296005	9634535	182
P = Provisional ; ***Source : Directorate of Agriculture (Evaluation Wing) Govt. of West Bengal***				

Annexure -18.a : Contribution of West Bengal to All India Production of Certain selected Crops							
SL. No.	**Crops**	**West Bengal to All India Production (In percent)**					
		1980 - 81	**1990 - 91**	**2000 - 01**	**2005 - 06**	**2006 - 07 (R)+**	**2007 - 08**
1	**Rice**	13.9	14.1	14.6	15.8	15.8	15.3
2	**Wheat**	1.3	1.0	1.5	1.1	1.1	1.2
3	**Pulses**	2.3	1.4	2.0	1.3	1.1	1.1
4	**Total Foodgrains**	6.4	6.4	7.0	7.5	7.3	7.0
5	**Oilseeds**						
	(i) Sesame	11.1	10.7	17.3	21.9	30.6	22.8
	(ii) Rapeseed & Mustard	4.0	6.5	10.0	4.7	4.6	6.2
6	**Jute & Mesta**	57.6	60.1	71.2	74.8	75.5	74.2
7	**Sugarcane**	0.6	0.4	0.5	0.4	0.4	0.5
8	**Potato**	20.4	29.9	34.7	31.2	22.9	
9	**Tea**	23.4	20.8	21.4	23.2	24.7 (P)	24.1 (P)
P = Provision + Tonnes per Ha							
R = Revised							
Source : Economic Review 2008 - 09, Government of West Bengal							

Annexure 19 : Area under High - Yielding varieties in West Bengal (Area in '000 hectares)												
Year	**Aus**		**Aman**		**Boro**		**Total Rice**		**Wheat**		**Total Rice & Wheat**	
	HYV Area	**% to total area**	**HYV Area**	**% to total area**	**HYV Area**	**% to total area**	**HYV Area**	**% to total area**	**HYV Area**	**% to total area**	**HYV Area**	**% to total area**
1980-81	219.9	35.75	965.5	22.91	346.5	100.00	1531.9	29.60	283.0	100	1814.9	33.24
1990-91	404.3	66.25	1956.5	45.43	896.1	100.00	3256.9	56.03	269.0	100	3525.9	57.97
2000-01	387.6	98.38	3029.5	33.10	1401.8	100.00	4813.9	88.52	426.0	100	5239.9	89.40
2005-06	285.8	99.20	3578.1	87.00	1381.9	100.00	5245.8	90.71	366.7	100	5612.9	91.26
2006-07	281.8	99.30	3481.6	87.00	1400.0	100.00	5163.90	90.81	350.6	100	5514.0	91.30
2007-08	288.2	99.40	3325.0	87.50	1511.6	100.00	5124.0	91.48	352.5	100	5473.3	91.99
Source : Department of Agriculture , Government of West Bengal												
Economic Review 2008 - 09 , Government of West Bengal												

Annexure - 20 : Growth in Area Coverage and Production of Fruits, Vegetable and Flowers				
Item	**Unit**	**2006-07**	**2007-08**	**Growth %**
Area of coverage under fruits	'000 ha	187.13	124.25	3.80
Production of fruits	'000 MT	2640.53	2766.67	4.78
Area of coverage under vegetables	'000 ha	903.62	912.41	0.92
Production of vegetables	000 MT	12087.97	12555.96	3.87
Area of coverage under flowers	'000 ha	18.56	19.59	5.55
Production of loose flowers	'000 MT	43.68	48.46	10.94
Production of cut flowers	Crore Spikes	129.66	196.80	51.78
Source : Department of Food Processing Industries and Horticulture,				
Government of West Bengal				
Economic Review 2008 - 09, Government of West Bengal				

Annexure - 21 : Area and Production of Fruits and Vegetables in West Bengal									
SL. No.	Name of Fruits / Vegatables	(Area in thousand hectares)				(Production in thousand tonnes)			
		2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
A.	**FRUITS**								
1	Mango	69.13	70.09	78.23	80.9	460.75	513.34	549.76	623.35
2	Banana	26.64	27.8	31.69	37.37	512.52	544.87	802.07	892.25
3	Pineapple	12.85	13.38	13.4	9.53	349.85	379.16	372.09	283.18
4	Papaya	8.71	9.51	9.9	10.69	253.14	263.65	276.92	308.62
5	Guava	9.37	9.88	10.82	11.86	140.89	152.99	148.96	162.21
6	Jackfruit	10.61	10.88	11.43	11.43	148.38	160.1	185.32	190.67
7	Litchi	7.16	8.05	8.09	8.11	69.91	74.92	77.24	77.76
8	Mandarin Orange	3.52	3.55	3.74	3.74	32.27	32.51	36.44	36.45
9	Other Citrus	6.27	6.48	7.06	7.21	50.07	54.56	61	62
10	Sapota	3.93	4.17	4.2	3.88	45.39	49.02	51.35	43.4
11	Others	8.1	8.9	8.57	9.53	65.11	76.58	79.38	86.78
	Total	166.29	172.69	187.13	194.25	2128.28	2301.7	2640.53	2766.67
B.	VEGETABLES								
1	Tomato	46.11	49.96	50.95	51.13	694.95	857.18	868.71	956.67
2	Cabbage	71.3	74.71	72.79	73.2	1863.91	1982.68	1968.11	2016.06
3	Cauliflower	64.63	65.64	66.11	66.91	1685.19	1666.15	1658.17	1682.09
4	Peas	24.96	21.67	21.56	20.93	122.02	129.38	124.52	123.8
5	Brinjal	148.35	152.9	152.46	153.93	2701.69	2757.44	2698.55	2734.93
6	Onion	16.33	17.51	17.92	18.67	183.58	221.67	237.54	248.77
7	Cucurbits	159.17	164.72	163.64	163.65	1748.17	1763.07	1978.6	2017.52
8	Ladies Finger	63.68	65.77	67.98	71.46	677.28	718.94	762.39	815.32
9	Radish	34.97	35.73	37.99	38.33	358.63	392.27	427.91	451.38
10	Others	238.91	241.23	252.22	254.2	961.2	1067.97	1363.47	1509.42
	Total	868.41	889.84	903.62	912.41	10996.62	11556.75	12087.97	12555.96
Source : Directorate of Food processing Industries & Horticulture, Govt. of West Bengal									

Annexure - 22 : Area and Production of Flowers in West Bengal										
SL. No.	Name of Flowers	(Area in thousand hectares)				Production				
		2004-05	2005-06	2006-07	2007-08	Unit	2004-05	2005-06	2006-07	2007-08
1	**Rose**	1.49	1.59	1.59	1.61	Crore Spikes	18.17	18.01	28.2	72.41
2	**Tuber Rose**	2.81	2.54	2.89	3.43	Crore Spikes	44.5	46.12	58.87	78.15
3	**Gladiolus**	1.88	2.06	2.06	2.29	Crore Spikes	26.96	29.35	30.22	33.38
4	**Chrysanthemum**	0.44	0.52	0.53	0.5	Thousand M.T.	0.52	0.59	12.37	12.86
5	**Marigold**	4.24	4.04	4.21	4.74	Thousand M.T.	33.79	32.48	34.33	38.7
6	**Jasmine**	0.46	0.58	0.57	0.46	Thousand M.T.	0.69	0.77	0.77	0.63
7	**Seasonal flowers**	4.32	4.02	4.1	4.07	Thousand M.T.	7.65	6.24	6	6.34
8	**Others**	2.28	2.54	2.61	2.49	Thousand M.T.	2.02	2.21	2.58	2.78
	Total	17.92	17.89	18.56	19.59					
* Unit in crore spikes										
(a) Unit in '000 MT										
Source : Directorate of Food processing Industries & Horticulture, Govt. of West Bengal										

Annexure 23 : AREA AND PRODUCTION OF SPICES IN WEST BENGAL (2005 - 06)

Crop	Area		Production		Productivity (kg/ha)	
	'000 ha	%	'000 mt	%	W.B.	India
Chilli (Rabi Bhadoi)	59.888	8.14	65.136	5.9	1903	1608
Ginger	11.213	11.43	83.15	21.20	7415	3969
Turmeric	17.04	10.57	30.319	4.23	1779	4446
Fenugreek	1.687	_	0.966	_	572	1269
Black pepper	0.185	0.07	0.547	0.687	296	310
Garlic	2.632	1.81	22.865	3.47	8687	4550
Coriander	9.693	2.5	10.146	3.1	1046	873
Black cumin	0.84	_	0.68	_	810	_
Fennel	0.404	1.76	0.165	0.59	407	1208
Large Cardamom	2.98	10.03	0.856	13.38	287	156
Total (including other spices)	108.5	4.21	216.7	5.68	_	_

Annexure 24 AREA AND PRODUCTION OF PLANTATION CROPS (2005 - 06)

SL. No.	Crop	Area in '000 ha	Production in '000 mt	Productivity
1	**Coconut**	30.562	4007.392 (lakh nuts)	131.13
2	**Arecanut**	10.236	19.116	1.87
3	**Betelvine**	19.148	139.486	7.27
4	**Cashewnut**	9.711	9.569	0.99

Annexure -25 : Consumption of Fertilizers and Pesticides in West Bengal							
Year	**Total Fertilizer Consumption in tonnes**			**Fertilizer Consumption (in Kg) per unit of Gross Cropped Area (Kg/ha)**	**Pesticide Consumption**		**Ingredient Active**
	N	**P**	**K**		**Quantity consumed in MT**	**Coverage (lakh hectares)**	**Per ha in Kg**
1980-81	167321	70844	44669	_	_	_	_
1990-91	411896	206782	134330	86.93	4040	46.48	0.47
2000-01	561880	296959	226252	119.02	3180	49.00	0.44
2001-02	586841	329785	261556	120.48	3170	52.00	0.42
2002-03	562998	341244	263377	122.77	3780	53.00	0.38
2003-04	581565	304177	230080	115.54	4000	51.00	0.44
2004-05	630995	339615	290894	132.47	4100	51.23	0.42
2005-06	611000	358000	271000	_	_	_	_
2006-07	678000	386000	301000	_	_	_	_
2007-08	685000	386000	304000	150	_	_	_
Source : Directorate of Agriculture, Government of West Bengal							
Bureau of Applied Economics & Statistics , Government of West Bengal - Statistical Abstract 2005							

Annexure -26 : Creation and utilization of irrigation potential in West Bengal			
Year	**Potential created upto the year ('000 ha)**	**Potential utilized during the year ('000 ha)**	**Percentage utilization over creation**
1996-97	4424.54	3559.41	80.45
2001-02	5096.95	3985.22	78.19
2006-07	5430.14	4375.62	80.58
2007-08	5501.12	4492.49	81.66
Source : (1) Water Investigation and Development Department, Government of West Bengal			
(2) Irrigation & Waterways directorate, Government of West Bengal			
(3) Economic survey, 2008-09, Government of West Bengal			

Annexure -27 : Production of Milk (Cow, Buffalo, and Goat) and Egg (Hen & Duck) in West Bengal		
Year	**Milk ('000 tonnes)**	**Egg (000 numbers)**
1990-91	2912*	2279023
2000-01	3470	2682079
2004-05	3790	2887649
2005-06	3892	2963720
2006-07	3984	3038645
2007-08 (P)	4077	3057342
*** = Exclude production of good milk**		
P = Provisional		
Source : Directorate of Animal Resources & Animal Health,		
Government of West Bengal		

Annexure -28 : Production of Meat in West Bengal						
Sl No.	**Year**	**Mutton**	**Goat Meat**	**Pork**	**Bovine (Cattle & Buffalo)**	**Poultry**
1	**1990-91**	4.0	91.5	31.4	533.4	35.4
2	**2000-01**	16.2	133.3	31.6	124.4	132.7
3	**2001-02**	16.3	135.2	32.4	123.6	134.6
4	**2002-03**	15.4	138.9	34.1	123.2	138.4
5	**2003-04**	15.7	144.3	33.7	125.8	143.5
6	**2004-05**	16.2	148.3	31.2	132.5	147.0
7	**2005-06**	16.6	152.2	31.8	135.5	151.0
8	**2006-07**	17.0	156.3	32.8	139.3	155.2
9	**2007-08 (P)**	17.7	161.5	33.7	140.7	151.4
P = Provisional						
Source : Directorate of Animal Resources & Animal Health, Govt. of West Bengal						

Annexure -29 : Production of Fish in West Bengal (In '000 tonnes)			
Year	**Production**		
	Inland	**Marine**	**Total**
1990-91	555	125	680
1995-96	740	153	893
2000-01	879	181	1060
2001-02	916	184	1100
2002-03	938	182	1120
2003-04	988	182	1170
2004-05	1035	180	1215
Source : Directorate of Fisheries, Government of West Bengal			
Bureau of Applied Economics & Statistics ,			
Government of West Bengal - Statistical Abstract 2005			

Annexure -30 : Inland, Marine and Total Fish Production in West Bengal and India during 2006 - 07			
Fish production	**West Bengal**	**India**	**% of all India production**
Inland	1181.00	3844.9	30.72
Marine	178.10	3024.16	5.89
Total	1359.10	6869.04	100.00
Source : Ministry of Agriculture, Government of India			
Economic review, Government of West Bengal, 2008 - 09			

Annexure - 31 : Output of Timber and Firewood and Revenue Receipts from Forest in West Bengal			
Year	**Timber* (in cubic metre)**	**Firewood** (in cubic metre)**	**Revenue Receipts (Rs. In lakh)**
1980-81	230417	450607	1576.05
1985-86	210748	454096	3346.41
1990-91	88252	210692	3394.00
1995-96	88554	208589	6299.69
2000-01	88160	250399	6577.36
2005-06	85993	324092	11393.81
2006-07	114589	387094	12911.63
2007-08	231578	262023	15215.35
*** = Timber includes pulpwood, match wood, other timber and poles**			
**** = Firewood includes quantity of firewood required for production of charcoals, other firewood and pulpwood.**			
Source : 1. Directorate of Forestry , Government of India			
2. Economic review, Government of West Bengal, 2008 - 09			

Annexure -32 : Other Forest products harvested		
Products	**Unit**	**2006 - 07**
Honey	Quintal	251.28
Wax	Quintal	13.96
Sal seed	MT	1296.30
Kendu leaves	MT	2065.34
Citronella grass	Quintal	3227.14
Source : Economic review, Government of West Bengal, 2008 - 09		

Annexure : 33

Agencywise, Broad Sector-wise flow of Ground Level Credit (GLC) during 2006-07, 2007-08, 2008-09 and Target for 2009-10 for the State of West Bengal

Rs. in crore

Particulars / Agency	**2006-07**			**2007-08**			**2008-09**			**2009-10**
Type of Loan	**T**	**A**	**% Ach**	**T**	**A**	**% Ach**	**T**	**A**	**% Ach**	**T**
Crop Loan										
CBs	1009.68	955.64	94.65	1472.85	1551.06	105.00	1912.35	1835.52	95.98	3017.66
SCB/CCBs	1043.54	786.06	75.33	1018.00	985.28	97.00	1375.00	795.81	57.88	1241.06
SCARDB	30.57	12.82	41.94	46.52	9.18	20.00	66.00	35.32	53.52	83.12
RRBs	266.05	169.83	63.83	288.40	243.81	85.00	496.40	430.95	86.82	874.92
Other Agencies	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	2.00
Sub-Total	**2350.09**	**1924.35**	**81.88**	**2825.77**	**2789.33**	**98.71**	**3849.75**	**3097.67**	80.46	**5218.76**
Term Loan(MT & LT)										
CBs	1076.32	1259.18	116.99	1518.15	1387.45	91.00	1880.65	1997.33	106.20	1992.34
SCB/CCBs	191.46	162.92	85.09	232.00	169.37	73.00	346.00	797.12	230.38	1130.94
SCARDB	169.43	75.71	44.69	153.48	111.39	73.00	234.00	101.40	43.33	238.88
RRBs	203.95	148.12	72.63	261.60	194.17	74.00	382.60	213.68	55.85	431.08
Other Agencies	8.75	9.65	110.29	9.00	10.18	113.00	0.00	0.00	0.00	3.00
Sub-Total	**1649.91**	**1655.58**	**100.34**	**2174.23**	**1872.56**	**86.13**	**2843.25**	**3109.53**	109.37	**3796.24**
Total Agri Credit (1+2)										
CBs	2086.00	2214.82	106.18	2991.00	2938.51	98.00	3793.00	3832.85	101.05	5010.00
SCB/CCBs	1235.00	948.98	76.84	1250.00	1154.65	92.00	1721.00	1592.93	92.56	2372.00
SCARDB	200.00	88.53	44.27	200.00	120.57	60.00	300.00	136.72	45.57	322.00
RRBs	470.00	317.95	67.65	550.00	437.98	80.00	879.00	644.63	73.34	1306.00
Other Agencies	9.00	9.65	107.22	9.00	10.18	113.00	0.00	0.07		5.00
Total	**4000.00**	**3579.93**	**89.50**	**5000.00**	**4661.89**	**93.24**	**6693.00**	**6207.20**	92.74	**9015.00**
Non-Farm Sector										
CBs	1601.01	1244.79	77.75	1959.00	1509.45	77.00	2101.60	2158.23	102.69	3207.00
SCB/CCBs	174.00	66.54	38.24	200.00	235.79	118.00	214.00	128.40	60.00	284.00
SCARDB	65.00	9.70	14.92	85.00	12.04	14.00	91.00	11.02	12.11	72.00
RRBs	281.00	124.59	44.34	350.00	195.07	56.00	375.00	239.83	63.95	572.00

Other Agencies	128.99	67.47	52.31	406.00	254.37	63.00	434.40	440.34	101.37	267.00
Sub-Total	**2250.00**	**1513.09**	**67.25**	**3000.00**	**2206.72**	**73.56**	**3216.00**	**2977.82**	92.59	**4402.00**
Other Priority Sector										
CBs	1850.01	2283.96	123.46	2012.00	2505.09	125.00	2340.70	2242.81	95.82	3341.00
SCB/CCBs	421.00	400.04	95.02	460.00	440.86	96.00	500.00	564.82	112.96	594.00
SCARDB	83.00	24.21	29.17	90.00	35.36	39.00	143.50	35.63	24.83	84.00
RRBs	387.00	368.02	95.10	418.00	378.11	90.00	489.00	402.81	82.37	607.00
Other Agencies	8.99	6.40	71.19	3.00	27.00	900.00	5.80	23.07	397.76	60.00
Sub-Total	**2750.00**	**3082.63**	**112.10**	**2983.00**	**3386.42**	**113.52**	**3479.00**	**3269.14**	93.97	**4686.00**
TOTAL GLC										
CBs	5537.02	5743.57	103.73	6962.00	6953.05	100.00	8235.30	8233.89	99.98	11558.00
SCB/CCBs	1830.00	1415.56	77.35	1910.00	1831.30	96.00	2435.00	2286.15	93.89	3250.00
SCARDB	348.00	122.44	35.18	375.00	167.97	45.00	534.50	183.37	34.31	478.00
RRBs	1138.00	810.56	71.23	1318.00	1011.16	77.00	1743.00	1287.27	73.85	2485.00
Other Agencies	146.98	83.52	56.82	418.00	291.55	70.00	440.20	463.48	105.29	332.00
GRAND TOTAL	**9000.00**	**8175.65**	**90.84**	**10983.00**	**10255.03**	**93.37**	**13388.00**	**12454.16**	93.02	**18103.00**
Note										
T - Target, A - Achievement										
CB - Commercial Banks (including Pvt. Sector Banks), SCB - State Cooperative Bank, CCB - Central Cooperative Banks,										
SCARDB - State Cooperative Agriculture and Rural Development Bank, RRB - Regional Rural Banks										
GLC - Ground Level Credit										