Jharkhand
State Agriculture Development Plan

2008-09 to 2011-12

NABARD CONSULTANCY SERVICES
JHARKHAND REGIONAL OFFICE
RANCHI

JHARKHAND


SAHIBGANJ
GODDA
PAKUR
KODERMA
DEOGHAR
PALAMU
GIRIDH
DUMKA
CHATRA
GARHWA
HAZARIBAGH
JAMTARA
LATEHAR
BOKARO
DHANBAD
RAMGARH
LOHARDAGA
RANCHI
GUMLA
KHUNTI
SARAIKELA-KHARSAWAN
EAST SINGHBHUM
SIMDEGA
WEST SINGHBHUM


JHARKHAND
AGRICULTURE MAP
N
BIHAR
Rajsar
Sundar
Kewoldog
Banki Phulwara
Jinjoi
Golai
Kamat
Chacko
Saraswatia
Mollio
Arraj
Jurga
Badmani
Ghaghra
Auranga
Ghaghri
Ramghat
Tilaiya
Konar
Badua
Gumani
Tetaria
Marakhi
Raghunathpur
Ajoy
Mayurasakshi
Khudia
Panchet
Ijri
Gowai
WEST BENGAL
Birha
Bishunpur
Phuljhar
Handhi
Khatwa
Subarnarekha
Multipurpose
Sankh
Karo
Kokro
Kanchi
Karkari
Burudih
CHHATTISGARH
Barahmi
Bijoy
Suru
Sonua
Sona
Kharkai
Desh Bandhu
Rajbandh
Roro
Torlow
ORISSA
Irrigated Area
Rice
Others Crops
Millets
Chilli
Vegetables
Groundnut
Fruit
Raval - Name of Irrigation Project
Map not to scale
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FOREWORD

Jharkhand, the 28th State of the Indian Union is best known for its rich mineral resources. However, 78% of the total population of 2.69 crore live in rural areas, largely dependent only on agriculture and allied activities. The total cultivable land in the State compares well at 52% of the total geographical area with 55% in the country. But, unfortunately while 76% of the total cultivable area is under net sown area in the country, only 43% is cultivated in Jharkhand. The state suffers from several critical gaps in the agricultural and allied sectors. It is against this back drop that the Agricultural Development plan for 21 districts of the State have been prepared by NABCONS on the basis of the assignment given by the Government of Jharkhand.

The proposed plan envisages a holistic revamp of the entire agriculture and allied sectors. The full implementation of the proposals is expected to significantly increase the cropping intensity, the net and gross cropped area and finally result in vastly improved nutrient availability to the rural population. The investments in allied sectors and integrated approach to farming are important to boost the household incomes and to mitigate the risks in agriculture dependent almost entirely on the vagaries of nature with only 10% of cultivated land under irrigation against the national average of 40%.

It is a great privilege and simultaneously a big challenge for NABCONS, the consultancy subsidiary of NABARD, to have been assigned the task of preparing the State wise and district (in respect of 21 districts) wise comprehensive Agriculture Plan (SAP & DAP) by the Jharkhand state govt. for the period 2008-11. I, in the dual role as the Principal Representative of NABCONS and Regional Chief of NABARD for Jharkhand state feel very happy to submit the comprehensive Agriculture Development Plan to the Govt. of Jharkhand.

I gratefully acknowledge the support received from Shri. A K Basu IAS, chief Secretary, Shri. S K Chaudhury IAS, Development Commissioner, Shri. A K Sarkar IAS, Principal Secretary Agriculture and Deputy Commissioners of all districts. The plan was prepared based on grass root level consultations at village, block and district level and research agencies.

I am confident that this plan would be a harbinger of great opportunities in accelerating overall growth of the state and improve the well-being of millions strong farming community in the state. We from NABARD, as the apex Agriculture and Rural Bank of the country, feel proud to commit ourselves as one of the very important stakeholders in our mission for integrated development of agriculture and allied sector and bringing pride of place for the state it deserves.

(K.C.Shashidhar)

Principal Representative, NABCONS &
CGM, NABARD, Jharkhand

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- Shri. A.K.Basu, IAS Chief Secretary, Govt. of Jharkhand, Ranchi
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- Shri. A K Singh, IAS, Govt. of Jharkhand, Ranchi
- Shri. S K Choudhary, IAS, Development Commissioner, Govt. of Jharkhand, Ranchi
- Shri. Aditya Swarup, IAS, Principal Secretary, Animal Husbandry and Fisheries, Govt. of Jharkhand, Ranchi
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- Dy. Commissioners and DDCs of all the districts
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- Dr. S Kumar, Head, HARP
- Scientists of IINRG
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- Shri. Nistar Minz, Director, Agriculture, Govt. of Jharkhand
- Shri. Rajiv Kumar, Director Fisheries, Govt. of Jharkhand
- Shri. S S P Singh, Director, Jharkhand State Horticulture Mission

- State level and district level officials of Departments of Agriculture, Dairy, Animal Husbandry, Horticulture, Soil conservation, Fisheries, PD of ATMA
- Farmers in different parts of the State.
- NGOs - Holy Cross KVK, SUPPORT, IRA, MASSP

Credits

The District and State Agriculture Plan for the State of Jharkhand was prepared under supervision of Shri K.C.Shashidhar, Chief General Manager, NABARD & Principal Representative, Nabcons, Jharkhand RO, Ranchi, and Shri P.L.Hatwalne, General Manager, NABARD Ranchi and under the guidance of Shri C P Mohan, Deputy General Manager, NABARD Ranchi by a team comprising of the following members

1. Shri K. Suresh Kumar, AGM, NABARD & Nodal Officer, Nabcons, Ranchi
2. Shri Sunil Kumar Mishra, AGM, NABARD, Ranchi
3. Shri B. Uday Bhaskar, AGM, NABARD, Ranchi
4. Shri D.Shankar, Manager, NABARD, Ranchi
5. Smt. Anukampa Jha, Manager, NABARD, Ranchi
6. Dr. Sriram Appulingam, Manager, NABARD, Ranchi
7. Shri Prabhat Keshava, Manager, NABARD
8. Shri M. K. Mandal, AGM(DD), NABARD, Bokaro
9. Shri Satyajit Bhattacharya, Manager (DD), NABARD, Dhanbad
10. Shri P. R. Jha,Manager (DD), NABARD, Deoghar
11. Shri N.K. Poddar, Manager (DD), NABARD, Dumka
12. Shri C .M. Murmu,AGM(DD), NABARD, East Singhbhum
13. Shri K. K. Mallick,AGM(DD), NABARD, Garhwa
14. Shri. Ashutosh K Sinha, Manager (DD), NABARD, Giridih
15. Shri. A K Choudhury, AGM(DD), NABARD, Hazaribag
16. Shri G. Thakur,Manager (DD), NABARD, Koderma
17. Shri Samrat Mukherjee, Manager (DD), NABARD, Lohardaga
18. Shri Kamalesh Kumar, AGM(DD), NABARD, Palamau
19. Shri U. K. Sen, AGM(DD), NABARD, Sahebganj
20. Shri H.K.Mahto, Manager (DD), NABARD, W.Singhbhum

21. Shri B. Paswan, Manager (DD), NABARD, Chatra
22. Shri M. K. Sinha, Manager (DD), NABARD, Godda

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I. SAP AT A GLANCE

Jharkhand State Agriculture Plan 20008-09 to 2011-12

(Rupees in crore)

Sl. No	Projects	2008-09	2009-10	2010-11	2011-12	Total
1	Land Development-Moisture conservation measures & Soil Health Improvement	57.65	153.94	164.30	168.34	544.33
2	Irrigation	66.90	147.29	157.77	159.16	531.12
3	Farm Mechanisation	4.42	5.64	6.33	3.65	20.04
4	Accelerated Seed Replacement Programme	43.27	75.77	73.55	70.06	262.65
5	Integrated Pest management Programme	1.45	3.22	3.40	3.00	11.07
6	Horticulture Development programme	39.48	55.26	64.68	71.41	230.83
7	Integrated Farming	13.34	35.64	41.40	35.45	125.83
8	Promotion of sericulture/ setting up of tassar silk composite unit etc) (ha)	2.90	17.55	9.25	7.05	36.75
9	Support for Lac cultivation - Supply of brood lac at subsidised rate (ha)	11.54	16.36	20.93	20.93	69.75
10	Bio-Fertlizer/ Vermi-compost/ NADEP compost units/ organic manure units	0.88	1.98	2.50	1.84	7.20
11	Strengthening Market Infrastructure	0.98	7.21	6.12	7.19	21.50
12	Strengthening Extension	4.86	12.02	32.50	10.60	59.98
13	Animal Husbandry / Dairy	56.42	153.73	173.93	179.09	563.16
15	Fisheries	5.61	13.70	13.95	16.01	49.27
16	Innovative Schemes	1.51	2.69	3.02	3.08	10.30
17	Research & development	0.00	3.82	2.52	1.81	8.15
18	Creating institutional Infrastructure including construction of Krishi Bhavans		19.00	20.00	15.00	54.00

19	Project preparation Fees	1.90				1.90
20	Contingencies @2% of the outlay				52.16	52.16
	TOTAL OUTLAY	**313.11**	**724.82**	**796.15**	**825.83**	**2659 .99**

N.B: The Plan is for 21 districts barring Ranchi, Gumla and Simdega

II. Summary of Recommendations

In conformity with the Terms of Reference, the following recommendation are made for the State Agriculture plan which are as under:

1. Increasing Net Sown Area (NSA) by 3.14. Lakh hectares.
2. Increasing Cropping Intensity (CI) from 114% to 128%. With the increase in irrigated area to 3.34 lakh ha through minor irrigation, availability of quality seeds, improved extension activity, treatment of soils and encouraging use of fertilizers, the plan targets to increase the double cropped area from 24.19 ha at present to 27.16 lakh ha.
3. Additional 49253 hectares cultivable waste land and 89099 hectares of other fallow to be treated for inclusion at a later stage. 39000 ha to be treated under watershed approach (21 district).
4. The additional area being brought under cultivation is presently categorised as Current Fallow.
5. Doubling the area under assured irrigation from 1.57 Lakh Ha to 3.14 Lakh Ha. 50% of this through irrigation potential created and 50% through minor irrigation investments proposed.
6. Present seed replacement rate is estimated at 10% in field crops and 20% in vegetables. 100% seed replacement to be achieved during the plan period. Apart from strengthening all the state seed farms, and converting 11 of them to comprehensive seed farms, seed

villages /clusters (200 ha) are to be created for certified seed production. Assistance will be given for developing seed processing.

7. Seed Production : Seed villages may be set up under the overall supervision of the KVK/Block authorities with community and NGO participation
8. Seed testing labs to be set up in all districts to cope with the seed testing requirements. It has been proposed to provide one seed testing lab in each districts.
9. Soil & Water Testing Labs : District level Agricultural Testing Labs may be set up in each District of the State.
10. Soil Health cards: It is an irony that soil health, which is the basic requirement for agriculture has been neglected by the farming community, more particularly the small and marginal farmers basically due to insufficient extension service. This has given lot of stress on the soil reserves of nutrients on account of wanton use of fertilisers without soil testing. While soil health care would have to be given utmost care in any agriculture development plan , it is envisaged that each farmer need to be given " Soil Health Card" for his land which would contain all required information relating to pH factor, nutrient status, soil depth, texture and structure, organic matter part from micro-biology, which would help the farmer in making suitable application of desired fertilisers and micro-nutrients. Soil health card to be issued to all farm holdings, however looking at the task involved it is proposed to cover 20% of the holding during the plan period.
11. Mobile Soil Water Testing Labs (Agricultural Testing Labs) and Farmer Schools. In addition to the District level ATLs one mobile Soil and water Testing Lab per district

may be set up. These labs may also be equipped with farmer training tools for creating awareness, bringing information on seeds, market prices, etc. as well as to collect feed back from farmers to fine tune supply side responses to meet demands as well as provide for demand/need based planning.

12. State Agriculture Farms : It is recommended that 12 State Agricultural Farm may be developed under Comprehensive Agriculture Farm Development Programme as Model Agri Farms. This may be achieved with Public Private Partnership. Each identified farm may have a tenure-based dedicated Farm CEO to ensure full implementation of the development programme.
13. Micro nutrient testing is to be done and enrichment kit is to be supplied to progressive farmers @ 500 farmers per district.
14. Considering the low level of farm mechanisation, promotion of farm mechanisation has been proposed. Small implements such as drum seeders, cono weeders, sprayers, winnower cum thresher, power tiller, paddy paddle thresher are to be distributed to create a demonstrative effect.
15. In non-NHM districts horticulture crops are proposed to be promoted. Fruit crops such as mango, Guava, Citrus fruits, Amla, Jackfruit and other minor fruits, spices such as garlic, ginger, turmeric are to be promoted. To promote vegetable cultivation in the area proposed for expansion distribution of kits containing vegetable seed, compost, plant protection material are proposed. Floriculture is proposed in districts having potential and Govt. has set up plat resources centre, mainly for loose flowers, in four districts

bulbous flowers. For demonstrative purpose tropical polyhouse for off season vegetable and floriculture.

16. To promote marketing of horticulture and vegetables and to minimise wastage, pack houses, market yards, grading and packaging centres, refrigerated vans and cold rooms have been proposed.
17. For increasing farm income integrated farming is to be promoted and demonstrated. This integrated mix farming model is to be promoted in all panchayats. Apart from this, for tribal families integrated agri – horti farms are to be promoted.
18. In districts having potential for tassar sericulture, for making available disease free layings (DFL), one centre with 4 grainage houses and common facility centre has been proposed, which will be able supply DFLs to farmers and buy back cocoons.
19. Timely and adequate availability of brood lac is a constraint in development of lac cultivation. Therefore in districts which have potential for Lac cultivation, arrangement of supply of brood lac at subsidised rate has been proposed.
20. State being organic by default, promoting organic input will enable promotion of organic farming. Bio-fertiliser units have been proposed. One 150 tonnes unit at Govt. sector and assistance for setting up small units by farmers.
21. Interventions through provision of INM and IPM packages have been proposed.
22. Extension is a weak area and one of the reasons for poor productivity and lack of crop diversification. To strengthen extension and for awareness creation, Krishi Gyan avam udyog Kendra is to be set up at sub-district level and at block level agri information

centres are to be set up. Farmers' capacity building, including training, exposure visit, awareness camps etc are proposed in agriculture, watershed, Horticulture, Animal Husbandry and fisheries. Apart from farmers para extension workers such as Krishi Mitras, Matsya Mitra and Gokul Mitra are also to be given training.

23. To bridge the gap in infrastructure required under Animal Husbandry – new veterinary hospitals, strengthening/Artificial Insemination centres have been proposed to meet the requirement of one AI centre for 1000 adult female cattle population, and one Veterinary centre for every 5000 adult animal units.
24. In order to promote pasture development community pasture /Silvipasture are to be promoted @ one unit of 5 ha for every 5000 adult cattle unit.
25. To promote modern dairy units in the State modern dairy demonstration centre of 50 animals are to be set up in potential districts. To promote dairy farming 2 animal CB cows are proposed to be supplied at 80% subsidy. Similarly, to promote mini dairy units of 5 CB cow units are proposed to be provided to progressive farmers at 50% subsidy.
26. Key factor towards a profitable dairy is a quality heifer rearing programme. To facilitate this a heifer rearing programme with the facilitation of an NGO has been proposed.
27. Concentrate, fodder, vaccination etc will be provided to heifer born out of AI upto pregnancy (18 moths age).
28. Jharkhand dairy project by NDDB for procurement and marketing milk is proposed to provide marketing support for milk produced in 12 districts.

29. Goat, pig, backyard poultry are preferred animal husbandry activities in the rural areas especially in tribal areas. These need to be promoted for increasing the income of rural population.
30. Goat unit of 10+1 improved varieties is proposed to be given to facilitate breed improvement of local goat population.
31. To promote pig farming, piggery unit of 3+1 of T&D variety developed by Birsa Agriculture University is proposed to be given to poor farmers.
32. In areas where duck farming has potential, duckery units of 30 birds are to be distributed, 60 low input technology bird poultry is proposed to be given to farmers to be taken up as subsidiary occupation and a source of additional income.
33. To make available animals and birds for the programme as also to meet the demand arising out of demonstrative effect of these schemes, the Govt. piggery, poultry and goat farms are proposed to be strengthened and new poultry and duck breeding farms, one each has been proposed to be set up.
34. To meet the feed requirement 3 feed plants have been proposed, for fodder production fodder seed is proposed to be distributed to dairy farmers at the rate of 10 kg per animal.
35. Disease diagnostic labs are not available for disease diagnosis, hence one centre in each district has been proposed.
36. Vaccination of livestock is important for maintaining healthy animals, the programme proposes to cover 100% of the livestock population.

37. Quality fish seed and its timely availability is one of the major issues affecting development of pisciculture. Due to shortage of fish spawn, seed rearing is also not possible in large scale. In order to overcome this it is proposed to purchase spawn from hatcheries in West Bengal and supply to identified fish seed growers to promote fish seed rearing, to meet the total seed requirement both for culture and stocking in reservoirs, in the short term and in the long terms. To meet the total spawn requirement locally fish seed hatcheries have been proposed in each district. These hatcheries could be leased out to progressive fish farmers, in view of the shortage of staff in fisheries department.
38. To promote seed rearing, seed rearing tanks of 30 decimal ponds are proposed to be constructed free of cost to weaker sections. Old Govt. tanks that has been silted need to be renovated, so that it could be leased out for taking up fish culture.
39. In the Govt. fish farms, demonstration farms on integrated farming incorporating various models is proposed to be set-up.
40. Fresh water prawn is a high value crop. Therefore, before promoting fresh water prawn farming, survival and returns of fresh water prawn farming is to be standardised to local condition especially in view of cold winter in this region. Pilot projects in different parts of the State have been proposed to study the viability.
41. Productivity of reservoirs is very low and stock enhancement and species enhancement are some of the techniques to increase productivity. This provide livelihood to

fishermen dependent on capture fisheries in reservoirs. Stocking of fish species of Indian major carps has been proposed in reservoirs.

42. Fishermen living near reservoirs need craft and net for exploiting the fisheries resources of reservoirs. It is proposed to provide boat and net to members of 214 registered fishermen co-operative societies.
43. Transporting the fish seed produced by fish seed growers for supply to farmers and reservoirs and for transporting fish caught by members of fishermen co-operative societies, transport vehicles have been proposed. This is to be given to the co-operative societies and also to the fisheries department.
44. Construction of landing centres at select reservoirs have been proposed to facilitate landing of fish catch from the reservoirs at one place and collection for marketing by the societies.
45. To increase fish production, reservoir resources could also be used by utilising the fringes of reservoirs for pen culture. This would provide additional income and employment to fishermen families living near the reservoirs. As this is not a very popular activity, to begin with it is proposed to be taken up in 15 reservoirs.
46. Fish markets in the State are not hygienically maintained. There is no proper waste disposal and measures to reduce spoilage of fish. Hygienic markets are important for maintaining quality of fish till it reaches the consumer and to achieve this, fish markets with proper facilities are proposed in the major cities, where there is huge demand for fish.

47. Irrigation device which can be introduced to conserve water resource is sprinkler irrigation, this also has been proposed for demonstrative effect.
48. Plan envisages assistance for farm mechanization efforts especially for improved and gender friendly tools, implements and machineries. Specific agricultural mechanization projects oriented toward enhancing farm productivity can be considered under this scheme. However, tractors are not covered under the scheme.
49. *Strengthening of Market Infrastructure and marketing development:* Plan proposes financial support for setting up of cold storages, cold chains, godowns, formation of farmer' SHGs, setting up collection centre etc. Assistance to PRIs/SHGs in promoting collection and sale to mandis/government agencies.
50. *Strengthening of Infrastructure to promote Extension Services:* This includes new initiatives for skill development and training for the farming community and to revamp the existing State agricultural extension systems.
51. *Activities relating to enhancement of horticultural production and popularization of micro irrigation systems*: Assistance will be available for nursery development, horticulture activities including marketing and drip/sprinkler irrigation.
52. *Grant support to the State Government institutions that promote agriculture/horticulture:* Wherever state level institutions that work for promoting agriculture/horticulture/allied sectors require a one-time grant support for their functioning/strengthening, such support can be provided.

53. *Study tours of farmers:* Study tours of farmers to see innovative practices and method of farming inside or outside the State especially to research institutions, progressive farms and units etc need to be arranged.

54. Organic and bio-fertilizers: Support for decentralized production at the village level and their marketing, etc. This will include vermi-composting and introduction of superior technologies for better production.

*55. Innovative schemes***:** The above list is not exhaustive. Therefore, schemes that are for agriculture, horticulture and allied sector development, but cannot be categorized above can also be proposed, as innovative schemes. Some of the technologies which are new to the State have been proposed under innovative schemes. These include SRI technology in rice production which can be demonstrated for increasing rice productivity and also reduce cost of seed, there by increasing income from paddy cultivation. This has been successfully tried in some areas. HARP has developed a low cost gravity drip system which can be tried in farmers' field for demonstrative effect, this would be very useful as the requirement of water is very less. Other programmes proposed with plan provision are mentioned as under:

i. Integrated Agri Horti.-Silvi Farming : This programme is aimed at developing resource poor Tribal communities through a combination of interventions viz. development of Orchards, health and women development and other income generating activities etc. in order to improve the income generating capacity for sustainable development of Tribal communities.

ii. Integrated Mixed Farming Model : Increase Net Sown Area : The State suffers from high levels of current fallow, even during Kharif, mainly due to deterioration of soil status, erratic rainfall and lack of seeds. The plan proposes to bring 3.61 lakh ha of current fallow into culturable mode with introduction of Integrated farming technique during the 11th plan period.

56. Convert Cultivable waste to cropped area **:** It is recommended that watershed based development may be extensively encouraged to bring large areas of cultivable waste into cropped area. The plan envisages 39000 ha of cultivable waste land cultivation through watershed development and 7743 ha through investments in bunding, Land terracing, moisture conservation measures, water harvesting links etc. The approach recommended is to involve community and NGOs.

57. Animal Health Clinics : New /strengthening AI centres proposed @ one AI centre for every 1000 adult female cattle population. Community pasture/ Gauchar land / Silvipasture/ Grass land @ 1 per 50000 Adult Cattle Units have been proposed.

58. Utilisation of Major and medium irrigation potentials: The government may take steps to remove bottlenecks in completing the distribution network of a large number of major. and medium irrigation projects so that the potentials created may be fully utilised. A state level Inter Departmental Empowered Committee vested with necessary powers to decide on matters leading to removal of hurdles may be set up for the purpose. A minor image of this committee may be set up at district level also.

59. Food Security : Jharkhand is one of the 12 states where National Food Security Mission on rice is being implemented. Commission desires that paddy yield should be stepped up to at least 3 Tonnes per Ha in the state from a meagre 1.1 Tonnes per Ha at present by fully utilising resource availability and technical guidance opportunities under the Mission. This plan would aim to achieve at least a conservative yield level of 1.8 T over a period of 5 years ending 2011.

60. Agri Prices : The terms of trade in agriculture is adverse. This calls for extra support in price and/or Integrated farming.

61. Electricity for Agricultural Purposes **:**The share of consumption of electricity for agricultural purposes was estimated at a very low 0.72% against all India overage of 22-93% with increasing requirements for energising pumpsets, operationalising gender friendly farm equipments, heat and light requirements for birds and animals etc., it is recommended that the State Government may take steps to reach electricity supply to all farm families a stipulated time frame of 5 to 7 years. As the investment in this regard shall be from the other departments, no physical or financial outlays are proposed under this plan.

Institutional Infrastructure

62. Agricultural Statistics Bureau : There is an urgent need to set up an Agricultural Statistical Bureau in the State to collect key statistic/information on production, productivity, inputs, income, food availability, prices and costs etc. so that the progress in the vital sector can be monitored on an ongoing basis and to make planning and

execution focussed and meaningful. A token amount of Rs. 2 crore is budgeted in the plan.

63. Efforts may be launched to publish important statistics at Block, District and State level may be made and a cell may be formed within the Ministry for Agriculture and Animal Husbandry for this purpose.

64. Agricultural Extension units : **Krishi Bhawan** with one Agricultural officer, a minimum of two Agricultural and Veterinary Assistants and Village level Agricultural Extension workers at the rate of the VLAEW per 5000 or less population covering contiguous villages may be set up. A token budget of Rs. 50 crore is provided in the plan.

65. Agro Industries Corporation : There is a pressing need for setting up of a State Agro-Industries Corporation in Jharkhand on the lines of ones existing in others States. The Corporation would be catering to the farm mechanisation demands of the progressive farmers and more particularly of small farmers who would require state support for improve use of farm implements.

66. State Seed Corporation : 100% seed replacement to be achieved during the plan period. Apart from strengthening all the state seed farms, and converting a few of them to comprehensive seed farms, seed villages /clusters (200 ha) are to be created for certified seed production. In the absence of a state seeds corporation, it is difficult to ensure implementation of the plan. Further, this would also help in arresting supply of

fake and sub-standard seeds by unscrupulous seed dealers and agencies to the gullible farmers. Rupees one crore is proposed in the plan for setting up the infrastructure.

67. Staffing at Extension centres : There are no adequate staff in existing departmental offices and extension centres. Urgent steps to fill up the vacancies need to be taken.

68. Institute Of Fisheries and Livestock Research: A dedicated research centre to develop suitable practices, breeds/species, etc in livestock and fish culture may be set up in Goria Karma Farm at Hazaribag**.** An outlay of Rs.2 crore is proposed as initial support for the Centre.

69. Centre for Research in Millets: Considering the fact that about 12 districts of the state suffer from droughts with regularity, a Centre for Research in Millets may be set up under the Birsa Agriculture University for coordinated research on dry land crops especially in millets. An outlay of Rs.2 crore is planned under the SAP.

OVERALL SUPERVISION AND MONITORING

70. District level Inter departmental Committee: Field level surveys and studies conducted by NABARD/ NABCONS show that the reason for poor conversion of irrigation potentials created into utilisation is the lack of distribution network in all important initiative like major, and medium irrigation projects as well as in micro lift irrigation and check dams. The situation calls for focussed action. It is recommended that a District level Inter departmental Committee to urgently study the issue under the chairmanship of District Development Commissioner may be set up which may submit

its recommendations to remove all hurdles in creating/maintaining distribution network for the irritation potential created in the district on a time bound manner. Ideally, the report may be submitted to the Chief Secretary in three months' time.

71. State Level Monitoring Committee: With the launching of the Agriculture Plan, the State Government would have to evolve proper mechanism to supervise, monitor and review the implementation of the 5-Year programme. This High Power Committee may be called as the Sate Level Monitoring Committee headed by Principal Secretary, Agriculture and comprising members from all concerned departments of the State Governments, BAU, HARP, IINRG, SLBC and NABARD. The body may make quarterly review and monitoring of the progress of the project implementation, monitor village wise achievements under Current Fallow Conversion Programme, identify constraints, ensure supply of inputs etc.

72. A State Level Inter Ministerial Empowered Committee with necessary power to decide on all matters leading to removal of hurdles may be set up for the purpose.

III. Terms of Reference

The assignment was initially awarded to Nabcons for preparation of RKVY plan for all the districts of the State with following terms of reference.

a. District wise assessment of potential for agriculture and allied sectors.
b. Identify infrastructure and support services required for development of each component and the infrastructure and support services required to be created for the development.
c. Preparation of agriculture development plan for all the districts and for the State as whole.

Further during the discussions with Development commissioner and Principal Secretary, Agriculture, it was informed that a Comprehensive Agriculture Plan need to be prepared for integrated development of agriculture sector in the state. While the part funding would be accessed from the components under RKVY, the remaining funding would be the responsibility of the Govt. of Jharkhand over and above the RKVY funding. It was also informed that the plan is to be prepared for 21 district and for three districts viz. Ranchi, Gumla and Simdega the assignment has been entrusted to Gene Campaign.

IV. Methodology adopted and Process of Consultations

Methodology adopted

NABCONS has been assigned the task of preparing Agriculture Plan for 21 districts in the State. In the remaining 3 districts, the work has been assigned to Gene Campaign, New Delhi. Also the Plan for 2007-08, has been integrated in the Plan for 2008-09

The following methodology and tools have been adopted for preparation of state and district agriculture plans for Jharkhand in respect of 21 districts. The plan for the remaining three districts is being prepared by Gene Campaign.

a. Collection of secondary data (district/block wise) regarding potentials of various activities / crops relating to agriculture and allied sectors, infrastructure, market and extension services.

b. Collection of primary data by way of discussions with line departments, development agencies and research institutes.

c. Village level consultations

d. Data collection from State level agencies regarding the policy direction, programmes and plans etc.

e. Assessment of the present level of development, identification of gap in infrastructure, support service, extension services, marketing support and capacity building etc.

f. Identification of programmes/components being implemented by Govt. departments for convergence in agriculture development plan through interaction with these departments.

g. Quantification and assessment of the financial requirements for creating infrastructure, support services and other initiatives.

h. Preparation of District Agriculture Plan.

i. Consolidation of district plans into State Plan.

V. Consolidation of Multi-level surveys, studies and consultations held by NABCONS at village, block, district & state levels

Consultative Process

The entire Plan has been prepared in a consultative approach with active participation of all the stake-holders.

- **Specific Projects** have been prepared based on inputs from

a) Line Depts. i.e. Agriculture Dept., Animal Husbandry, Dairy, Fisheries and Horticulture

b) Strategic Research Extension Plan (SREP) prepared by ATMA in 8 districts under the guidance of SAMETI

c) Potential-linked Credit Plans (PLP) prepared by NABARD for all the districts in the State

d) Farmers in select areas

e) Select NGOs

f) Discussions with District Authorities and the district line departments

g) Birsa Agricultural University

h) Research Institutions such as ICAR (HARP) and IINRG (erstwhile ILRI)

i) RRBs and commercial banks

- Govt of Jharkhand could not incur any expenditure during 2007-08 i.e., during the first year of 11th Five year plan (RKVY) under Stream I because of late receipt and procedural issues.

Consultative Workshop at village, district and state levels

NABCONS convened a series of workshops of the all the stakeholders at the district levels for obtaining their expectations and suggestions. The line department officials of the districts were provided with the copy of the plan prepared for the concerned district. The district wise discussions on the plan was taken up and district officials, NGOs and farmers made suggestions for incorporating in the plan. Following are the important suggestions made. Some of the suggestions that emanated from the stakeholders in the district level meets are briefly outlined under:

Dumka district:

- Rain water to be harvested for irrigation
- Crops that require less water to be promoted
- Mixed farming to be promoted
- Oil seeds such as Mustard, Naijar, Rai etc need to be promoted
- More areas to be covered under watershed programme
- Renovation of old lift schemes to be done
- Soil treatment should be given priority
- Strengthening of soil testing lab and awareness creation about need for soil testing required
- Protection of horticulture crops from grazing important
- Soil quality monitoring and surveillance system to be setup at block level
- Natural springs available could be harvested for irrigation
- Crop rotation to be promoted to maintain the fertility of soil
- Collection centres for forest produce required to ensure

- Drum seeder used by farmers had yielded good result, therefore it should be provision for at least 5 drum seeder per panchayat
- If irrigation is available off season vegetable cultivation in greenhouse possible
- In situ rainwater harvesting required
- One watershed each for 4 different terrains of the district required
- Land consolidation must for promoting agriculture in the State, as the holdings are fragmented
- Seed production should be decentralised to ensure timely supply of seed
- There is severe shortage of man power in the departments and for soil testing labs soil scientists are not available.
- Sericulture has potential in the district

Jamtara district:

- Farm forestry on the field bunds could be promoted
- Crops suited for acidic soils should be promoted
- Fish hatcheries and fish seed farms to be promoted to meet the demand of fish seed
- Commercial fish culture by SHGs to be promoted
- Lac cultivation by SHG should also be promoted and lac processing plant to be setup
- There is potential for tassar cultivation but demonstration farm required
- Milk Chilling plant required in the district
- Pulsed production to be promoted
- There is potential for floriculture
- Fish culture need to be developed on cluster approach
- Soil testing lab to be set up
- Land leveling to be included in land development

Deoghar District:

- There should be water lifting devises in checkdams

- Soil testing lab to be setup at block level
- There is potential for area expansion under ground nut
- Fodder seed production is important for dairy development
- Milk collection centre required in Saraighat panchayat
- There is potential for tassar and lac cultivation
- Floriculture should be promoted
- Poultry, lac & tassar cultivation and floriculture can be taken up through SHGs
- Integrated farming is possible in Saraighat
- Commercial cattle breeding farm to be setup for providing good quality cattle
- In tradition peda making areas such as Ghomara village there is demand for milk and dairy farming on clusters need to be promoted

Sahebganj District:

- There is potential for poultry farming through SHGs
- There is good potential for Mango orchard, planting material is available
- There is potential for fish culture, poultry and vegetable cultivation
- Piglets are not available breeding farm may be setup
- There is potential for bamboo boring in 6 pnachyats of Sahebganj block
- *Barbati* is cultivated in the district, this needs to be promoted as there is market for the same, special programme to be made.
- Drum seeder to be provided at the rate of 50 units per block
- Sprayers @ of 20 per block and cono weeder @ of 50 per block may be provided
- There is potential for custard apple
- One organic input unit in each panchayat to be provided
- DoC not available, poultry hatchery to be set up (Deoghar is proposing a poultry hatchery this could cater to the needs of Sahebganj also
- Soil testing lab to be setup

Pakur District :

- Farmer group should be given assistance for production of certified seeds
- There is potential for goat farming, good quality animals not available, bucks of good breed could be provided for breed improvement
- Short duration paddy has been demonstrated by KVK. Awareness to be created for use of this variety paddy by farmers
- Veterinary centres and a pathological lab to be established
- Vaccines not available, to be made available
- Shifting cultivation to be discouraged
- Collection and marketing of minor forest produce to be arranged
- Soil testing lab to be setup
- Bulk milk cooler to be installed

Godda District :

- Breed improvement of livestock required
- Vaccine to be made available
- Dry land farming to be promoted
- Chilling plant to be setup
- Pathological lab to be setup
- Sericulture to be promoted

Ramgarh District:

1. There is good potential for vegetables in Gola(Potato 2000 ha) and Ramgarh blocks
2. Cold chain for vegetable required
3. There is potential for Garma paddy in Sikhidri area 200 acre
4. There is potential for ground nut
5. There should be provision for seed production of rain fed crop
6. Good quality potato seed is not available resulting in poor productivity

7. Plant protection to be included especially for termite control
8. Breed improvement of goat with Black Bengal goat in Gola and Ramgarh blocks
9. T&D pig rearing has potential in Mandu block and there is good demand
10. For meeting the demand for piglet in the district, production of piglet to be increased in State AH farm
11. Good potential for backyard poultry in Ramgarh district. Good quality poultry breed suited for purpose to be identified and hatchery setup
12. Farm for Beetal goat is to be established for breed improvement of goats
13. Fodder seed production to be included

Hazaribag District:

1. Grain godowns need to be setup in the district
2. Vegetable export zone to be set up
3. Production of HYV vegetable seeds developed by HARP to be taken up
4. Fencing of Govt. seed farms required to protect the farm
5. Free gracing is to be banned for development of agriculture in the district
6. Potential for vegetable in Ichak block - Tomato, Potato and coriander leaves seed to be made available
7. Processing facilities potato need to be setup
8. In Barkagaon there is good production of Tomato processing plant required
9. Marketing facilities for coriander leaves required
10. Short duration Maize variety developed by BAU to be included in seed production
11. Bajra and Jowar could be promoted under rain-fed condition
12. Distribution of small implements such as tiller to be included

Koderma District:

1. As there is shortage of extension workers Kisan mitra should be proposed for each panchayat

2. Nursery development for horticulture crops to be included in the plan
3. Processing unit for rice, dal etc and dehydration of vegetables to be set up
4. Renovation of defunct micro lift to be taken up
5. There is potential for vegetables such as potato, Radish, Tomato etc in Markaccho block
6. Area expansion possible for Arhar and Bajra and Jowar as inter cropping
7. Vaccination programme for livestock to be included in the plan
8. Livestock farms should be decentralised to each region
9. Subabul which require less irrigation is a good fodder crop and can be planted on farm bunds
10. Reservoir fisheries Development
11. Women to be given training in fish culture

Giridih District:

1. Milk route to be developed
2. 500 units of 2 milch animal to be given
3. Commercial dairy to be promoted
4. Fodder development to be taken up - perennial Paragrass and Azolla seasonal barseem
5. Protection for fodder crop is to be provided
6. To address the breed improvement of nondescript cattle population in the rural areas, the person taking the cattle for gracing may be given communication facilities so that when the animals come to heat can be communicated to AI centre and AI facilities extended.
7. All the existing Govt. seed farms to be strengthened
8. Power tillers is to be included in farm mechanisation
9. At least one cold storage is to be setup in the district for potato and off season vegetables

Dhanbad District:

1. Arhar area expansion possible in Govindpur, Baliapur and Tundi blocks

2. Vegetables there is scope in Dhanbad, Govindpur and Jharia balocks
3. Good potential for sericulture and Lac in Tundi block
4. Power tillers are in demand in the district
5. Village level data can be collected if format is developed for data collection - District planning Officer
6. Potential for floriculture in Baliyapur, Govindpur and Nirsa blocks
7. Milk route to be developed
8. Agri-clinics in each panchayat required

Bokaro District:

9. Boundary wall for Govt. seed farms are to be constructed
10. Unit cost of well considered is on the lower side
11. Fertilisers use has not included in the plan, need to be addressed
12. Godown for storage of seeds and other inputs is to be set up
13. There is potential for floriculture in Chandankiyari and Petarwar blocks
14. There is potential for Turmeric, Ginger and Sweet potato
15. There is potential for Mushroom and medicinal plants
16. Kisan Mitra may be promoted to address the shortage of extension staff
17. Capture fisheries in reservoirs need to be promoted - Fishermen require craft and gear for catching fish
18. Ice plant and transportation facilities for fish required
19. No disease diagnostic centre and training centre for AH
20. Development of Pastures / Gauchar land to be developed for demonstration
21. Breeding farm for Goat and Pig to be setup in the district
22. Cultivation of elephant foot yam (Amorphophallus/oal) with turmeric as inter cropping with papaya on farm bund has good potential

23. Minor fruits such as Jack fruit, Ber, Jamun etc. to be promoted

24. SRI technology need to expanded to more areas

Chatra District:

1. Kisan Mitra may be promoted to address the shortage of extension staff
2. Already there are 3 seed villages only one more required
3. There is scope for Lac cultivation
4. There is scope for Summer Paddy in Itkhori block
5. Renovation of defunct microlift required
6. Block agriculture information centres for providing information to farmers
7. There is scope for organic farming, Identification of crop, arrangement for certification and marketing is required
8. Jack fruit, Ber and Jamun need to be promoted
9. Horticulture activities not covered under NHM also should be promoted

West Singhbhum District:

1. Floriculture to be included as gladiola is being cultivated in the district.
2. Training/ awareness is required about modern practices
3. Tassar has very high potential. Proper marketing is required.
4. There is potential for Turmeric, Ginger and cashew has potential. Processing facility for cashew required.
5. Improved agricultural implements are required.
6. Marketing arrangement for medicinal and aromatic plants to be made. There is potential for lemon grass but extraction unit not available.
7. Onion storage godowns required.
8. There is potential for Lac cultivation, brood lac to be made available.
9. There is potential for Piggery and Goatery
10. Sprinkler irrigation to be promoted

11. Summer *mung* is to be promoted
12. Seed storage facility to be created
13. There is potential for Turmeric, Ginger
14. Poly house to be included for off season vegetable cultivation
15. Pathological lab to be set up

Saraikela- Kharsawan District:

1. Tassar and lac have very high potential. The tassar yarn, produced here, is considered to be the best in quality in Asia.
2. Seed storage godown is needed. Kisan bhavan cum training centre could be built along with this.
3. Sprayer, mechanized paddy thresher, mechanized transplanter, fodder chopping machines to be included in the plan. They may be given to farmers' clubs/ groups.
4. Floriculture- 10 ha/ block (Nimdih and Chandil)
5. Organic farming - Certification programme needed
6. Animal husbandry- Pathological lab at district level is required
7. Watershed Development programme should be in 3000 to 5000 ha.
8. Off season vegetables in poly houses to be promoted
9. There is potential for Turmeric, Ginger and elephant foot yam (ol)
10. There is potential for integrated pig / duck -cum- fish farming
11. Pathological lab to be set up
12. Vaccines not available, to be made available
13. Seepage tank to be included for recharge of wells

East Singhbhum District:

1. Paddy thresher to be distributed @ 100/ block.
2. Mushroom cultivation to be added and spawn production centre to be established
3. For fruit trees, fencing to be added

4. Goatery & piggery- No. of units to be increased.

5. Poultry has high potential- Hatcheries required for DoC.

6. Dairy development has very high potential. Dairy units may be set up. Milk coop. societies to be organised.

7. Model farms for fodder may be included

8. There is potential for ground nut in 200 ha in Baharagora area

9. There is scope for high value vegetable in Potka, Jamshedpur and Patmda, 100 ha each

10. Cashew, Papaya, Mango and Citrus are to be included

11. Vaccines for Goat and Pig to be included

12. Practical training on Animal breeding to progressive farmers to be provided

13. Potential for sheep in Patamda

14. Fodder seed production can be taken up in the livestock farm

Palamau district:

- Seed village is required in each block
- As the rainfall is less in the area irrigation system which use less water such as sprinkler system should be introduced
- There is potential for soyabean but processing facility is required
- Integrated fish farming, integrating crop, horticulture and fish culture to be promoted
- Renovation of canal system of defunct irrigation project required to benefit Palamau and Lesliganj blocks
- Soil testing labs should be established at block level
- To promote organic fertilisers and pesticides, training and awareness creation programme required
- Timely availability of fertiliser to be ensured
- Organic products are not getting remunerative prices, market to be identified
- Para extension workers to be appointed for strengthening extension

- Awareness creation for use of new farm implements required
- Vegetable seed to be made available as there is shortage of seed though there is potential for area expansion
- Plant protection material to be made available
- There is potential for onion and garlic in Ramsagar and Lesliganj blocks
- Holding size is small therefore consolidation of holdings and cooperative farming must for agriculture development
- Dry land horticulture need to be promoted
    - Farmers may be imparted training on short duration paddy and seeds of this variety may be made available to them.
- The model farming system developed by Zonal Research Centre to be promoted - ZRC to provide the details
- Seed drill is to be included in farm mechanization
- There is potential for floriculture - Gladiolus and Marigold - Lesliganj
- Silvipasture to be promoted
- Bee keeping there is potential
- In situ water conservation required
- Marketing of minor forest produce through SHGs to be promoted
- KVK will provide block wise potential for different crops in the district
- Storage facilities may be provided to the farmers to prevent distress selling and help farmers in getting remunerative prices
- There is potential for mushroom cultivation in Chattarpur block

Latehar District:

- The production of barley, millets, mahua, till, oat, turmeric, ginger, green peas, soya bean, garlic, mustard may be encouraged among the farmers in the district.
- Lift irrigation projects to be promoted

- Drip irrigation being done it is to be extended to more areas
- Dry land horticulture (Amla, Ber, Custard Apple) to be promoted and awareness creation required for it
- Inter cropping and integrated farming to be encouraged among the farmers
- Integrated fish farming to be promoted
- Certified seed production to be promoted
- There is potential for cultivation of medicinal plants
- Refrigerated vehicle for transportation of Tomatoes required
- Bulls of Saiwal and Red sindhi verities can be supplied for natural service, in addition to AI for breed improvement of Cattle
- At exit points FMD protection points may be setup
- Mass vaccination required but vaccines need to be made available - AH officer to workout the requirements
- Fodder seed production to be done in Govt. farms - A project is to be prepared
- A pathological lab is to be set up for disease diagnosis

Garhwa District:

- There is potential for vegetable cultivation - vegetables such as Brinjal, Tomato, chilies, Potato, Onion, Garlic, pea however there is no marketing arrangement
- Vegetable seed production programme to be included
- Productivity of chilies coming down, reason to be assessed
- Action to be taken to compete the on going irrigation works
- Pathological lab for livestock to be setup
- There is potential for construction of checkdams
- Water bodies available in the upland distribution system required to be made
    - Land leveling required, crop varieties suited for dry land farming to be made available
    - Seed villages to be setup

- Awareness creation on new farming techniques required
- Cold storage to be setup
- There is potential for poultry and piggery
- Sheep rearing has potential - suitable varieties for the area to be identified
- Renovation of existing check dams and other irrigation structures required
- Breed improvement
- There is good vegetable production, but transport facilities for marketing required
- Gravity drip system developed by HARP to be promoted in all blocks
- Short duration crops suited for the area to be identified
- There is potential for medicinal and aromatic plants and processing facility to be set up

Lohardaga District:

- Seed villages to be setup
- Soil testing lab to be setup
- Integrated fish farming to be promoted
- Fish hatchery to be setup
- Second crop to be promoted - there is potential for vegetable cultivation in Kudu and Senna blocks
- Floriculture on group farming to be promoted
- Facilities for marketing of vegetables required
- Vermi compost to be promoted
- Gravity drip system to be promoted
- Awareness creation on scientific fish farming necessary
- As the ponds are seasonal, to reduce seepage polythene lining to be tried

Interaction with Project Directors of ATMA and SAMETI

NABCONS had interaction with the ATMA and the SAMETI to obtain their valuable feedback on the expectations and perceptions and suggestions for developing agriculture in the state. Some of the suggestions and by them have been collected as under district wise:

Hazaribag District

Seed processing unit to be setup

Floriculture to be promoted

Low cost poly house to be set up for off season vegetables

Sprinkler irrigation need to be promoted

Backyard Poultry hatchery to be setup

Goat and pig bread improvement programme to be takenup

Sugar cane there is potential

Palamau District

Seed storage -cum- training centre to be constructed

Saraikela Kharsawan District

Cold rooms for vegetable required to be set up for marketing

Under farm mechanisation Sprayers, Paddy thresher (manual and mechanised) to be included.

Gravity drip system developed by HARP to be popularised

Chilling plant to be setup

Pond and well constructed under various programme be made us for irrigation

Strengthening of existing watersheds required

Jamtara District

Refrigeration for vaccines to be provided

AI facilities to be set up at Panchayat level

Gokul mitr be trained in administering vaccination and first aid.

Chilling plant to be setup

Tassar cultivation to be promoted as innovative project

Integrated Animal Husbandry cum fisheries to be promoted

Bokaro District

Seed farm to be strengthened with provision of boundary wall

Wells are to be provided in good no for irrigation

West Singhbhum District

Mixed farming with lift mechanism and storage tank to be promoted

Extraction plant for medicinal and aromatic plan to be set up

Chilling plant to be setup

Chatra District

Micro lift to be given on group basis

Series of checkdam to be constructed on perennial rivers /streams

Post Harvest management of Peas, chilies and Tomato required

Reclamation of acid soils to be taken up

100% subsidy for lime to be provided

Koderma District

Soybean to be promoted

Micro lift to be given on group basis

Series of checkdam to be constructed on perennial rivers /streams

Post Harvest management of Peas, chilies and Tomato required

Reclamation of acid soils to be taken up

100% subsidy for lime to be provided

Bamboo boring to be included in irrigation programme

Sahebganj District

Bamboo boring and deep tube well to be included in irrigation programme

Check dam

Chilling plant

Village level Consultation

Consultation with local farmers and community was also held at several villages across the state. The village level need assessment is appended at the end of the report.

Consolidation

The Comprehensive agriculture plan prepared and presented in the following chapters has carefully taken care to utilise the feedback, findings from the village, block and district level surveys, technical inputs obtained from various sources and information/ data base from GOI, concerned state govt. departments, research institutes, various study reports, etc. in arriving at an implementable plan for 5 years under this 5-year Agri-Plan.

PART-B

CHAPTER-1
INTRODUCTION

1.1. Agriculture is not only the economic backbone of an agrarian state like Jharkhand, it is an essential element of the strategy to make growth more inclusive. However, the stage of agriculture in Jharkhand has remained at a very abysmal stage of development despite years of experimentation, plans, programmes and strategies. Reasons being many, the National Policy for farmers, 2007 calls for a paradigm shift from a purely commodity centered approach to a human centered approach for agriculture development. This requires improving economic viability of farming by substantially increasing the net income of farmers.

- Various Central Sector and Centrally Sponsored Schemes are being implemented by the Government of India and the State Governments for development of agriculture and allied activities as per guidelines of the Agriculture Policy. Following major initiatives have been taken to accelerate the pace of developmental activity and implement the objectives of the Agriculture Policy of the Centre and the states.

- Macro Management Scheme has been launched after integrating 27 ongoing Centrally Sponsored Schemes to enable a shift from programmatic approach to a macro management mode of assistance to the states in the form of work plans based on crop/area specific, regionally different strategies, to provide flexibility to State Governments and to ensure timely and effective application of limited financial resources.

- Common guidelines have been issued for National Watershed Development Project for Rainfed Areas to harmonize the implementing norms with other watershed development

programmes. A Watershed Development Fund with a corpus of Rs.200 crores each from NABARD and the Department of Agriculture & Cooperation, has been created.

- Seed Legislation is under revision to give fillip to varietal research and plant breeding. Enactment of legislation on the "Protection of Plant Varieties and Farmers Rights" is on cards. This is likely to stimulate investment and initiatives both in public and private sectors for development of new plant varieties and a vibrant seed industry. A National Seed Policy is under formulation. A Scheme for Seed Crop Insurance has been launched to cover the risks involved in seed production. A Seed Bank has been established to meet contingent requirements of seed in the wake of natural calamities.

- Increasing availability, flexibility and security in the flow of credit to the farmers. All eligible farmers are proposed to be covered under the Kisan Credit Cards scheme within the next 3 years. A personal insurance package is proposed to be extended to Card Holders covering them against risk to life and injury.

- A scheme has been introduced for provision of capital subsidy for construction/modernization and expansion of cold storages and storages for horticultural produce.

- Rural Infrastructure Development Fund corpus has been increased from Rs.4500 crore in 2000-01 to Rs.14000 crore in 2008-09 and the interest rate charged by NABARD reduced.

- Market Information Network has been launched with the objective to provide farmers latest information on price movements of agricultural commodities and other essential data.

- Cooperative Sector Reforms: a new Bill has been formulated and introduced in Parliament for replacing the existing Multi-State Cooperative Societies Act, 1984.

- Formulation of new subsidy linked scheme for establishment of rural godowns.

- Promotion of Food Processing Industries and value addition in agriculture through the excise exemptions and other interventions.

- Standing Committee of Union Ministers and Chief Ministers constituted to consider issues concerning agricultural strategies, food management and promotion of agriculture exports. The Committee has approved the outline of the proposed Grain Bank Scheme which will be extended to BPL families in identified areas and developed on the contours of the recently launched Sampoorna Grameen Rozgar Yojana

1.2. Genesis of Comprehensive 5-year Agri-plan for Jharkhand

In spite of plethora of programmes being implemented by the state and the central authorities for development of agriculture, agriculture still languishes with a very poor rate of growth in the country as a whole and more so in a state like Jharkhand. What has lacked is a comprehensive outlook for development in the sector improvement taking agro-climatic conditions, natural resource and technology into account, and integrating livestock, poultry and fisheries in a more integrated manner. A lot therefore remains to be done at the state and the central level with full involvement of all the stakeholders including the public and the private sector .

National Development Council, in its meeting dated 29 May 2007, resolved that a special Additional Central Assistance Scheme be launched. The Scheme has been named as Rashtriya Krishi Vikas Yojana (RKVY). The scheme has been introduced to incentivise States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource and technology into account, and integrating livestock, poultry and

fisheries more fully. This new scheme for Additional Central Assistance to State Plans would be administered by the Union Ministry of Agriculture over and above its existing Centrally Sponsored schemes, to supplement the State specific strategies including special schemes for beneficiaries of land reforms.

The Department of Agriculture, GoI in compliance of the above resolution and in consultation with the Planning Commission, prepared the guidelines for the RKVY Scheme according to which the Scheme would be a State Plan Scheme. The eligibility for assistance under the scheme would depend upon the amount provided in State Plan budgets for agriculture and allied sectors over and above the base line percentage expenditure incurred by the State Governments on agriculture and allied sectors. The base line would be a moving average and the average of the previous three years would be taken into account for determining the eligibility under the Scheme, after excluding the fund already received. The RKVY funds would be provided to the States as 100% grant by the Central Government. The States are required to prepare the Agriculture Plans for the districts and the State, that comprehensively cover resources and indicate definite action plans.

1.3. Objective of Comprehensive 5-year Agri-plan for Jharkhand

In the above backdrop, the importance of placing agricultural infrastructure in place, timely and adequate flow of credit as well as effective capacity building measures can change the scenario and place Jharkhand in the National Map. This can be achieved by preparing district specific agricultural plans with well spelt-out policies, realistic objectives, effective organizational/ institutional linkages and a blending of planning from below and above. This would facilitate meaningful and sustained rural development by taking into account available resources, local needs and requirements to meet the challenge.

The assignment was initially awarded to Nabcons for preparation of RKVY plan for all the districts of the State with following terms of reference.

a. District wise assessment of potential for agriculture and allied sectors.
b. Identify infrastructure and support services required for development of each component and the infrastructure and support services required to be created for the development.
c. Preparation of agriculture development plan for all the districts and for the State as whole.

Further during the discussions with Development commissioner and Principal Secretary, Agriculture, it was informed that a **Comprehensive Agriculture Plan** need to be prepared for **integrated development of agriculture sector** in the State. While the part funding would be accessed from the components under RKVY, the remaining funding would be the responsibility of the Govt. of Jharkhand over and above the RKVY funding. It was also informed that the plan is to be **prepared for 21 districts** and for three districts viz. Ranchi, Gumla and Simdega the assignment has been entrusted to Gene Campaign.

- Accordingly, the task of preparing the **State and district wise comprehensive five year Agriculture Plan (SAP & DAP)** were **assigned to NABARD Consultancy services (Nabcons) by the Jharkhand State Govt..** The broad objectives are as under :

i. To achieve 4% growth in agriculture as envisaged in the XI Plan 2007-08 to 2011-12
ii. Introduction of appropriate interventions in specific regions for a balanced regional development taking into account agro-climatic conditions, natural resources, local needs and technology.
iii. To orient the agriculture development strategies to meet the needs of the farmers.

iv. To bring about quantifiable changes in the production and productivity of various components of agril & allied sectors by addressing them in a holistic manner with a view to maximise returns to the farmers in agril & allied sectors.

v. To increase public & private investment in agril & allied sectors.

vi. To reduce yield gaps in important crops through focussed intervention by ensuring access of farmers to the latest technologies and strategic researches.

vii. To create opportunities for multiple livelihoods through crops- livestock integrated farming for economic well-being of farming community by adoption of appropriate strategies.

viii. To strengthen linkage between research, extension and farming communities as well as development of both backward and forward linkages.

ix. To improve the economic viability of the farming by substantially increasing the net income of farmers in a sustainable manner.

x. For improving agricultural production, better farming methods can be shown to the farmers through demonstration, rotation of crops, conservation of moisture and use of improved implements within the reach of the peasants, distribution of improved seeds and enhanced irrigation systems.

CHAPTER-2

STATE PROFILE

2.1. The new State of Jharkhand formerly a part of Bihar, was formed on November 15th, 2000 with Ranchi as its capital. The 28th state of the Indian Union, Jharkhand has a total geographical area of 79714 sq. Km. The State extends between 22 degrees North to 25.5 degrees North latitudes and 83 degree East and 87.75 East latitudes.

- Jharkhand largely comprises of the forest tracks of Chhotanagpur plateau and Santhal Pargana and has distinct cultural traditions. The State has 24 districts, 212 blocks and 32,260 revenue villages. The territory of the State is bound by Bihar in the North, West Bengal in the East, Orissa in the South and Chattisgarh in the West. Located on an elevation of 300 to 610 meter above sea level, the climate of the state ranges from dry semi humid to humid semi-arid types.

- The state comes under Agro - Climatic Zone VII i.e. Eastern Plateau and Hills Region. This region is further subdivided into three zones namely, Central and North Eastern Plateau Zone, Western Plateau Zone and South Eastern Plateau Zone. As per the agro-ecological characterization of the country Jharkhand falls in Zone 12 and 13 .

- The annual rainfall in the plateau and sub-plateau region is 1400 mm on an average, of which **82.1% is received during the period June to September and the rest 17.9% in remaining months**. There are a number of perennial rivers and streams flowing through the State. The important rivers are Damodar, Subarnarekha, Koel Karo, Barakar and Sankh. A mineral rich State, Jharkhand is also blessed with rich fauna and flora.

- The total forest area in the State is 23.32 lakh ha. covering 29.26% of the geographical area (79.71 lakh ha.) which is much above national average of about 18%.

- The total population of the State as per 2001 census is 2.69 crore with average density of population of 338 per sq.km as against all India average of 324. Jharkhand ranks 13th in terms of population, accounting for 2.62 percent of All India population. The Share of tribal population is about 28% of the total population. Jharkhand has one of the highest levels of poverty in India at 40.3% as against the All India Average of 27.5 %. There is sharp contrast between rural (49%) and urban poverty (23%) in the state. 70% of its population depend mainly on agriculture and allied activities for their livelihood contributing about 15% to Gross Domestic Product .On the other hand almost the same proportion of agricultural workers (58.4%) engaged in the country contribute about 23 % to national GDP. This broadly reveals the low productivity of Jharkhand agriculture.

- Jharkhand has one of the highest levels of poverty in India at 40.3% as against the All India Average of 27.5 %. There is sharp contrast between rural (49%) and urban poverty (23%) in the state. 70% of its population depend mainly on agriculture and allied activities for their livelihood contributing about 15% to Gross Domestic Product .On the other hand almost the same proportion of agricultural workers (58.4%) engaged in the country contribute about 23 % to national GDP. This broadly reveals the low productivity of Jharkhand agriculture.

- The Gross State Domestic Product (GSDP) at factor cost by industry of origin (current prices) of Jharkhand increased from Rs.35030.04 Cr in the year 2001-02 to Rs. 69751.96 Cr in the year 2006-07, showing an average annual growth rate of 14.13 percent. The gross per capita income of the State has accordingly increased from Rs. 12845.00 in 2001-02 to Rs. 23591.00 in 2006-07. The Net State Domestic Product (NSDP) at factor cost by industry of origin (current prices) increased from Rs. 27504.77 Cr in the year 2001-02 to Rs. 61530.90 in the year 2006-07 , thus showing an average annual growth rate of 14.8 per cent. The net per capita income of the State has accordingly increased from Rs. 10972.00 in 2001-02 to 20,811 in 2006-07.

- The share of primary, secondary and tertiary sectors in NSDP in the year 2006-07 accounted for 24 percent, 41 percent and 35 percent respectively. The shares of primary sector and tertiary sector as percentages of SGDP have shown a gradual declining trend from 35 percent and 45 percent, respectively in 2001-02 to 24 percent and 35 percent, respectively, in 2006-07, whereas the secondary sector has shown an increasing trend from 20 percent in 2001-02 to 41 percent in 2006-07. Agriculture and Allied Activities' which play an important role in the economy of Jharkhand contributes about 13 percent to NSDP, and provides livelihood to about 80 percent of the State's population.

- Out of the total 79 lakh hectares geographical area of Jharkhand state, the **cultivable area is estimated around 41.80 lakh hectares** out of which the **net sown area is 18.08 lakh ha**. The land surface being uneven are subject to sheet and gully erosion, causing loss of soil and plant nutrients and about 23 lakh hectares are subjected to severe erosion every year. But, erosion, moderate to severe taken together affect about 30 lakh hectares which is about 40 per cent of the geographical area. Thus, checking soil erosion by adopting soil conservation measures should be the most important step to check land degradation. Important land use pattern characteristics of the three sub zones in Chotanagpur and Santhal Parganas of Plateau region are presented below:

Sub Zone	Sub Region	Total Geographical area (m ha)	Population (million)	Net cultivated area	Forest (%)
IV	Central North Eastern	4.1	12.3	55.0	13.0

	Plateau				
V	Western Plateau	2.5	6.0	24.0	33.0
VI	South Eastern Plateau	1.3	3.5	31.6	24.0

- Jharkhand has 40 percent of the nation's mineral reserves. It ranks first in the production of Coal, Mica, Kyanite and Copper in India. The major industries located in the State are Iron and Steel, Automobile, Nonferrous, Fertilizers, Chemicals and Cement. Large scale investments in both public and private sectors have been made in basic and heavy industries. So far, major industrial activities in large and medium sector have taken place in Chotanagpur region of the State. These industries have had marginal spread effects because of the failure to develop the necessary forward and backward linkages. Industrial pockets prosper in the vicinities of important towns like Ranchi, Dhanbad, Bokaro, Jamshedpur and Hazaribag which are also home to several specialised educational and research institutions like BIT, XLRI, XISS, ISM, BAU, HARP, IINRG etc, all of which promises to power the growth of the nascent State.

- There are about 63000 units of small scale industries with an investment of about Rs.415 crores which provide employment to two lakh persons. On the other hand, 309 units of large and medium units with an investment of nearly Rs.12000 crores provide employment to about 74,000 persons. It is clear that village and small scale industries have an important role to play in socio-economic development of the state, particularly from the viewpoint of employment generation and balanced regional development.

- The State of Jharkhand has an installed power generating capacity of 1390 MW as against national capacity of 105000 MW. The Thermal power generating capacity in the state is around 90% i.e. 1260 MW. The Plant Load Factor (PLF) of thermal stations is 18 to 20%,

far less than the national average of about 70%. The thermal hydel ratio in Jharkhand is 90:10 as against national level of 76:24. Rural electrification is a major challenge to the state as only 15% of the 32,000 villages of the state have been electrified till date. The Average annual per capita consumption of electrical energy and per capita installed capacity for country are about 400 KWH and 100 watts respectively. As against this, the figures for Jharkhand are 200 KWH and 50-60 Watts respectively.

- The total length of state road in Jharkhand is 5400 km., of which only 900 km. is double lane road and rest is intermediate and single lane roads whereas the country as a whole has more than 3 million km of road network. The National High Way is 1600 Km and the State High Way is 5400 Km. As per the record only 8484 no. of villages (26 %) have road connectivity out of 32260 no. of villages in Jharkhand. The state has extensive railway network providing vital links to important cities of the country. There is one national airport at Ranchi.

- Food security situation in the newly formed state of Jharkhand is very serious. Despite availability of huge natural resources more than 40% of the population live below poverty line. The state is one of the lowest in ladder of development indicators. As per the world food program mapping, Bihar and Jharkhand are listed as the most insecure in terms of food and nutritional security. According to National Sample Survey II, about 2 percent of population suffer from acute and chronic hunger and 10 percent from seasonal food insecurity. Agriculture is the main source of livelihood for the people of state. About 70% of people are depended on small farmlands less than 1 hectare in size. Stabilising agriculture for small and marginal farmers alongwith looking for livelihood options in the state is one of the greatest challenges. The flow of credit in the State is facilitated through a multi-agency banking mechanism comprising of Commercial Banks, RRBs and

Cooperatives. The State has a network of 1,731 branches covered by 22 public sector banks with 1,123 branches, 8 private sector banks with 36 branches, 2 Regional Rural Banks with 388 branches, 8 District Cooperative Banks (DCCBs) with 142 branches and one Land Development Bank with 42 branches as on 31 March 2007. The rural and semi urban branches account for 82% of the total branches in the State. The average population per Bank Branch in the State was 17,340 as on 30 September 2007 as compared to all India level of 16,000.

State profile in tabular format is appended below.

STATE PROFILE

1. Geographical Features

(i) Geographical Area	79,714 sq. km.
(ii) Normal average rainfall (2001-	1330 mm.
(iii) Main rivers	Damodar, Suwarnarekha, Koel, Karo, Barakar, Sankh

2. Administrative Units

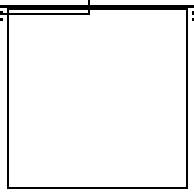
i	No. of Districts	24
ii	No. of sub-divisions	31
iii	No. of blocks	212
iv	No. of Towns	152
v	No. of villages	32,620
vi	No. of villages electrified	14,667 (45%)
vii	Villages connected by roads	8484 (39%)
viii	National Highways	1600 km.
ix	State highways	5400 km.
x	Health centres	566
xi	Schools	22691

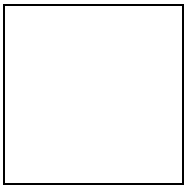
3. Population

(2001 census)

i	Total	2.69 Crore
ii	Rural	2.09 Crore (77.74%)
iii	Urban	0.59 Crore (22.26%)
iv	Male	1.38 Crore (51.51%)
v	Female	1.31 Crore (48.49%)
vi	Density of population	338 persons per sq. km.
vii	SC population	0.32 Crore (11.8%)
viii	ST population	0.71 Crore (26.3%)
ix	Literacy	53.6%
	a. Male	67.3%

	b. Female	38.9%
x	BPL population (rural)	23.69 lakh families
xi	Percentage of total workers engaged in agriculture & allied activities	66.85%
xii	Per capita annual income (at 2003-04 rates)	Rs.12,509.00





Mineral Resources

(Million tonne)

SL.No.	Mineral	Jharkhand	% share to all India
i	Coal	69128.00	32.67
j	Iron Ore	3758.00	37.39
k	Lime stone	511.00	0.68
l	Copper Ore	112.00	25.40
m	Bauxite	70.00	2.84
n	China clay	45.69	4.38
F	Kyanite	0.13	4.64
p	Fire clay	50.00	9.84

q	Dolomite	29.00	0.66
r	Graphite	0.38	0.09
s	Bentonite	0.80	0.22
t	Soapstone(Seatile)	0.30	0.14
u	Quartz & Silica sand	148.00	6.16

(Source: Jharkhand : A Statistical Profile 2005, Government of Jharkhand)

CHAPTER-3

STATE LEVEL POTENTIALS
AGRICULTURE AND ALLIED SECTOR

3.1. Agriculture as Mainstay of Jharkhand economy

Although Jharkhand is endowed with vast and rich natural resources, mainly minerals and forest, 80 per cent of its population residing in 32620 villages depend mainly on agriculture and allied activities for their livelihood. One of the main strategies for development of the State is to ensure agricultural and rural development on a sustainable basis. Capacity building is the focal point for any developmental endeavor. In the agricultural sector there is scope for bringing additional area under cultivation through vertical and horizontal expansion, increasing the area under irrigation, raising production and productivity of food crops through optimum utilization of inputs like seeds, fertilizers, pesticides, agricultural tools and implements.

3.2. Horticulture

Horticulture is one of the important sub-sectors of agriculture, having ample scope for expansion in Jharkhand. The agro-climatic conditions of the State is conducive for commercial cultivation of large variety of fruits, vegetables, flowers and medicinal & aromatic plants. The total area occupied by various plantation and horticulture (P&H) crop in the State is about 2.57 lakh hectares with an estimated total production of 37.85 lakh tonnes. Different kinds of fruit crops are grown in Jharkhand. Considering the agro-climatic suitability and future prospects, the State Government has programmed to implement various schemes/programmes for promoting this sector. A major thrust is being given for bringing additional areas under various plantation and horticulture crops and enhancing the productivity of the yielding crops. Besides supply of protein-rich food, the fisheries sector also has vast potential to provide employment to

the people in the rural areas. Horticultural development has vast potential not only in terms of meeting the local requirements of fruits, vegetables flowers and medicinal and aromatic plants but also in terms of exploiting the opportunities for exports.

Favourable agro-climatic conditions allow round the year production of varieties and "off-season" vegetable (such as brinjal, cabbage, cauliflower, ladies-finger, onion, peas, potato, pumpkin, mushroom, capsicum and green chilly) and fruits (such as mango, litchi, guava, banana, papaya, lemon, hack fruit, amla and others).

3.3. Forest based industries

Forest based industries come into the picture primarily because of an ever-increasing demand for power in the country. The fossil fuel resources are estimated to last only for the next 50 years and bamboo biomass has been identified as an alternative source of bio-energy. The technical feasibility of using bamboo in biomass gasifiers has been versified and confirmed by the Indian institute of Science, Netpro Renewable Energy (India) Ltd. Bangalore and other Institutions in the country. It is estimated that the woody biomass production of bamboo at the rate of 15 tonnes / ha of marginal land with protective irrigation can yield adequate biomass to run 1 MW power generation plant effectively. The use of bamboo for power generation can mitigate the rural power crisis, achieving self - sufficiency in power supply.

Also, huge investment potential is there for:

- Units engaged in bamboo-based laminates, composites, boards, plywood etc.
- Tasar & Lac based industries.
- Medicinal plants sector for propagation, value addition, processing etc.

3.4. WATER RESOURCES

The area under irrigation have been variously reported as about 10.3% (2003-04, Ministry of Agri, GoI) and 10.73% (1997-98 Report of Commission on Agricultural Reforms, Research and Development March 2008). However, the cropwise data on irrigated area under principal crops show an extremely grim picture.

Sl. No.			
1	Total Area under Food grains	2005-06	19.30 lakh ha
2	% of land under food grains with irrigation	2003-04	7.50%
3	% Irrigation under Major crops	% to total area under food grains	% area under irrigation
	Rice	70%	5.6%
	Wheat	3%	86%
	Maize	9%	1.8%
	Other ... (Jawar, Bajra)	2%	Nil
	Pulses	15%	2.2%
	Total food grains	100%	7.5%

* Agri. Stats 2006-07, Min of Agrl. crop, GoI.

At the same time, the large number of medium, major and minor irrigation projects Implemented in the state has created potentials to irrigate 7.12 lakh ha as shown under :

Type	**As on 31.03.2008**
1. Major and Medium Irrigation	2.34 lakh ha
2. Minor Irrigation (including individuals)	4.79 lakh ha
Total	**7.12 lakh ha**

The **Second State Irrigation Commission** has made an assessment of the water resources in the State and identified 16 river basins which can be harnessed through major, medium and

minor irrigation schemes. The Commission had identified separate potential for reservoir schemes and lift irrigation schemes.

The Commission has also assessed the ground water resources in the State at 5482 million cubic metres. The average stage of development of ground water in the State is approximately 20 per cent with further potential for future development. Ground water exploitation under the private sector is mainly through dug wells. With the huge ground water potential available in the State, 8-10 lakh additional wells can be constructed. Physiographically, the entire State is plateau area where ground water resources may not be depended upon for rabi and summer crops.

Field level surveys and studies conducted by NABARD/ NABCONS shows that the major hurdle in the conversion of irrigation potentials created into utilisation is the lack of distribution network in all important initiatives like major, and medium irrigation projects as well as in micro lift irrigation and check dams. The situation calls for focussed action. It is recommended that a District level Inter departmental Committee to urgently study the issue under the Dy. Comm. may be set up which may submit its recommendations to remove all hurdles in creating/maintaining distribution network for the irrigation potential created in the district on a time bound manner. Ideally, the report may be submitted to the Chief Secretary in three months time. A State Level Inter Ministerial Empowered Committee with necessary power to decide on all matters leading to removal of hurdles may be set up for the purpose.

3.5. AGRO-BASED ENTERPRISES

Jharkhand has a leading advantage for agro-based industries owing to the following factors:

- Availability of land for setting up post -harvest infrastructure.

- Hassle- free single window clearances
- Assured water and power connections
- Capital investment subsidies in addition o APEDA/ NHB subsidies
- Amenable banking System in the state with tremendous scope for improvement in the off take of credit for development in agriculture.
- Sales tax concessions and tax holidays
- Facility of Special Economic Zone at Jamshedpur
- Agri- export zone for vegetables and fruits at Ranchi linked with major production centres.
- Joint venture possibilities with Jharkhand State Agriculture Marketing Board and Department of Industries, Jharkhand.
- Technical knowledge back up from horticulture and agro-forestry research centres.
- Immense scope for contract farming/organic farming
- Luxuriant forest covers rich in natural medicinal plants

Based on the availability of raw materials, infrastructure as well as domestic and export needs, investment opportunities for potential investor has been identified in the following areas:

- Grain holding and storage
- Creating food processing facilities

- Producing juices, pulps, extracts of fruits and vegetables, canned fruits and vegetables
- Brined, picked and pasteurized vegetables offer export prospects
- Cold chain infrastructure for perishable fruits and vegetables

3.6. Fisheries

Jharkhand is endowed with vast fresh water resources in the form of tanks/ponds and reservoirs. These water bodies are yet to be exploited for commercial aquaculture. Thus, there is an abundant scope for horizontal and vertical expansion of fish culture in the State. The livestock production at 10.73 lakh litres of milk, 661-.4 million eggs and 7.04 lakh kgs. of wool in Jharkhand indicate that this sector makes a sizeable contribution to the State's economy.

3.7. ANIMAL HUSBANDRY

Most of the dairy development activities in Jharkhand are taken care of by the Dairy Development Directorate. It promotes milk producers' unions in the districts of Ranchi Lohardagga, Palamu, Gumla, Chaibasa, East Singhbhum Hazaribagh and Bokaro and helps in milk collection from rural areas through milk cooperative societies and marketing in the urban areas, establishment of mini-dairies and provision of technical inputs extension services .

The State has a forage seed production farm at Chatra. There is also a feed plant in Ranchi which manufactures and supplies adult cattle feed (ACF) and bypass protein feed (BPF) to the farmers on cost basis. There are dairy plants at Jamshedpur, Bokaro and Ranchi and 13 milk-chilling plants in different districts of the State under the Dairy Development Directorate.

With a view to having qualitative and quantitative achievement of wool and mutton, a new breeding policy has been adopted. Under the policy, selective breeding and cross-breeding

programme had been launched at Chatra where Shahabadi ewes are crossed with Rambouillet breed of USA. Besides, Corriedale breed of ram was also used for the purpose. In addition, grading up programme of Shahabadi ewes with Corriedale ram had also been taken up. There are two wool collection centres in East Singhbhum district.

Dumka, Deoghar and Godda districts account for higher population of' goats followed by the districts of South Chhotanagpur Division and Hazaribagh Division. Selective breeding with beetal breed and grading up with Jamunapri goats had been taken up in the State. There are threegoat farms-one in Chatra for Beetal bred and two in Ranchi and Sahebganj for Black Bengal breed.

Pigs are mostly concentrated in the plateau region of Chhotanagpur. The tribal people have a special interest and aptitude for pig husbandry. During the 8th Plan (1992-97), scheme for upgrading of country pigs with boars of exotic breed, strengthening of pig breeding farm and publicity of bacon factory product was taken up.

The State has five pig breeding farms at Gatiriakarma, Hotwar, Saraikela, Jamshedpur and Kanke where large White Yorkshre breeds and *Desi* breeds of pigs are reared. Ranchi Veterinary College rears pigs and supplies piglets to the farmers besides training the beneficiaries.

Based on the above discussions, following thrust areas in agriculture and allied activities identified for the state of Jharkhand would have to be given special attention by the policy makers, planners and all the stakeholders for sustainable development of the state

- Agriculture and allied activities
- Agro Based Industries
    - Cattle food
    - Jute, hemp, sisal and other fabrics

- Tea cultivation, processing and packaging
- Paper
- Floriculture
- Horticulture including vegetable based

- Sericulture/ tassar
- Forest based industry like shellac, bamboo, etc.
- Live stock based industry
- Industries based on recycling of wastes, eco friendly raw materials, and processes
- Food processing industry
- Industries based on medicinal and aromatic plants
- Industries based on non-conventional energy
- Tourism
- Cold storage
- Ceramics
- Sports goods
- Packaging
- Textile, hosiery, knitwear
- Handicrafts and handloom based industries

CHAPTER-4

POLICY OUTLINES ON AGRICULTURE

The National Policy on Agriculture seeks to actualise the vast untapped growth potential of Indian agriculture, strengthen rural infrastructure to support faster agricultural development, promote value addition, accelerate the growth of agro business, create employment in rural areas, secure a fair standard of living for the farmers and agricultural workers and their families, discourage migration to urban areas and face the challenges arising out of economic liberalization and globalization. Over the next two decades, it aims to attain:

- A growth rate in excess of 4 per cent per annum in the agriculture sector;
- Growth that is based on efficient use of resources and conserves our soil, water and bio-diversity;
- Growth with equity, i.e., growth which is widespread across regions and farmers;
- Growth that is demand driven and caters to domestic markets and maximises benefits from exports of agricultural products in the face of the challenges arising from economic liberalization and globalisation
- Growth that is sustainable technologically, environmentally and economically.

The policy seeks to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of country's natural resources - land, water and genetic endowment to promote sustainable development of agriculture. Other measures delineated are as under:

i. The use of bio-technologies will be promoted for evolving plants which consume less water, are drought resistant, pest resistant, contain more nutrition, give higher yields and are environmentally safe. Conservation of bio-resources through their ex situ preservation in Gene Banks, as also in situ conservation in their natural habitats through bio-diversity parks, etc., will receive a high priority to prevent depletion of bio-diversity.

ii. Balanced and conjunctive use of bio-mass, organic and inorganic fertilizers and controlled use of agro chemicals through integrated nutrients and pest management (INM & IPM) will be promoted.

iii. A regionally differentiated strategy will be pursued, taking into account the agronomic, climatic and environmental conditions to realize the full growth potential of every region. Special attention will be given to development of new crop varieties, particularly of food crops, with higher nutritional value.

iv. A major thrust will be given to development of rainfed and irrigated horticulture, floriculture, roots and tubers, plantation crops, aromatic and medicinal plants, beekeeping and sericulture for augmenting food supply, promoting exports and generating employment in the rural areas.

v. Development of animal husbandry, poultry, dairying and aqua-culture will receive a high priority in the efforts for diversifying agriculture, increasing animal protein availability in the food basket and for generating exportable surpluses.

vi. An integrated approach to marine and inland fisheries, designed to promote sustainable aqua culture practices, will be adopted.

vii. The regionalization of agricultural research based on identified agro-climatic zones will be accorded high priority. Application of frontier sciences like biotechnology, remote sensing

technologies, pre and post-harvest technologies, energy saving technologies, technology for environmental protection through national research system as well as proprietary research will be encouraged.

viii. The research and extension linkages will be strengthened to improve quality and effectiveness of research and extension system.

ix. Adequate and timely supply of quality inputs such as seeds, fertilizers, plant protection chemicals, bio-pesticides, agricultural machinery and credit at reasonable rates to farmers will be the endeavour of the Government.

x. The Government will endeavour to create a favorable economic environment for increasing capital formation and farmer's own investments by removing distortions in the incentive regime for agriculture, improving the terms of trade with manufacturing sectors and bringing about external and domestic market reforms.

xi. Rural electrification will be given a high priority as a prime mover for agricultural development. The quality and availability of electricity supply will be improved and the demand of the agriculture sector will be met adequately in a reliable and cost effective manner.

xii. Bridging the gap between irrigation potential created and utilized, completion of all ongoing projects, restoration and modernization of irrigation infrastructure including drainage, evolving and implementing an integrated plan of augmentation and management of national water resources will receive special attention for augmenting the availability and use of irrigation water.

xiii. Emphasis will be laid on development of marketing infrastructure and techniques of preservation, storage and transportation with a view to reducing post-harvest losses and ensuring a better return to the grower.

xiv. Setting up of agro-processing units in the producing areas to reduce wastage, especially of horticultural produce, increased value addition and creation of off-farm employment in rural areas will be encouraged.

xv. Institutional reforms will be pursued so as to channelise their energies for achieving greater productivity and production.

xvi. The Government will provide active support for the promotion of cooperative form of enterprise and ensure greater autonomy and operational freedom to them to improve their functioning.

xvii. Endeavour will be made to provide a package insurance policy for the farmers, right from sowing of the crops to post-harvest operations, including market fluctuations in the prices of agricultural produce.

xviii. The price structure and trade mechanism will be continuously reviewed to ensure a favourable economic environment for the agriculture sector and to bring about an equitable balance between the rural and the urban incomes.

xix. Quality consciousness amongst farmers and agro processors will be created. Grading and standardization of agricultural products will be promoted for export enhancement. Application of science and technology in agriculture will be promoted through a regular system of interface between Science and Technology institutions and the users/potential users to make the sector globally competitive.

xx. The database for the agriculture sector will be strengthened to ensure greater reliability of estimates and forecasting which will help in the process of planning and policy making.

xxi.GENESIS OF RASHTRIYA KRISHI VIKAS YOJANA

In spite of plethora of programmes being implemented by the state and the central authorities for development of agriculture, agriculture still languishes with a very poor rate of growth in the country as a whole and more so in a state like Jharkhand. What has lacked is a comprehensive outlook for development in the sector improvement taking agro-climatic conditions, natural resource and technology into account, and integrating livestock, poultry and fisheries in a more integrated manner. A lot therefore remains to be done at the state and the central level with full involvement of all the stakeholders including the public and the private sector .

National Development Council, in its meeting dated 29 May 2007, considering the need for accelerating agriculture and allied sector, resolved that a special Additional Central Assistance Scheme be launched. The Scheme has been named as **Rashtriya Krishi Vikas Yojana (RKVY).** The scheme has been introduced to incentivise States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource and technology into account, and integrating livestock, poultry and fisheries more fully. This new scheme for Additional Central Assistance to State Plans would be administered by the Union Ministry of Agriculture over and above its existing Centrally Sponsored schemes, to supplement the State specific strategies including special schemes for beneficiaries of land reforms.

The Department of Agriculture, GOI in compliance of the above resolution and in consultation with the Planning Commission, prepared the guidelines for the RKVY Scheme according to

which the Scheme would be a State Plan Scheme. The eligibility for assistance under the scheme would depend upon the amount provided in State Plan budgets for agriculture and allied sectors over and above the base line percentage expenditure incurred by the State Governments on agriculture and allied sectors. The base line would be a moving average and the average of the previous three years would be taken into account for determining the eligibility under the Scheme, after excluding the fund already received. The RKVY funds would be provided to the States as 100% grant by the Central Government. The States are required to prepare the Agriculture Plans for the districts and the State, that comprehensively cover resources and indicate definite action plans.

OBJECTIVE of RKVY

Food grain production at the National Level has come to a near stagnation over the last few years due to various reasons ranging from soil erosion to floods to lack of technological breakthrough in agriculture. In response to the crisis and ensuring food security, the government at the national level is now focussing on the concept of "bridging the yield gap". The concept means that if a State has reached the maximum yield level for a particular crop, the attention should be focussed on other States where the potential remains to be tapped. This is the area where Jharkhand can substantially contribute to raise the agricultural production level because of it's untapped potential. In this backdrop the importance of placing agricultural infrastructure in place, timely and adequate flow of credit as well as effective capacity building measures can change the scenario and place Jharkhand in the National Map. This can be achieved by preparing district specific agricultural plans with well spelt-out policies, realistic objectives, effective organizational/ institutional linkages and a blending of planning from below and above. This would facilitate meaningful and sustained rural development by taking into account available resources, local needs and requirements to meet the challenge.

CHAPTER-5

CRITICAL GAP AND STRATEGIES FOR COMPREHENSIVE AGRICULTURE - AN ANALYSIS

5.1. Broad Constraints and handicaps in Agriculture development in the state

- Out of the total 79 lakh hectares geographical area of Jharkhand state, the cultivable area is estimated around 41.80 lakh hectares out of which the net sown area is 18.08 lakh hectares. The land surface being uneven are subject to sheet and gully erosion, causing loss of soil and plant nutrients and about 23 lakh hectares are subjected to severe erosion every year. But, erosion, moderate to severe taken together affect about 30 lakh hectares which is about 40 per cent of the geographical area.
- The Agro-climatic conditions of the State are suitable for cultivation of wide variety of high value crops. But the Agricultural economy of the Jharkhand state is characterised by its dependence on nature, low investments, low productivity, mono-cropping with paddy as the dominant crop, inadequate irrigation facilities and small and marginal holdings.
- The average land holding in the State is 1.58 hectares. The share of land holdings of small and marginal farmers to the total holdings is 80 percent.
- The agriculture is susceptible to vagaries of monsoon which can be gauged from the fact that as much as 88% of the total cultivated area is un-irrigated. The major crops of the State are maize, rice, wheat and chick pea. The State contributes about one percent of All India food grain production.
- Consumption of fertilizer at 67.6 kg per hectare is lower than the All India level of 104.5 kg per hectare.
- Irrigation stands out as the most critical requirement for the development of Agriculture in the State. Despite the fact that the State has a good rainfall, the surface water availability to

agriculture is not sufficient due to inadequate storage facilities etc. Ground water recharge rate is low, as a result, the water table in the plateau is going down. Presently, the availability of water resources is only 2,87,810 lakh m^3, out of which 2,37,890 lakh m^3 is from surface water and rest 49,920 lakh m^3 is from ground water. The total utilization of surface and ground water in the State for irrigation purposes so far is only 47,360 lakh m^3 out of which 39,640 lakh m^3 is surface water and 7,720 lakh m^3 is ground water.

- More than 70% of the rural population depend on agriculture and allied sectors for their livelihood. Much of the farming is at a subsistence level with virtually no surplus. Eightyeight percent of agriculture is under mono-cropping and 73% of net sown area is under grains, predominantly paddy. The productivity of paddy ranged from abysmally low levels from 1062 Kg/ha in the Western plateau to 1314 Kg/Ha in the Central-North Eastern plateau, which are far too below national average of 1984 Kgs/Ha. The other crops in the state are wheat, maize, tur and other pulses and oilseeds etc together accounting for 27%(564700 Ha) of the gross cropped area. All these crops have productivity lower than the national average .
- The overall capacity of the farmers in terms of skill, physical and financial resources remain very low. They also donot have access to modern technology, quality planting materials, information and suffer from gross ignorance on modern package of practices.
- **Poverty profile:-** Incidence of poverty is very high in the state although the conventional estimates of poverty are not available currently. The data from BPL survey by the govt. and micro studies clearly indicate high incidence of poverty in the state along with being one of the most food insecure states in the country. As per the BPL Survey (1997-2002) of about 3.77 million rural families in the state, 2.32 million families live below poverty line.
- Reduction in poverty in the state has been very low in comparison to the national trends, perhaps lowest when compared to the national trends. The peculiar trend & feature is that

the incidence of poverty is much higher in tribal specific population (TSP) areas as compared to non-Tribal specific population areas. Rural Jharkhand is the poorest among 35 states and UTs of the country as per the mixed recall period consumption (MRP) method with 40.20 % of the rural population below poverty line. As per Recall period Methodology , it is second at 46.30% of the rural population below poverty line. The persons below poverty line is 18 % points more than the national average.

Spatial Distribution of Poverty in Jharkhand

Percentage of BPL	**Districts**
80% And Above	Gumla, Simdega W. Singhbhum, Latehar,
70-80%	Lohardaga,Seraikela Kharsawan,
60-70%	Ranchi,Dumka,Jamtara
50-60%	Deoghar, , Pakur, Sahebganj, Garhwa,
40-50%	Giridih, Koderma. Godda Hazaribagh, Giridih
Below 40%	Bokaro(36.22%), Dhanbad(8.3%),Deoghar

Source :Annual Report 2004-05 ,Department of Food, Civil Supplies and commerce, Government of Jharkhand pp50

- According to the advance discussion copy of the report titled " The India State Hunger Index : Comparisons of Hunger Across States by the International Food Institute released on October 14, 2008, Jharkhand ranks as the 2nd worst affected state in terms of Hunger Index with a score of 28.67 based mainly on overall calories undernourishment among the population and proportion of underweight children.

Food Deficits in Jharkhand

Food grains -	**52%**
Vegetable -	**12%**
Fruits -	**52%**
Milk -	**52%**

Fish - 52%

- There is very high prevalence of nutritional insecurity among the population in the state which is abetted low per capita availability of all agricultural and allied activity products on one hand and low level of income among vast number of rural poor making it difficult for those to purchase and consume required nutritious diet. The per capita availability of some of the crop/animal products are given below.

5.2. Role of agriculture and allied sectors continue to be paramount in the context of the state to provide food security, increasing rural income and bring overall rural prosperity. The extremely high prevalence of hunger and poverty call for immediate efforts to increase production and productivity of foodgrains on the one hand and increase farm income from integrated approach to farming. However, unfortunately agriculture and allied sectors suffer from critical gaps as discussed below.

- **Erratic distribution of rainfall**

The state receives on an average 1289 mm rainfall varying between 1285 and 1308 mm between diff. sub zones. out of which 85-86% is received during four monsoon months. Monsoon usually breaks in mid June and late arrival as well as early cessation are not uncommon. In fact, distribution of rainfall is uneven and erratic. Some times rain occurs as high as 140 mm in 245 hours. Dry spells of 2-3 weeks and even more usually occur in July-August. Failure of Hathia rain (late September-early October) is observed once in four years, which not only adversely affects grain growth of standing crops but also affects establishments of second crop in winter season. As a general practice in the state, paddy being the most preferred crop, its

sowing season during kharif keeps on extending even to late August /early September depending on the rainfall factors thereby affecting the yield of the crop.

- Low availability of water/soil-conservation

Out of the total 79 lakh hectares geographical area of Jharkhand state, the cultivable area is estimated around 38 lakh hectares out of which the net sown area is 23.62 lakh hectares. The land surface being uneven are subject to sheet and gully erosion, causing loss of soil and plant nutrients and about 23 lakh hectares are subjected to severe erosion every year. But, erosion, moderate to severe taken together affect about 30 lakh hectares which is about 40 per cent of the geographical area. Thus, checking soil erosion by adopting soil conservation measures should be the most important step to check land degradation. Important land use pattern characteristics of the three sub zones in Chotanagpur and Santhal Parganas of Plateau region are presented below:

Sub Zone	Sub Region	Total Geographical area (m ha)	Population (million)	Net cultivated area	Forest (%)
IV	Central North Eastern Plateau	4.1	12.3	55.0	13.0
V	Western Plateau	2.5	6.0	24.0	33.0
VI	South Eastern Plateau	1.3	3.5	31.6	24.0

- Due to high average precipitation in the state and undulating topography and porous soil characteristic, it results in high runoff and leaching of available rainwater . Thus, soils donot retain adequate moisture even for kharif crop. Rabi crop becomes impossible without tapping ground and surface water, which is scarce.
- **Poor status of soil:-** The run-off during monsoon in the undulated land mass prevailing most of the state leads to loss of top soil and both the run-off and leaching due to soil porosity leads to loss of scantily available soil nutrients. The soils are also left acidic with deficiency in micro-nutrients.

- **Small land holding**:- The Agricultural economy of the Jharkhand state is characterised by dependence on nature, low investments, low productivity, mono-cropping with paddy as the dominant crop, inadequate irrigation facilities and small and marginal holdings. The average land holding in the Sate is 1.58 hectares. The share of land holdings of small and marginal farmers to the total holdings is 80 percent. Only 0.84 % of the land holdings are in the category of 10 Ha and above. The small size of the holdings renders it impossible to enhance economics of scale. It is therefore, impossible to organise farmers so that cropping patterns, marketing, seeking extension support and obtaining training and capacity building.
- **Low capital formation in Agriculture and allied sectors:-** The small land holdings size , low productivity, predominantly grain-oriented subsistence and lack of adequate surplus do not provide incentives for individual farmer to make capital investments in his farm. Thus, while the need for entrepreneurial growth and private capital formation in the farm sector is a necessity, it is imperative in the current context to step up public investments in the sector leading to substantially higher capital formation in agriculture. The two-pronged path of (a) incentivising for diversified farming, private capital investments and (b) of state investment in capital expenditure is a pressing imperative. This will require the state to significantly increase annual plan overlap for the sector for the next 5-10 years.
- **Non-adoption of crop rotation**: 88% of the land is under mono-cropped paddy and the only crop rotation practiced in the state is Paddy-wheat. The lack of water, deterioration of soil status and inability to purchase seeds and inputs often lead to both restricting kharif cropped area and also increase probability of current fallow.
- **Large proportion of current fallow** :- As per land use data available from GOI statistics, 12.44 lakh Ha is under current fallow, which works out to 15.6 % of the total geographical area. The comparative position at the at the All-India level is 148.05 lakh Ha which is

4.5%. Major strategy would be to bring this current fallow under cultivation by way of proper crop planning.

- Non-adoption of inter-cropping in uplands: Unlike in most parts of the country, inter-cropping as a regular practice is not so common in this state with the result that proper land use and crop planning are not ensured and farmer is left with only subsistence farming without any additional returns from the scarce land in his possession. Planning needs to be done to make use of the interlands suitably by use of proper crop planning and selection of suitable crops and farming practices.
- **Non-adoption of recommended varieties**: Non-availability of certified seeds of suitable varieties of crops and quality seeds of recommended variety resulted in low seed replacement, poor level of fertiliser use, inadequate pesticide application, which are critical inputs resulting in deceleration in the productivity of the crops . Due to his fact, the common farmer has taken to use of traditional low yielding crop varieties. This needs to be seriously looked into and the facilities created for availability of suitable crop cultivars and recommended varieties.
- **Broadcasting method of sowing** : Large number of farmers practice broadcasting method of sowing of paddy and other crops in the state mainly due to erratic rainfall pattern, absence of water for nursery raising resulting in low yield of most of the crops.
- **Low input Use by the Farmers**: Production and productivity in the state is grossly handicapped by very low level of input use, viz. in good quality seeds, fertilisers, pesticides, etc apart from credit. The level of critical inputs has remained at the bottom when compared against national average. Consumption of fertilizer is only a meagre 67.6 kg per hectare as against the All India level of 104.5 kg per hectare. There is a pressing need to increase the input use to at least close to national average.
- **Quality Seed production**: Availability of quality seed is the biggest challenge for agriculture development in Jharkhand. At present hardly 5% of the requirement is met by

the public agencies. The plan has made required projections and provisions for quality seed production and availability.

- **Research and Development**: Technology is the main driver of progress more so for development of agriculture in the state. While there are a very few premier institutes in the state doing research in the field of agriculture and allied sectors, these are not adequate. The state requires dynamic research with its bio-diversities for developing appropriate technology suitable for large section of small farmer and the rainfed system of agriculture. There is an emergent need to develop high yielding, locally compatible seeds in millets, and upland paddy. The state has good potential of vegetables and tubers. It also has very good gene pool in plants, crop and animals which need to be conserved. Considering these potentials, the premier research institutions in the State such as Birsa Agricultural University, Horticulture and Agro forestry Research Project and the Central Rainfed Upland Rice Research Centre at Hazaribag should be adequately equipped with latest tools and equipments.
- **Feed and fodder development**: Huge scarcity in the requirement of green fodder and concentrates for the animal population in the state to the extent of 50%, poses a great challenge for development of dairying and animal husbandry . This needs to be bridged through multi-pronged strategy like mixed farming, fodder seed production, setting up of feed plants, etc.
- **Agri-Credit**: The flow of credit in the State is facilitated through a multi-agency banking mechanism comprising of Commercial Banks, RRBs and Cooperatives. The State has a network of 1,731 branches covered by 22 public sector banks with 1,123 branches, 8 private sector banks with 36 branches, 2 Regional Rural Banks with 388 branches, 8 District Cooperative Banks (DCCBs) with 142 branches and one Land Development Bank with 42 branches as on 31 March 2007. The rural and semi urban branches account for 82% of the total branches in the State. The average population per Bank Branch in the State was

17,340 as on 30 September 2007 as compared to all India level of 16,000. The banking system in the State had Rs.36,456.80 crores of deposits and Rs.16,308.80 Cr as advances with a CD Ratio of 44.7% as on 31 March 2007.

- **The CD ratio has shown a very dismal picture** although it has shown an increasing trend in last six years from 27.4% in March 2002 to 44.7 % as on March 2007. Out of 24 districts, 18 districts are having CD ratio less than 40%. Agriculture advances as percentage shown a declining trend from 10.72% in 2003-04 to 9.2 % in 2006-07 against. Banks lending is moving towards non-priority sector at the cost of core activities. The percentage of NPA to Gross Credit for the Banks in the State is at 4.83 % of the Gross Credit as on 31 March 2007. Special Sub Committees of DLCC have been constituted in these districts to monitor CD ratio and draw up monitorable Action Plans to increase CD ratio and improve credit to agriculture.

- **KISAN CREDIT CARD**

It may be seen from the table given below that percentage of achievement has declined from 102 % of the target in 2004-05 to a mere 54 % in 2006-07. Cumulatively the number of KCC issued by the banks in the state stood at 6.34 lakh as against 8.59 lakh farmers in the state. The agency wise achievement is as under:

Name of Agency	2004-05			2005-06			2006-07		
	Target	Achievement	% Ach	Target	Achievement	% Ach	Target	Achievement	% Ach
CBs	108122	82345	76	122430	58503	48	122430	67376	55
RRBs	42407	71890	170	80716	40353	50	80716	41389	51
Total	**150529**	**154235**	**102**	**203146**	**98856**	**49**	**203146**	108765	54

- **TERM LOAN UNDER AGRICULTURE & ALLIED ACTIVITIES**

The financing under Agriculture and Allied Activities (term loan) has registered a negative growth rate of 5 % which is a disturbing trend. The main objective of doubling of agricultural credit was creation of assets and with such dismal lending for term loan the purpose gets defeated. Agency wise flow of credit to the sector is given in the following table.

(Rs. Crore)

Year	Comm Banks	RRBs	Total
2004-05	213.39	22.39	235.78
2005-06	330.87	22.03	352.90
2006-07	324.18	13.65	337.83

CHAPTER 6

STATE AGRICULTURE PLAN- 2008-09 to 2011-12

6.1. Land Development

Soil Health: The activities, which can be grouped under the broad sector of 'development of Soil health' are the following :

Micro Nutrient Testing - Micro nutrients play an important role in enhancing agriculture productivity. Testing of soil for micro nutrient level is required for finding out micro nutrient enrichment that is required in the soil. It is proposed to provide this service free of cost to 500 farmers per district during the plan period.

Micro nutrient enrichment - Once the deficiency in micro nutrient is identified, programme for its enrichment is important. It is proposed to provide micro nutrient enriched fertilisers for 1 acre farm to 500 farmers per district.

Soil Amelioration : The soil in the State is predominantly acidic and to increase the productivity by release of nutrients from the soil , soil amelioration is required. The slack from steel plant could be used as it is available free of cost, it is propose to transport the same to farmers field.

Top Soil Preservation - The topography of the State in most part is such that during monsoon there is heavy run off and resultant soil erosion. Field bunds can reduce the velocity of run off and enhance percolation of water into subsurface. It is proposed to cover 46000 ha during the plan period.

Soil testing labs - Soil testing labs are inadequate in the State and this infrastructure need to be strengthened to extend the facility to the farmers. It is proposed to establish soil and water testing labs in each district and mobile labs on a selective basis. The mobile labs could also be used for awareness creation among farmers about farming techniques, new crops etc. though audio visual tools.

6.1.1 Soil and Moisture Conservation measures

Soil conservation is the preservation of soil from deterioration and loss by using it within its capabilities, and applying the conservation practices needed for its protection and improvement. Sloping lands when put under cultivation are subjected to accelerated soil erosion. The top fertile soil is washed away with every rain and flowing water to maximum as possible from the soil depleting the soil fertility. In addition to this, the rainwater does not get sufficient active time to infiltrate into the soil profile and is lost in surface runoff. Conservation measures are therefore necessary to control soil erosion and retain maximum water so far as possible, in the soil.

For the uplands therefore, it is proposed to take up soil and moisture conservation measures on watershed approach and in low lands water harvesting tanks and check dams are proposed for moisture conservation. Dugwells and micro lift have also been proposed for irrigation purpose.

Soil and moisture conservation of watershed approach : A write up on the approach and methodology are given in appendix -1. It is proposed to take up one watershed in each district during the plan period.

Sl.	Projects	Unit Cost	Physical	Financial (Rs)
		(Rs.)		
	Land Development programme - moisture conservation measures & Soil Health Improvement			
a	Treatment of cultivable waste land	40000	49253	1970120000
b	Treatment of other fallow land	10000	89099	890990000

c	Soil amelioration programme for acidic soils under Current Fallow Land, which is deficient in micro nutrients to be brought under cultivation through soil amelioration and land reclamation	10000	181302	1813020000
d	Watershed Development	12000	39000	468000000
e	Soil Health Cards - coverage 5% of land holdings every year	450	486287	218829150
f	Micro nutrient testing (No)	200	10500	2100000
g	Micro nutrient enrichment (No. of farms of one acre coverage each)	1500	10500	15750000
h	Soil testing labs with micro nutrient testing at district level (No.)	1500000	22	33000000
i	Mobile soil and water testing lab cum mobile Agri school (No.)	1500000	21	31500000
				5443309150

6.2.. SUBSIDY FOR IRRIGATION

6.2.1. Introduction

Irrigation is a critical input in agriculture and the need for increased food-grain production in the country has accelerated all activities related to development of water resources and its management. Groundwater resources, in particular, have become an invaluable resource for agricultural development and rural water supply schemes in the country and it is estimated that 80% of this requirement is met through groundwater alone. Groundwater resources are more sustainable even under periods of moisture stress and therefore greater emphasis is being laid on the optimum development and efficient management of this resource on scientific lines.

It is a well known fact that timely irrigation boosts crop yields and allows intensive use of land besides providing scope for altering the cropping pattern in favour of high value crops. Most importantly, irrigation acts as a buffer under drought conditions, whereby the protective irrigation can prevent crop loss.

Sources of Irrigation at Jharkhand:

Canal	**17.53%**
Pond	**19.07%**
Tubewell (Nal Kup))	**8.25%**
Well	**29.38%**
Others	**25.77%**

The fluctuating trend in rainfall over the past few years coupled with the above facts are primarily responsible for the large extent of mono-cropped area in the district, which in turn has led to the deficient food-grain production.

Hence, expansion of irrigation facility through Major, Medium and Minor Irrigation projects is the need of the hour. As per the long term plan perspective, the State has planned to expand irrigation potential to 12.765 lakh Ha from major and medium schemes by the end of the 12th Five Year Plan, i.e. - by 2017. By the end of 2003-04, irrigation potential of 6.93 lakh Ha has already been created through the completion of various irrigation projects. However, of the total created potential of 7.12 Lakh Ha, only 1.17 Lakh Ha has been utilised. A number of major and medium irrigation schemes are also under various stages of completion, which will also create additional irrigation potential on completion.

While Major and Medium Irrigation projects are constrained by long gestation periods, environmental issues, high costs and rehabilitation of project-affected people, minor irrigation schemes have many advantages - these are small projects implemented and managed by farmers, do not require high technical know-how, generate sizable employment, designs suitable for different agro-climatic zones can be developed by the farmers themselves utilising their own experience. Most importantly, gap between potential created and utilised is marginal because, they are privately owned and better managed structures.

6.2.2. Irrigation Potential of MI Sector

A) Availability of Groundwater under various hydro-geological conditions -

(i) **Main Alluvial Basin :** The main Alluvial Basin varies in thickness from 20 to 30 m near Chotanagpur Plateau to nearly 1200m in the North. It forms a single but heterogeneous aquifer system. At shallow depth, the aquifers consist of admixture of sand, clay & 'Kankar'. In the deeper layers, the aquifer material comprises coarser clastics and is capable of yielding good quantity of water. Groundwater occurs under both unconfined and confined conditions.

(ii) **Marginal Alluvial Terrain :** Marginal alluvial terrain, though a part of the main alluvial basin, is primarily composed of finer clastics and the thickness of the aquifers is not much and is of the order of 40m or less. This terrain is a low yielding area and is generally suitable for sinking of open wells and small filter points.

(iii) **Hard Rock Terrain :** Hard rock terrain, underlain by different types of igneous and metamorphic rocks, is best suited for large diameter, open wells at geologically favourable locations.

(iv) **Soft Rock Areas :** In soft rock areas, groundwater occurs in the weathered mantle and in the sand stones. Sandstone aquifers at a few places, are under pressure, and are yielding water at the rate of 15 to 50 lpm.

- There are a number of perennial or semi perennial river and streams in the state and construction of checkdams in the upstream of these rivers/ streams will provide irrigation to a large portion of land. Further construction of micro lift irrigation structure in the vegetable growing areas will also facilitate the farmers. Considering these factors,

6.2.3. The proposed plan for Subsidy Assistance for Irrigation programme is as under:

6.3 Accelerated Seed Replacement Programme

Seed is a important input determining the productivity of crops. The present seed replacement rate in crops is estimated to be only around 10%. It is proposed to achieve 100% seed

replacement during the plan period. The major crops cultivated in the state have been considered for certified seed production. As it would take some time to establish seed farms, it is proposed that 20 % of the seed would still be purchased from outside the State The major crop in the State being paddy, the focus is on this crop and it is proposed to introduce an accelerated paddy development programme. It is proposed to produce certified seed for replacement in 100% of the area under paddy cultivation. It is proposed to be done on three different strategies i) Assistance to farmers for setting up dedicated certified seed villages for production of certified seed, ii) Assistance to State seed farms and iii) Establishment of Comprehensive Agriculture Seed Farm under professional farm administrator. For production of foundation seed required for production of certified seed assistance is proposed to be given to BAU, Comprehensive agriculture seed farm etc.

Crop wise requirement of certified seed to fill the gap between replacement rate and actual seed supply

Sr.No.	Crops	Certified seed requirement (in qntl)
1	Rice	634891
2	Maize - Kharif	43963
3	Wheat	147519
4	Pulses	44346
5	Oilseed	9654

6.3.1 Assistance to seed villages

Bulk of the farmers in the State use stored seeds for production. It is proposed that 100% of the area under crops may be brought under seed replacement programme. Around 17500 ha of land is estimated to be required for production of certified seeds. Out of this 500 ha of land is expected to the utilised for the purpose from the State Seed Farms. To meet the remaining demand it is proposed that seed villages may be identified where farms of selected progressive

farmers may be identified as seed farms and the farmers shall be provided with the necessary inputs including foundation seeds advising on package of practices and training and margin money assistance for infrastructure for seed processing and seed testing. The District level implementing Agency (eg. ATMA) may identify NGO with adequate competency and manpower & agri entrepreneurs or KVKs etc. to provide necessary advise support to these farmers. Such identified entities may be given an incentive of Rs. 1300/- per ha. The NGO may be imparted trainees training for scientific seed production.

i. Support for setting up seed processing, seed testing equipment, threshing floor, tractor etc. : Rs. 12.75 cr
ii. Supply of foundation seeds : Rs. 13.42 cr
iii. Buy back of certified seed : Rs. 154.25 cr
iv. Purchase from outside agency : Rs. 43.08 cr

Total : Rs. 223.50 cr

6.3.2 Support to State Seed farms

The state has 105 seed farms, strengthening them for seed production is important for production of quality seed, which is most important requisites for development of agriculture development. During the plan period it is proposed to provide assistance to 87 farms for development of irrigation facility, water conservation measures, seed processing unit, godown for seed storage, machinery and fencing of the farm.

Unit Cost

1	Land Development	24700
2	Water Conservation	61750
3	Irrigation facility	200000
4	Seed Processing Unit	1500000
5	Godown for seed storage	1000000

6	Farm machinery (power tiller, Winnower cum Thrasher, power sprayer, pumpset, Cono weeder, seed cum fertiliser drum etc.)	126800
7	Fencing	120000
	Total	**3033250**

6.3.3. Comprehensive Agricultural Seed Farm Development Programme

In addition to assistance to seed farms it is suggested that 10% of the seed farms which may be identified on a selective basis may be taken to be developed as Model Seed farms under a scheme called the **Comprehensive Agricultural Seed Farm Development Scheme** . It is proposed that 12 number of seed farms may be taken up. State Government may appoint as suitable administer for the farm with a clear term of office for implementing the scheme. The various activities to be taken under the development scheme shall be :

i. Land development
ii. Develop Irrigation facilities including Drip and sprinkler irrigation
iii. Water Conservation measures including rain water harvesting
iv. Develop a Model farm with appropriate diversified crops for demonstration purposes.
v. Farmers' Hostel facilities & Training Centre
vi. Renovate Administrative Building
vii. Purchase modern tab and field equipments.
viii. Take up fencing of the farm.

It is also suggested that the State Government may find these identified for any deficit in outlay that may be required over and above that available under SAP.

Unit Cost - Comprehensive Agriculture Seed Farm Development

Programme 10 Farms

Sl. No.	Items	Cost (Rs.)
1	Land Development	49400
2	Water Conservation	123500
3	Irrigation	98800
4	Model (Demonstration) Farm development of 0.5 to 1.0 acre area	5000
5	Farmers Training School & Farmers' Hostel	1680000
6	Administrative Building	420000
7	Computer	30000
8	Seed Processing Unit	1500000
9	Godown for seed storage	1000000
10	Farm machinery (power tiller, Winnower cum Thrasher, power sprayer, pumpset, Conoweeder, seed cum fertiliser drum etc.)	126800
11	Fencing	78000
12	Farm Administrator to reconstruct and revamp the farm and run it	
	Total	**5111500**

6.3.4. Seed Testing Lab

One of the important component for ensuring production of quality seed is Seed Testing lab. The state does not boast of many seed testing facilities and therefore it is proposed to set up a Seed Testing lab in each of the districts with financial support of Rs. 31.53 lakh per unit. The total Plan outlay under this segment is estimated at Rs. lakh.

6.3.5. The proposed plan for Accelerated Seed Replacement Programme is as under:

Sl.	Projects	Unit Cost	Physical	Financial (Rs)
		(Rs.)		
1	**Integrated Development of Major Food Crops**			
i	Accelerated Seed replacement programme			

a	Margin money assistance to seed villages for setting up of seed processing, Assistance for seed testing equipments, tractor, other	1500000	85	127500000
b	Subsidy on foundation seeds	500	268438	134219000
c	Buy Back of certified seed produced by seed villages (Qtl.)			
	Paddy	1625	505081	820756625
	Maize	2300	35170	80891000
	Wheat	3600	118006	424821600
	Pulses	5000	35484	177420000
	Oilseeds	5000	7723	38615000
d	Purchase of certified seeds from outside agencies			
	Paddy	1790	129810	232359900
	Maize	2530	8793	22246290
	Wheat	3960	29513	116871480
	Pulses	5500	8862	48741000
	Oilseeds	5500	1931	10620500
ii	**Support to State Seed farms**			
a	Comprehensive Agriculture Seed Farm Development Programme (No.)	5111500	12	61338000
b	Support to Govt. seed farms (No.)	3033250	87	263892750
				0
iii	**Seed Testing Labs**	**3153000**	21	**66213000**
TOTAL				***2626506145***

6.3.vi Integrated Pest Management

Indiscriminate use of chemical pesticides not only hampers the sustainability

in production of food grains but also poses a great threat to the environment. Integrated Pest Management (IPM) approach has been globally accepted for ensuring sustainable development of agriculture. It has become more relevant due to a number of advantages like safety to environment, arsenic free food commodities, low input cost, use of locally available organic pesticides etc. In order to propagate Integrated Pest Management (IPM) it is proposed to distribute integrated pest management kits to farmers and create awareness about IPM. A budgetary provision of Rs. 11.07 crore has been made under the head.

Sl.	Projects	Unit Cost	Physical	Financial (Rs)
		(Rs.)		
	Integrated Pest Management			
a	IPM kit distribution (No.)	1500	17800	26700000
b	Strengthening of Plant Protection Centre	500000	168	84000000
				110700000

6.4. Farm Mechanisation

Farm mechanisation has the potential to be a critical input under intensive agriculture. However, the major constraint for intensive agriculture practices are lack of other resources such as irrigation facility etc. in the State. The production and productivity of the Food grains is directly related to the agri. implements commonly used in the fields. Improved implements also helps in soil and water conservation to a larger extent and also helps in reducing the mandays engaged in agriculture. Taking into consideration of the benefits some mechanisation equipments such as Drum seeders, weeders, winnower cum thrasher are proposed to be

distributed to the progressive farmers and sprayer and power tiller to farmer groups / farmers clubs under this programme.

Following are the mechanisation equipments proposed to be distributed to the progressive farmers and farmer groups / farmers clubs under this programme:

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
	Farm Mechanisation			
a	Plastic Drum seeder (No.)	3000	6040	18120000
b	Cono weeder (No.)	1000	7920	7920000
c	Sprayer to farmer groups/ farmers clubs (No.)	1600	5285	8456000
d	Winnower cum Thresher (No.)	15000	769	11535000
e	Power tiller (subsidy)	75000	1306	97950000
f	Paddy Paddle Thresher	4000	14110	56440000
				200421000

In the case of Plastic Drum Seeders, compared to broadcasting, about 50–60% less paddy seed is needed, and there is saving in labor cost. These machines are easier to use in operations such as weed control, pest management, inter row cultivation by a push weeder and harvesting. Moreover, there is potential for intensively using these seeders during the kharif season. It is easier to use a push weeder when paddy is sown in rows using a drum seeder.

The cono weeder is ideally suited for weeding between rows of paddy crop. The cono weeder has two conical rotors mounted in tandem with opposite orientation. Smooth and serrated blades mounted alternately on the rotor uproot and burry weeds because the rotors create a back and forth movement in the top 3 cm of soil. The cono weeder can satisfactorily weed in a single forward pass without a push pull movement. It is easy to operate by a single operator. The weeder does not sink in puddled soil.

Paddy thresher cum winnower : The thresher with the newly developed concave was found more efficient even for the moist and long crops. The 8.0 hp thresher was found to handle crops of 0.30 ha per hour and delivers straw, chaff, stone and clean paddy in separate outlets. A saving of Rs. 950 per ha and 135 man-hrs per ha can be achieved compared to manual threshing.

Sprayers range in size from man-portable units (typically backpacks with spray guns) to self-propelled units similar to tractors, with boom mounts of 60-151 feet in length. The types are Backpack/knapsack, Foot, Garden, Hand compression, Power and Stirrup.
Considering the small farm holdings in the State power tillers will be best suited to meet the farm power requirement.

6.5. Horticulture: The agro-climatic conditions of the State is conducive for commercial cultivation of large variety of fruits, vegetables, flowers and medicinal & aromatic plants. The total area covered by various Plantation and Horticulture (P & H) crops in the State is about 1.82 lakh ha., with an estimated total production of 19.55 lakh tonne. The share of P & H crops is 8.6% of the net sown area of 21.22 lakh ha.

6.5.1. PRESENT STATUS

As per the latest available data (2002-03), the estimated area and production of major P & H crops in the state are as under.

Sr	Crop	Area (Ha)	Production (MT)
A	**Fruit crops**		
i	Mango	9905	59430
ii	Guava	5973	71676
iii	Jack fruit	4018	64288
iv	Lime	1782	3564

v	Litchi	1508	7540
vi	Banana	775	24800
vii	Papaya	268	21440
viii	Other fruits	7228	68367
	Total	**31457**	**321105**
B	**Vegetables**		
i	Peas	37800	302400
ii	Potato	31191	249337
iii	Cauliflower	9958	199160
iv	Gourds	9000	108000
v	Okra	8897	80073
vi	Brinjal	7951	127216
vii	Tomato	7290	131220
viii	Cabbage	6537	130740
ix	Onion	6303	113454
x	Cow pea	5143	36001
xi	Chilies	4641	27846
xii	Radish	1555	27990
xiii	French Bean	938	6566
xiv	Carrot	460	8280
xv	Other vegetables	11567	85398
	Total	**149231**	**1633681**
C	**Plantation Crops** (Cashew nut & Coconut)	1909	NA
D	**Flowers** (Marigold, Roses, Gladiolus etc)	25	NA
Total (for all crops)		**182622**	**1954786**

Source: Dept.of Horticulture

6.5.2. POTENTIALS FOR THE SECTOR

FRUIT CROPS

The major fruit crops grown in the state are Mango, Guava, Jack fruit, Citrus, Litchi, Banana Sapota, Papaya etc., Considering the agroclimatic suitability and future prospects, Government of Jharkhand through the Department of Horticulture, has planned to implement various schemes / programmes for the promotion of this sector. Major thrust is being given for

bringing additional area under various P & H crops and enhancing the productivity of existing orchards.

The mango varieties cultivated in the state of Jharkhand are *Jardalu, Amrapalli, Mallika, Bombai Green, Langra, Himsagar, Chausa & Gulabkhas* whereas the major litchi varieties grown are *China & Shahi*. There is ample scope for promoting development of the fruit crops like jack fruit, custard apple (seethaphal), sapota, ber, mango, wood apple, tamarind etc., through adoption of appropriate multi-tier cropping system and dry land horticulture technology.

Since majority of the fruit crops are having long gestation periods, a substantial portion of the expansion programme is expected to attract investment credit.

VEGETABLE CROPS

In Jharkhand State, about 1.492 lakh ha is under vegetable cultivation. The area coverage under vegetable crops is increasing year after year due to better returns compared to cereals/pulses. The major vegetable crops grown are potato, cauliflower, cabbage, onion, tomato, chillies, brinjal, bhindi and leafy vegetables. Villages around Ranchi and few other districts have been described as the 'vegetable bowl' of Jharkhand from where truckloads of green vegetables are transported to different parts of Jharkhand, Bihar, Orissa and to Kolkata in West Bengal. Although the state grows such huge quantities of green vegetables every year but it consumes only 1 lakh metric tonne per annum.

6.5.3. Plan Assistance for plantation of Horticulture crops

Considering the agroclimatic suitability and future prospects, major thrust is being given for bringing additional area under various P & H crops. There is ample scope for promoting development of the fruit crops like jack fruit, mango, guava, amla, citrus, etc., through adoption of appropriate multi-tier cropping system and dry land horticulture technology.

- **Medicinal & Aromatic Plants**

There is huge potential for cultivation of Medicinal and Aromatic plants. However the entire potential under this sector remains untapped. Department of Forest and Environment, attempted a Pilot project for training of forest dwellers in identification, collection and processing of medicinal plants.

- **Floriculture**

Considering the suitable agroclimate conditions, commercial floriculture, viz. rose, gladiolus, tuberose, marigold, chrysanthemum, etc. can be taken in selected districts depending on the market or access to the market.

The physical and financial proposals under Horticulture is given below.

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
	Horticulture Development			
i	Assistance for Plantation of horticulture crops			
a	Mango (ha)	30000	3570	107100000
b	Guava (ha)	30000	1830	54900000
c	Jack fruit & other minor fruit crops (ha)	22500	2650	59625000
d	Amla (ha)	26250	250	6562500
e	Citrus (ha)	30000	1270	38100000
f	Spices (ginger, garlic, chilli & turmeric) (ha)	11250	300	3375000
g	Medicinal and aromatic plants (ha)	28500	450	12825000
h	Nursery - 1 ha unit (No.)	150000	39	5850000
ii	**IPM & INM for horticulture crops**	**2000**	5250	**10500000**
iii	**Mulching - local haystack & plastics**	**15000**	1950	**29250000**
iv	**Support for vegetable cultivation (Certified seed, compost, plant protection, etc.) (ha)**	**15000**	120681	**1810215000**
v	**Floriculture (loose flower) (acre)**	**12000**	2090	**25080000**
vi	**Bulbulous Flowers (ha)**	**45000**	375	**16875000**

vii	**Tropical polyhouse for off season vegetables and flower cultivation (500 sq mtr unit)**	**370000**	346	**128020000**
	HORT (IPM, VEGE,FLORICUTURE)			**2308277500**

6.5.A. Integrated Mixed Farming :

Present Farming Situation in Jharkhand

The farming situation is based on two types of land ie land on upper slope, *Tanr* land, and the land following called *Don* land. The sub-classes of these are *Tanr I*, *Tanr II*, *Tanr III* and *Don I, Don II, Don III*. For technology generation, these are grouped again into three categories ie. Upland (*Tanr I & Tanr II*), Medium land (*Tanr III & Don III*) and Lowland (*Don I & Don II*). The uplands are characterised by red colour lateritic soil which has a low pH, poor in organic carbon and well drained. The midlands are yellow, medium textured, moderately acidic and poor in organic carbon & moderately drained. The lowlands are greyish, heavy textured, have neutral pH and poorly drained. The average rainfall is about 1200 mm per annum and no attempts are made to conserve water, protect the crops and increase the cropping intensity. Due to mono cropping system, the scope for farm employment is limited to very short period of 5 to 6 months. For rest of the period, majority of the rural population migrate to near by towns for livelihood.

Even though rainfed rice yields are low (less than 1 ton / ha.) and unstable, rice is being cultivated to meet the food demands of small and marginal farmers who possess 75% of total farm holdings. Small and marginal landholders face typical problems than large farmers as they have to be dependent on farming for their household needs and majority of these farmers are resource constrained, economically poor and poor in awareness about use of technology or improved practices. The benefits of technology developed in green, white or other agricultural

revolutions have remained confined to large and resourceful farmers. From this small holding, it is not possible to sustain an average family size of 5 members with single crop production enterprise. Hence emphasis on crop diversification and integrated development of both farm and non farm sector is crucial for better livelihood opportunities for the rural households.

Crop diversification possibilities

Technological options for rice substitution and crop diversification in rainfed uplands are rain water management, off-season ploughing, early sowing, closer spacing, early weeding, timely fertilizer application, plant protection measures, early harvesting and proper soil intercultural practices. Other relevant technologies are selection of crop varieties and cropping systems in relation to rainfall pattern and crop growth period. Some of the parameters relevant to upland farming are :

- ✓ The crops to replace rice should be of short duration, low duty and/or deep rooted which can extract soil moisture from deeper soil layers during dry spell.
- ✓ Some of the promising crops for rainfed upland rice area are maize, ragi, black gram, pigeon pea, cow pea, groundnut, sesame, niger, cotton, mesta, sweet potato etc.
- ✓ Inclusion of legumes in the cropping system to improve soil fertility besides providing food and nutritional security.
- ✓ Pulses have inherent quality to trap the moisture from the low strata of the soil therefore, they are considerably moisture stress tolerant and fit well in rainfed conditions.
- ✓ Adopt dry land horticulture and agro-forestry systems in sloppy Uplands.
- ✓ Suitable forage crops to be grown to sustain dairy industry.
- ✓ In all crops, there must be emphasis on integrated weed management, nutrient management, rainwater management, plant protection measures and post- harvest technology.

Integrated multi component farming systems, where the wastes from one operation or subsystem can be used as input for other subsystems/enterprises can reduce the risks as well as costs of production; improve soil fertility, provide balance nutrition and ensure enhanced holistic yields as well as income.

The rainwater harvesting tank provides life saving irrigation during the dry spell to various upland crops, such as vegetables, groundnut, pigeon pea, maize, cow pea, moong bean, urad bean etc. Fruit crops viz., Papaya, Banana, Pine apple etc. could be raised on pond embankments. A cow dung provides compost for manuring the adjacent farm land and slurry to the farm pond to encourage growth of phyto-plankton and zoo-plankton which serve as fish feed in the tank. Catla, Rohu, Mrigal and Shrimp could be cultured in layers of water body for nutritious food and income to the family. Fertility of the water body of the tank by providing dropping/excreta through out the tank. A poultry cottage could be erected at one corner of the farm pond and these birds kept in the cottage should preferably be layers so that the farm family can earn extra money. One or two dairy cows could easily be managed by the family with the help of feed, green fodder raised from the farm.

The proposed plan for Horticulture Development programme is as under:

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
	Integrated Mix Farming	**250000**	3603	**900750000**

Different models and strategies for implementing integrated mixed farming have been discussed in the **Appendix-II**

6.5.B. Integrated Agriculture : Agri-horti-silvi culture

Poverty is closely linked to a degraded environment and this is true with the tribals of Jharkhand. Indiscriminate exploitation of forest resources and poor crop and animal production practices have lead to low productivity and degradation of agricultural land and depletion of

forest resources. As a result of low income and shortage of food, majority of the tribals migrate to nearby towns for sustenance.

Due to lack of synergy of various tribal developmental programmes implemented by various agencies, the results of the programmes have not been visible and sustainable. The socio economic indicators of the villages clearly justify the need for further intensification of developmental efforts aimed at achieving remunerative self- employment to prevent migration, develop sustainable livelihood and improve the quality of life.

This could be achieved though promotion of orchard development, productive utilisation of natural resources of the individual farm and capacity building of the people to manage their own resources at individual and community level. The assured income is possible through promotion of cultivation of horticultural crops (fruit and plantation), as these crops once established will provide regular income despite vagaries of rainfall as compared to the seasonal crops like cereals and pulses. Apart from assured income, the horticultural crops will supplement the nutritional requirement of tribals leading to improved quality of life.

In Jharkhand, the Integrated agri-horti (Orchard) model could be replicated in the predominantly tribal Districts of Jharkhand State. This approach is being successfully implemented in West Singhbhum district.

The core interventions of the programme will be establishment of orchard of the selected fruit crops as a foundation economic activity and utilisation of border of the orchard for planting of multi purpose forestry and income generation to the rural households can be quite substantial. At Rs. 15,000/yr/rearer income for 2000 rearers will be to the tune of Rs. 3 crore/ yr permanently for say 20 to 30 years / till the life of the trees. For 30 member Mahila group per CFC at Rs. 60,000/yr/woman, the total income through 12 CFCs (360 women) would be Rs.2.16 crore/yr. For 12 persons in 6 Cocoon banks at the rate of Rs. 48,000/yr. the income generation would be Rs. 5.76 lakh/yr. Every weaver requires 350 gm / day for 25 days a month.

The cascading effect on weavers would be Rs. 5000/- to Rs. 8000/month on a regular basis. Thus, it could be seen that promotion of this activity will lead to a huge impact on rural livelihoods.

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Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
	Integrated Agri Horti farming for livelihood improvement of Tribal families (acre)	**32500**	11000	**357500000**

6.6. Sericulture under RKVY

Status of Tasar Sericulture in Jharkhand

The undivided Bihar state was the largest producer of tassar silk in the country. Having occupied more than 80% of tasar producing areas, Jharkhand ranks first among the tasar

producing state, with a contribution of about 50-65% of country production. Tasar culture is concentrated mainly in the tribal areas of the state such as Santhal Parganas and Chotanagpur regions particularly in the districts of West Singhbhum, Ranchi, Dumka, Godda, Giridih & Saraikela accounting for over 65% rearers with the organizational support of Central Silk Board (GoI). Over 47000 rearers are reported to be engaged in silkworm rearing but only 50-60% of them are active and do rearing every year. As per estimates, the food plant availability in the forest is spread over in 9 lakh hectares but only 36000 ha. are presently being used for tasar silkworm rearing.

The agroclimatic conditions of the State are suitable for commercial development of tasar & mulberry silk. Sericulture is an agro- industry, comprising of production and processing of cocoons. The State of Jharkhand is the leading tasar silk producer in the country and accounts for nearly 60% of the total production in India.

Considering the quick income generation capacity, there is a good scope for expansion /strengthening of sericulture activity so as to provide additional livelihood income for the rural poor in the State.

The Central Silk Board has set up a training centre in Kuchai block of Saraikela- Kharsawan district, which would train around 70 artisans in weaving, spinning and fashion designing of silk products. The State Government also plans to produce 500 metric tonne of tasar silk by 2010.

Seed Production

The three tier system of seed organisation is yet to be established in the state. Under the system, the Basic Seed Multiplication & Training Centres (BSM & TCs) produce and supply both

Bivoltine (BV) & Trivoltine (TV) basic seed to the Govt. & NGOs for multiplication and production of commercial seed at Govt. Grainages / Pilot Project Centres / Private Grainages and supply to commercial rearers. The supply of commercial seeds from these agencies is far below the total requirement and the rearers largely depend on their own or other sources which do not meet the quality standards. Less than 30% of the estimated demand of nearly 50 lakh commercial seed can be met by the Govt. units but the actual production is far below the production capacity mainly due to poor multiplication rate of the basic seed. The annual production of these units is around 7 lakh layings only, which is nearly 50% of their cumulative production capacity.

Production Capacity of Different Govt. Seed production system

Agency / Centre	No. of units	Capacity / Unit (DFLs)	Cumulative Capacity (DFLs)
Pilot Project Centre(PPCs)	24	40,000	960,000
Tasar Stations	10	10,000	100,000
Tasar sub-station	51	5,000	255,000
Block Plantation	4	15,000	60,000
Total	**89**	**70,000**	**1,375,000**

About 80-85% of the seed produced in the state come from private sources. By and large, rearers produce layings are not tested and cannot be called as Disease Free Layings (DFLs)

Basic Seed Supply

It is largely the responsibility of the Central Silk Board (CSB) to meet the entire requirement of the basic seed of the state for multiplication and further production for supply of commercial DFLs to the rearers. There are three basic Tasar Seed Multiplication and Training Centres (BSM & TC) in the state located at Kharswan (Seraikela-Kharswan), Kathikund (Dumka) and Madhupur (Deoghar) with a supply capacity of 32000 dfls each. However, the demand is more

than their supply capacity and hence additional facilities have to be created to almost double their capacity.

Marketing

There is no organised marketing system for different tasar products especially seed cocoons, commercial cocoons, different types of silk yarn etc. in the state. In order to have remunerative prices for different tasar products, a committee under the Chairmanship of Director, Central Tasar Research & Training Institute (CTR & TI) fixes rates every year. The Raw Material Bank (RMB) of Central Silk Board (CSB) located at Chaibasa (West Singhbhum) announces these rates and in the absence of prospective buyers would procure the cocoons at these rates. In addition 'PRADAN' & 'SANSTHAN', two NGOs working in the state in the field of tasar also purchase cocoons directly from producers. The Tasar Marketing organisation of Govt. of Jharkhand has its units at Chaibasa, Giridih & Amarpara to buy cocoons on a limited scale. The Central Silk Technological Research Institute (CSTRI) having its Demonstration-cum-Training Centre (DCTC) at Bhagalpur in Bihar provides required support in post cocoon areas of reeling, spinning and weaving to Jharkhand state also.

It is known that Sericulture could provide additional sources of income for the farmers. Going by this premise, this activity is proposed to be integrated with the farming system. Keeping this perspective, the cost estimates for promoting sericulture in identified regions is as follows :

S. No	Particulars	Nos	Unit Rate	Inv. Cost (Rs in lakhs)
1	Tassar Production Centre including Training Centre & Admin. unit	1	2,500,000	25
2	Grainage Houses of 1 lakh capacity (1 grainage for processing activity)	4	1,250,000	50
3	1 lakh / grainage the nuclear seed requirement for 3 grainages	8,000	4	0.32
4	Cost of Rearing @ Rs. 200 / Rearer	40	20,000	3.2
5	Buy back of Quality Basic Seeds	300,000	1.6	4.8

6	Maintenance & Processing in Grainage houses from Nov. to June @50,000/lakh	50,000	3	1.5
7	June to July - Butterfly to Egg preparation-Basic seed (8000 X 6) - 48,000. For 80 groups, 600 Basic DFLs to each group			
8	Rearing support to 1 Resham Doot (Rs. 25000) + 2 Seed rearers (Rs. 7500/rearer) per group for Basic seed multiplication	80	40,000	32
9	Each group from 600 Basic DFL produces 5000 Commercial DFL which are sold at Rs.4 / DFL to Commercial Rearers, a subsidy of Rs. 3 /DFL given to Resham Doots of each group	400,000	3	12
10	For 5000 DFLs, 30,000 pierced cocoons are sold by Resham doots at Rs. 0.60/cocoon with an earning of Rs.18,000/-. A net earning of Rs.36,000/- (Rs. 38,000/- less Rs. 3,000/-) results in 12,000 / rearer within a period of 1.5 months			
11	Support to Commercial Rearers at Rs.1000 per person	20,000	80	16
12	Each person produces 10,000 cocooons which are sold at Rs.1.50/cocoon resulting in income of Rs. 15,000 over a period of 1.5 months. Total commercial cocoon production of 1.6 crore			
13	Value Addition by a 30 member Mahila group through Common Facility Centre for Reeling & Spinning comprising shed (6 lakh), machines, Hall, Office, Store Room & Creche & working Capital of Rs. 3.5 lakhs. After 3 months training production process will lead to monthly earning of Rs. 5,000/woman/month. Marketing to be done through JHARCRAFT. Thread to be given to weavers for fabric preparation. Fabric to be purchased by JHARCRAFT & sold by keeping margin. Assuming 10 lakh / cocoon per CFC and assuming 75% of 1.6 crore cocoon reaches CFC	12	1,500,000	180
14	1 Cocoon Bank / CFC	6	5,000,000	300
15	Tassar Plantation for 80 groups X 23 members/gp therefore approx. 2000 ha.	2,000	30,000	600
	Total (Rs. in lakh)			**1,080**

Besides non-recurring employment which is to be generated through implementation of this project, the non-recurring employment in terms of income generation to the rural households can be quite substantial. At Rs. 15,000/yr/rearer income for 2000 rearers wil be to the tune of Rs. 3 crore/ yr premanently for say 20 to 30 years / till the life of the trees. For 30 member Mahila group per CFC at Rs. 60,000/yr/women, the total income through 12 CFCs (360 women) would be Rs.2.16 core/yr. For 12 persons in 6 Cocoon banks at the rate of Rs. 48,000/yr. the income generation would be Rs. 5.76 lakh/yr. Every weaver requires 350 gm / day for 25 days a month. The cascading effect on weavers would be Rs. 5000/- to Rs. 8000/month on a regular basis. Thus, it could be seen that promotion of this activity will lead to a huge impact on rural livelihoods.

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
	Promotion of sericulture/ setting up of tassar silk composite unit etc) (ha)			
a	Tassar Production centre with Grainage House	14500000	3	43500000
b	Common Facility Centre	1500000	36	54000000
c	Tassar Plantation (per Ha)	30000	6000	180000000
d	Cocoon Bank	5000000	18	90000000
				367500000

6.7. Lac Cultivation under SAP

Lac cultivation in India and Jharkhand

Jharkhand is the leading producer of the lac in the country with a share of more than 57% of the 20000 MT of country's production. The lac industry is faced with the threat of cheaper imports from Indonesia and Thailand. Considering that our country has a processing capacity of 40000 MT, the total annual production ranges from 20,000 to 22,000 MT only. To strengthen lac production, the requirements are to increase the cultivation of no. of trees per unit area of land, to increase the productive capacity of these trees, to organise marketing of lac and to ensure stability in price. There is ample scope for promotion of intensive cultivation lac by raising short gestation host plants like flemingia semialata with combination of Galwang and Ber.

Sr No	Particulars	India	Jharkhand	% share
1	Area under cultivation (approx)	80,000 sq.km.	40,000	50

2	No. of host trees (approx)	200-250 million	110 million	50
3	No. of host trees exploited	70-80 million	35 million	50
4	Total production (2006-07)	23.229 t	7,490	32
5	No. of families dependent on lac	8-9 lakh	4 lakh	50
6	No. of large (licensed) industries/ units	103	29	28
7	Employment generation	80-90 million mandays/ year	35-40 million mandays/ year	35-50
8	Value of lac exploited (2003-04)	Rs.1,300 million	600	45
9	Contribution to lac growers income		25-32%	-

Potential of lac cultivation in income and employment generation

Income generation by cultivation of lac on major lac-host trees (Rs./ha).

Lac-host (No./ ha)	Lac insect strain	Expenditure involved	Income generated	Net profit
Kusum (70)	Kusmi	117,000	547,000	430,000
Ber (494)	Kusmi	160,000	693,000	533,000
Ber (494)	Rangeeni	119,000	254,000	135,000
Palas (770)	Rangeeni	37,000	76,000	39,000

Employment (man-days/ha) generated by cultivation of lac on major lac-host trees.

Lac-host (No./ha)	Lac insect strain	Man days generated		
		Male	Female	Total
Kusum (70)	Kusmi	268	212	480
Ber (494)	Kusmi	67	58	125
Ber (494)	Rangeeni	47	110	157
Palas (770)	Rangeeni	45	35	80

Production status of lac at National level

- ✓ Lac production has shown a declining trend since 1930s to 1980s because of the shrinkages in are of cultivation, deforestation due to industrialisation and population pressure.

- ✓ Lac, once cultivated almost in entire country is now confined only to eastern states like Jharkhand, Chhattisgarh, West Bengal and parts of Maharashtra (Vidarbha region), Madhya Pradesh and Orissa.
- ✓ Lac production in the country had been fluctuating widely during the past years. However, it has stabilized at around 20,000 tons now.
- ✓ It is felt that there is ample scope for aiming a quantum increase in the lac production to realise this untapped potential.
- ✓ There is substantial increase in lac production in Chhattisgarh due to systemic intervention by State Forest Department and Indian Lac Research Institute, resulting enhanced national lac production to the tune of 23,000 tons (2006-07).

Regional issues directly related to development

The lac growing regions are characterised by high proportion of tribal population, families living below poverty line and low literacy percentage. The tribal population mainly depends on rain-fed agriculture and forest produce for their livelihood and lac is an important source of cash. About 28% of their agriculture income is contributed by lac cultivation.

Existing institutional mechanism

- ✓ Indian Lac Research Institute, Ranchi (Now Indian Institute of Natural Resin and Gums)- ICAR - Research and Development
- ✓ Institute of Forest productivity - Extension
- ✓ TRIFED - Marketing
- ✓ JHASCOLAMF - Cooperative Marketing under the State Government
- ✓ SEPC - Export promotion

Strengths of Jharkhand

i. Most suitable agro-climate for lac cultivation
ii. Rich traditional knowledge and skill in production, processing

iii. Favourable infrastructural support for research, development and marketing (ILRI, IFP, JHASCOLAMPF, TRIFED etc.)

iv. A good number of lac host-plants like Kusum, Palas, Ber etc. available for commercial exploitation

v. Adjacent (=100 kms) to country's main marketing centre of lac (Balrampur, West Bengal).

Major lac markets in Jharkhand

Sr.No	Districts	Market place
1	Ranchi	Ranchi, Bundu, Ormanjhi, Khunti, Murhu, Silli, Jonha
2	Palamau	Daltonganj, Manika, Satbarwa, Latehar, Chandwa, Balumath
3	West Singhbhum	Chandil, Chaibasa, Chakradharpur

Major lac processing industry centres

Sr.No	Districts	Market place
1	Ranchi	Bundu, Khunti, Ranchi (Total - 9)
2	Palamau	Daltonganj, Latehar (Total - 3)
3	West Singhbhum	Chakradharpur (1)
4	Garhwa	Garhwa (1)
	Total	**14**

Enhancing lac productivity (per tree and unit area)

- ✓ Scientific method of lac cultivation
- ✓ Host plant improvement and management
- ✓ Lac pest and disease management
- ✓ Promoting kusmi/ lac cultivation on common host

Production

The present lac production in the country is around 20 thousands tones. Since last two years, the production came down due to lack of interest by developmental agencies in brood lac production despite availability of improved technology that ensures lac production. There is spurt in demand of lac in the country and raw lac is being imported to fulfill this demand. The country has the potential to fulfill the gap between the demand and supply by adopting the activities.

- ✓ Enhancing exploitation of unexploited host trees
- ✓ Lac cultivation through JFM programme
- ✓ Raising of potential lac host trees on large scale
- ✓ Quality and timely availability of broodlac
- ✓ Revival of lac in traditional production catchments
- ✓ Integrated Pest Management
- ✓ Mechanization
- ✓ Primary processing to seed lac
- ✓ Lac marketing
- ✓ HRD

Lac farming for assured livelihood to rainfed agriculture

One of the merits of lac cultivation is that it does not require irrigation. Front Line Demonstration programme executed in various states like West Bengal, Jharkhand, Orissa etc. confirm the success of lac farming and validated lac production technologies of ILRI under rain fed conditions. More interest is being taken by the State Forest Departments. This activity needs promotion especially for winter crop to ensure livelihood in years of drought. Physical and Financial projections under this activity is given in the following table.

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)

	Support for Lac cultivation - Supply of brood lac at subsidised rate (ha)	**225000**	3100	**697500000**

6.8. Organic Farming/ Bio fertilizer/ Vermicompost

Organic farming is being carried out sporadically by a handful of farmers in the State. In order to propagate organic farming in a larger segment and to bring these farmers to the level of national standards awareness programmes need to be conducted in large numbers. Besides, a Certification of the products need be done through approved agencies. Accredited certifying agencies can be established to certify the products conforming to the required standards, at acceptable costs.

Considering the importance organic inputs for organic farming is proposed to provide assistance for setting up vermicompost units. The proposed plan for organic farming component is as under:

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
8	**Bio-Fertlizer/ Vermi-compost/ NADEP compost units/ organic manure units**			
a	Setting up of 150 tonnes units	600000	18	10800000
b	Margin money assistance for setting up of organic manure units	10000	6120	61200000
				72000000

6.9. Strengthening Market Infrastructure

The farm products distribution channel in the state is unorganised resulting in large scale wastage, devaluation of products and inadequate market information for the farmers. The availability of cold chain can avoid wastage and preserve quality which is likely to make it possible for farmers to diversify and realise market related value apart from access to knowledge relevant to decision making.

Supply chain is a collaborative system covering input supply, production, harvesting, storage, processing and trade channels. Credit, technology and extension complete the horizontal integration. Looking into the above aspects setting up of Agri Marketing centres, through SHG have been proposed.

To reduce the wastage of vegetables during transit it is propose to setup cold rooms in major vegetable growing areas. This will provide better returns to vegetable produced by farmers in the State.

The total Plan outlay under this segment is estimated at Rs. 21.50 crore.

The proposed plan for Strengthening Market Infrastructure programme is as under:

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
	Strengthening Market Infrastructure			0
a	Pack House	250000	18	4500000
b	Market Yard	1500000	17	25500000
c	Grading / Packaging	1500000	22	33000000
d	Refrigerated Van	2400000	30	72000000
e	Cold rooms for vegetables (No.)	2500000	32	80000000
				215000000

6.10 Strengthening Extension services

Extension services claim paramount importance in the present day agriculture and allied activities. Farmers now need latest information not only on cropping practices, but also on support services, Govt. and bank schemes, markets, etc. The extension system need to be geared up accordingly. Tremendous amount of extension work is necessary to build capacity and confidence in farmers to make them accept and adopt to the market oriented production system. There is a need for shift in approach, from technology transfer to Capacity Building mode. The extension system need to cater to the requirements of the tenant farmers, share-croppers, farmers who have small area of land, women farmers, who form the larger chunk of the farming community. Extension has been identified as one the major bottlenecks in agriculture development in the State and therefore need to be given emphasis. Therefore, it is propose to set up *Krishi Gyan avam Udyog Kendras* for sub district level.

. The Farmers' Clubs and SHGs could work as an effective link in the extension process. Agriculture Department, Agriculture University, ATMA, KVKs, need to organise training and Extension Programmes, for progressive Farmers, members of Farmers' Clubs and SHGs on regular basis. For capacity building of farmers, skill development programmes, exposure visits, awareness creation etc have been proposed under various sectors such as crop production animal husbandry, fisheries, Floriculture, as also two new approaches included in the plan viz. Watershed and The integrated agri-horti approaches. The skill development programmes would be of 10 days duration and around 30 participants could be included per programme.

Agriculture Department, Agriculture University, ATMA, KVKs, need to organise training and Extension Programmes, for progressive Farmers, members of Farmers' Clubs and SHGs on regular basis. For capacity building of farmers, skill development programmes, exposure visits, awareness creation etc have been proposed under various sectors such as crop production animal husbandry, fisheries. The total Plan outlay under this segment is estimated at Rs. 59.98 crore.

The proposed plan for Strengthening Extension Services is as under:

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
	Strengthening Extension			
I	***Krishi Gyan Avam Udyog Kendra***	**8500000**	28	**238000000**
II	***Agri information centre***	250000	184	46000000
III	***Farmers Capacity building programme***			
a	**Agriculture**			
i	Skill development (10 days, for 30 farmers @Rs.180/Farmer per programme) (No.)	54000	736	39744000
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
iii	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	324	22680000
iv	Publicity material	10000	736	7360000
v	Awareness Programme like Kisan mela	100000	184	18400000
b	**Watershed**			
i	Skill development (04 days, for 50 farmers @Rs.180/Farmer per programme) (No.)	36000	156	5616000
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	78	2340000

iii	Exposure visit outside State (30 farmers @ Rs 3500 per farmer) (No.)	105000	78	8190000
iv	Publicity material	10000	78	780000
v	Awareness Creation Programme	25000	312	7800000
c	**Horticulture**			0
i	Skill development (10 days, for 30 farmers @Rs.180/Farmer per programme) (No.)	54000	736	39744000
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
iii	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	164	11480000
iv	Publicity material	10000	736	7360000
v	Awareness Creation Programme	25000	184	4600000
d	**Animal Husbandry**			0
i	Skill development (08 days, for 30 farmers @ Rs. 180/Farmer per day) (No.)	43200	736	31795200
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
iii	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	84	5880000
iv	Publicity material	10000	760	7600000
v	Awareness Creation Programme	25000	184	4600000
vi	Trainers training program for Gokul Mitra @ 180 per day for 60 days - coverage (No)	10800	1260	13608000
				0
e	**Fisheries**			0
i	Skill development (10 days, for 30 farmers @Rs.150/Farmers per programme) (No.) - FFDA	45000	736	33120000
ii	Skill development (05 days, for 50 farmers @Rs.150/Farmers per programme) (No.) - NFDB	22500	84	1890000

iii	Skill upgradation programme for Matsya Mitra (3 days, 30 Matsya Mitra @Rs.200 per trainee per programme)	18000	84	1512000
iv	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
v	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	81	5670000
vi	Publicity material	10000	736	7360000
vii	Awareness Creation Programme	25000	184	4600000
				0
	SUB TOTAL			**599809200**

6.11. Animal Husbandry& Dairying

Animal husbandry activities like dairy, goat rearing etc. have good potential in the State due to larger area under pastures and fallow-land and availability of fairly good amount of fodder. At present no commercial importance is attached to these activities and only nondescript local breed of cattle with very poor milk yield are maintained mainly for manure and draught purpose. Farmers keep local breed of pig and goat for meat purpose and there was practice of keeping backyard poultry and duck. All the animal husbandry activities are done in traditional method based on grazing/browsing/scavenging etc. and no efforts are made for intensive rearing of livestock scientifically for milk and meat purpose. The animal husbandry activities have great potential to generate additional employment and income by adopting mixed farming.

The bottlenecks in the growth of Animal Husbandry and Dairy sector in the State, as observed is rooted in the following 3 inherent problems

a. Lack of viable and strong institutional arrangement for implementation and monitoring of dairy development programmes and delivery of backward and forward linkages in the rural areas.

b. Lack of entrepreneurship among rural people and profitability of dairy units.

c. Lack of irrigation facilities and non availability of sufficient water in summer season.

10.3 For addressing the above inherent problems relating to growth of Animal Husbandry and Dairy sector following strategies have been recommended :

- Creation of strong institutions through people's organisation. However, care is required for such institutions as it has been observed that lack of social mobilisation before organising people's organisations such as co-operative societies leads to plethora of non functional institutions. Thus SHG Groups/Federations/ Kisan Clubs help to overcome such bottle neck in building up of vibrant institutions which can work on sustainable basis to deliver all the backward and forward linkages required for successful running of Animal Husbandry and Dairy units as well as running of the institutions profitably and sustainably. Hence primarily it is assumed that the animal husbandry programmes recommended under the project will involve good SHG Groups/Federations/ Kisan Clubs under guidance of NGOs/Banks/Govt Departments etc.

- A system for providing veterinary care and Breeding services at the door step of farmers need to be evolved through cooperatives/NGOs, with the help of private practitioners, unemployed veterinary graduates etc. for which it is assumed that the investment projected in the programme is to strengthen/ add on the activities of the NGOs/cooperatives/Govt Institutions /KVKs through their existing infrastructure and manpower and accordingly projections has been made to improve the facilities/equipments/tools to enhance the services etc.

- Local cattle may also be upgraded with a milch / dual-purpose indigenous cattle breed like Sahiwal, Red Sindhi, Tharparkar or Haryana. Such upgraded cattle will meet the need for bullocks and also provide some amount of milk. Similarly, the local buffaloes may be upgraded with Mahesani or Murrah breed. In urban and peri-urban areas, crossbreeding with Holstein Friesian and Jersey cattle may be popularised. AI services will be utilised extensively as far as possible. However, in remote and difficult areas and places where AI services are difficult, grading-up of native cattle and buffaloes in the villages would be through distribution of bulls in the villages for natural service (NS) under Nandishala programme. The NS programme again could be implemented through similar institution as stated above who would look after feeding and health (vaccination and disease testing) of bulls and maintain records.

- Development of common property resources (CPR) in collaboration with Local bodies, NGOs and AH Department should be attempted. With the help of the Department of Forest silvipasture / Horti-Sivipasture / Agro-Forestry could be popularised. The community land belonging to Panchayat could also be used for this purpose. Suitable grasses and legume mixture can be established along with forest trees.

- Extension will be the single most critical tool for the development of dairying in Jharkhand. The involvement of NGOs in entrepreneurship development and motivating the farmers to adopt dairying on commercial scale will be very important. The farmer have to be educated through discussion and demonstrations, on the relative importance of various practices and options that could be exercised in the field of animal nutrition and animal health for maximising the productivity. The resources available locally (cattle and buffalo farms belonging to NGOs or progressive farmers) would be used for demonstration / motivation of farmers. Such farms may be upgraded or new Modern Dairy

Centre may be established by Government and run by NGOs/People's organisation/KVKs/progressive farmers.

- Good quality animals preferably of the Black Bengal Breed or graded up with Black Bengal, Beetal and Barbari breeds or various combination of cross -breds available locally or from the state of Uttar-Pradesh and Punjab or from the government farm at Kanke and Chatra are suitable cross breds. Black Bengal crosses with Beetal bucks as studied by Birsa Agriculture University, however, would be the most suitable breed for milk and meat yield for this region. However, care should be taken to purchase male and females from different source to avoid inbreeding. NGO/People's organisations/KVKs/Progressive Farmers may be provided with breeding units for regular supply of males and females among the farmers for grading up of the local population in large scale. These satellite breeding farms may be integrated with Agricultural University / Animal Husbandry Department for regular supply of good quality buck and veterinary services and supply of quality inputs through hand holding to these firms.

- The pig farming constitutes the livelihood of rural poor belonging to the lowest socio-economic strata and they have no means to undertake scientific pig farming with improved foundation stock, proper housing, feeding and management. Pig farming will provide employment opportunities to seasonally employed rural farmers and supplementary income to improve their living standards. Looking at the local demand, availability of land for scavenging /grazing, availability of agricultural and kitchen wastes pig farming has great potential in all the districts. However, slow take off of the piggery scheme in the state can be attributed primarily to the lack of awareness regarding housing, feeding and breeding of pigs and skill for rearing quality animals. Apart from these, non availability of quality piglets, inbreeding due to faulty breeding system and inadequate veterinary services further

retard the exploitation of potential in the State. To promote piggery as a livelihood activities supply of quality piglets of improved breed such as TammworthXDesi (T&D) developed by Birsa Agriculture University the programme envisage for establishment of Pig Breeding units with the help of NGO/People's participation for multiplication of improved pigs and supply to the farmers on regular interval. This will also help to demonstrate pig rearing practices in scientific manner to the local farmers.

- Duck rearing is prevalent among weaker sections of rural population which provides them supplementary and steady income on daily basis besides providing them nutrition duck eggs for family consumption and engaging family labour in their leisure hours to look after Duck unit thus, generates rural employment. Marshy, riverside, wet land and barren moors are excellent areas for duck farming. Duck cum fish farming can be integrated. If taken with fisheries and paddy as a secondary activities the productivity of primary crop is also enhanced without any additional cost on rearing of duck. Khaki Campbell is best egg producing breed in ducks. Animal Husbandry Department of Govt of Jharkhand from their Duck breeding farms at Hotwar and Divyayan Krishi Vigyan Kendra, in Ranchi district supply hybrid Khakhi Campbell ducklings in a limited manner. A bulk of supply comes from the neighbouring State of West Bengal. To improve the regular Supply of Ducks to the farmers it is proposed to establishment of 5000 duck breeding farm through KVKs/NGOs/Govt. Farm. To overcome the bottlenecks in the growth of Animal Husbandry and Dairy sector in the

  state, the following projection is included in the plan:-

Sl. No.	Projects	Unit Cost (Rs.)	Physical	Financial (Rs)
I	**Animal Husbandry / Dairy**			
a	New veterinary institutions/strengthening Inst under Govt. (No)	700000	1014	709800000

b	New / Strengthening of AI Centres for equipments,semen bank and Liquid nitrogen storage and 4 yrs operational cost (No.)	816000	246	200736000
c	Development of Community pasture/ Gauchar land/Silvipasture/ Grass land of 5 ha/ unit @ 1 silvipasture/50000 Adult cattle unit	219780	163	35824140
d	Modern Dairy Demonstration Centre/district - 50 animal unit	4000000	13	52000000
e	2 CB milch cow under prototype scheme - 80% subsidy	57600	6451	371577600
f	Mini dairy units of 5 CB cows @ 50% subsidy	92000	450	41400000
g	Assistance for Heifer rearing	13390	3102	41535780
h	Jharkhand Dairy project - for developing procurement and marketing system of Milk	39400000	11	433400000
I	Goat Breeding Unit of 10 Does +1 bucks for grading up of local population with Improved goat breeds	100000	12820	1282000000
j	Promotion of Improved pig breeds (T&D) 3+1 unit	105000	14523	1524915000
k	Duck Breeding cum Hatchery Unit with 5000 parent ducks	3000000	1	3000000
l	New Animal feed plant @ 100 MT/ unit	40000000	2	80000000
m	New Poultry feed plant 100 MT unit	40000000	1	40000000
n	Promotion of backyard poultry (60)	7000	7032	49224000
o	Promotion of Hybrid Khaki campbell ducks (30)	7000	2665	18655000
p	Distribution of fodder seed @ 10 kg peranimal @ Rs. 20/kg	200	83288	16657600
q	Disease Diagnostic Labs	8000000	21	168000000
r	Strengthening/new Govt. goat farm	25000000	4	100000000
s	Strengthening / New Govt. piggery farm	25000000	4	100000000
t	Vaccination programme	25	12316184	307904600
u	Strengthening Govt. Poultry breeding farm	20000000	1	20000000
v	New Poultry breeding farm for low input technology birds	35000000	1	35000000

				5631629720

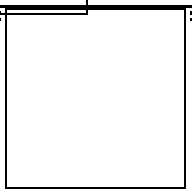
6.12. Fisheries

Fish seed Farms

The total water area in the form of ponds and tanks available for fish culture in the State is estimated to be 34100 ha. Apart from these there are other water bodies such as reservoirs which require stocking of fish seed. The total fish seed requirement of the State is estimated at 81 crore. The fish seed available in the State is around 7 crore only thus leaving a gap of 74 crore fish seed. The farmers have to depend on supply by traders from outside the State, quality of which can not be assured. Thus one of the major requirement for development of fish culture in the State making available sufficient quantities of quality fish seed. Therefore, fish seed production need to be given due importance for development of fish culture in the State. A fish seed production programme has to be implemented by giving assistance and training to progressive fish farmers for fish seed production. The spawn production from the hatcheries in the State is inadequate to meet the seed production programme. Therefore, spawn from hatcheries outside the State has to be bought and supplied to fish seed farms by progressive farmers. The training could be done under FFDA programme or Nation Fisheries Development Board assisted training. The assistance would involve supply of spawn at the rate of 16 lakh per hectare and fry catching net. As there is good demand for quality fish seed in the State marketing would not be a problem. While providing assistance to seed farms, potential demand in the area has to be kept in mind and accordingly restrict the number and size of farms.

Demonstration farms of integrated Fish farming

Integration of animal husbandry activities such as duck rearing and pig rearing would increase income per unit area of the farmers, as there is higher unit area biomass production. Though

duck rearing and pig rearing are popular  in many parts of the State, their integration with fisheries are not. In order to promote integrated fish culture, demonstration farms need to be set up in districts which have potential. The unit cost of integrated fish farming is estimated at Rs. 5.00 lakh. Cost of development would include renovation of pond, construction of pen / shed, feeding equipment etc., cost of piglets /ducklings, fish seed etc. Farmers could be taken to the farms for exposure visits.

Pilot project on Fresh water Prawn farming

Fresh water prawn farming also has good potential in the State and it gives higher returns than fish farming, however it require more attention than fish farming and would demand better management practise. The prawns are susceptible to lower temperatures and mortality would be higher during winter. Therefore, before recommending the technology to farmers a pilot project need to done in Govt. fish farms to evaluate the farming technique to local conditions. 45 farms in different regions of the State has been proposed. The cost of a unit has been estimated at Rs.2.75 lakh

Fish culture in the State is mostly confined to rearing of fish in village ponds and ahars in a very traditional way. Due to lack of awareness on scientific management of fish farms the fish production and productivity is very low in the State. These water bodies are yet to be exploited for commercial aquaculture.

The following activities could be envisaged to facilitate Fish culture on a commercial scale.

i. Demonstration ponds under FFDA/ Fisheries Department/Agriculture Universities
ii. Training to farmers in scientific fish culture
iii. Establishment of hatcheries in district

Projects	Unit Cost	Physical	Financial (Rs)
	(Rs.)		
Fisheries		0	0
Fish seed farms by farmers - Spawn and fry net to be supplied by Fisheries Department (20 Lakh Spawn/unit) (No.)	12500	1308	16350000
Fish seed Hatchery 2 to 3 crore spawn capacity	400000	123	49200000
Demonstration Farm for integrated fish farming (No.)	500000	14	7000000
Pilot project on Fresh water Prawn farming (No.)	275000	45	12375000
Construction of seed rearing tanks	55000	2500	137500000
Renovation of Govt. tanks	300000	420	126000000
Stocking of fish fingerlings in reservoirs @ 800 per ha (ha)	800	88204	70563200
Boat and gear for reservoir cooperative societies	100000	155	15500000
Vehicle for transporting fish seed and fish	300000	54	16200000
Landing Centres in reservoirs (No)	500000	29	14500000
Pen culture in reservoirs (No.)	300000	15	4500000
Construction of Hygienic Fish Markets	1000000	3	3000000
Strengthening of Govt Seed farm and construction of seed hatchery & other infrastructure	20000000	1	20000000
TOTAL			**492688200**

6.12. Innovative Schemes

12.1 System of Rice Intensification (SRI) : The System of Rice Intensification (SRI) technology is a "Less Water" method of production which is suitable to poor farmers who have relatively more labour than land and capital. Under this system of rice production synergistic interactions lead to much higher grain yield. Rice being the major crop and item of daily food intake of the population, it is proposed to take up intensive propagation of SRI technology for rice cultivation during summer. **This innovative technology is proposed to be implemented in all the major rice producing districts of the State.** The total Plan outlay under this segment is estimated at Rs. 4.269 lakh**.**

12.2 Tea Cultivation : Jharkhand is not a traditional tea growing area, however it has been demonstrated that it is possible take up tea cultivation in the State. Being a cash crop it can give better returns, however it need to be demonstrated in different parts of the State.

12.3 Demonstration of Gravity Drip System : The gravity drip system developed by HARP for 1 Ha farm can be demonstrated for adoption by progressive farmers who wish to diversify their cropping system with low cost drip system. The model developed for one ha upland include 0.25 ha for water harvesting tank (at the highest point of the land), 0.25 ha for upland paddy with facility for critical irrigation from the water harvesting tank, 0.25 ha guava or other fruit trees with drip irrigation system from the water harvesting system and 0.25 ha vegetable cultivation, with drip irrigation system.

12.4 Demonstration of sprinkler irrigation : Sprinkler system being one of the efficient irrigation system, it need to be promoted in the State. Therefore it is proposed to demonstrate sprinkler irrigation, so that farmers can adopt for high value crops.

Physical and financial programme under the Plan period is given below.

Projects	Unit Cost	

	(Rs.)	Physical	Financial
Innovative Schemes			
Adoption of SRI technology in paddy Production including farm pond (Unit Area 1 acre)			
Farm ponds (No.)	36400	1740	63336000
Cono weeder (No.)	6000	1740	10440000
Trainer's training (No.)	15000	27	405000
Farmers Training (No.)	10000	40	400000
Seed 3 kg/acre @ Rs.15/kg (area covered)	45	1740	78300
		0	0
Tea Cultivation (acre)	100000	50	5000000
Demonstration of Gravity drip system - Developed by Harp (No. of units)	132000	158	20856000
Demonstration of Sprinkler irrigation (2 Acre model) No. of units	17000	148	2516000
			103031300

6.13. Research & Development

There is an emergent need to develop high yielding, locally compatible seeds in millets, and upland paddy. The state has good potential of vegetables and tubers. It also has very good gene pool in plants, crop and animals which need to be conserved. Considering these potentials it is proposed that the premier research institutions in the State such as Birsa Agricultural University, Horticulture and Agro forestry Research Project and the Central Rainfed Upland Rice Research Centre at Hazaribag may take up the necessary research Project. These centres may also the equipped with ultra desiccation units for storage of germ plasm. Research to identify ideal storage conditions may be taken up. The cost of such ultra desiccation unit is given below :

S. N.	Particulars	Cost (Rs. lakh)

1	Drying chamber (6x3'x3') with electric heating and thermostat.	0.50
2	Vacuum sector	4.00
3	Chemical dehydrants	0.10
4	Seed moisture metre	0.15
5	Electronic Precision Balance	0.40
6	Total	5.15

Collaboration with National Bureau of Plant Genetics Resources may be considered in this regard.

Conservation of Local Gene plasm : One gene-Seed Banks is proposed to be set up in each of the districts to promote conservation of genetic diversity of agro biodiversity and animal breeds. This gene pool can serve as seed sources for farmers and as genetic material carrying specific traits , that can be used by breeders to create new varieties that will be needed for a changing climate.

The following budgetary provision is made for the period 2008-12 of the Plan.

Projects	Unit Cost(Rs.)	Physical	Financial (Rs)
Research & Development			
Gene Seed Bank & Identification and Preservation of Indigenous Livestock	1000000	21	21000000
Ultra Desiccation Unit for storage of germplasm	515000		515000
			21515000

6.14. Institutional Infrastructure

1. **Agricultural Statistics Bureau** : There is an urgent need to set up an Agricultural Statistical Bureau in the State to collect key statistic/information on production, productivity, inputs, income, food availability, prices and costs etc. so that the progress

in the vital sector can be monitored on an ongoing basis and to reader planning and execution focussed and meaningful. A token amount of Rs. 2 crore is budgeted in the plan.

2. Efforts may be launched to publish important statistics at Block, District and State level may be made and a cell may be formed within the Ministry for Agriculture and Animal Husbandry for this purpose.
3. **Agricultural Extension units** : **Krishi Bhawan** with one Agricultural officer, a minimum of two Agricultural and Veterinary Assistants and Village level Agricultural Extension workers at the rate of the VLAEW per 5000 or less population covering contiguous villages may be set up. A token amount of Rs. 50 crore is budgeted in the plan.
4. **Agro Industries Corporation** : There is a pressing need for setting up of a State Agro-Industries Corporation in Jharkhand on the lines existing in others ate. The Corporation would be catering to the farm mechanisation demands of the progressive farmers and more particularly for the small farmers who would require state support for improve use of farm implements. An oultlay of Rs.2 crore is planned under the SAP.
5. **State Seed Corporation** : 100% seed replacement to be achieved during the plan period. Apart from strengthening all the state seed farms, and converting a few of them to comprehensive seed farms, seed villages /clusters (200 ha) are to be created for certified seed production. In the absence of a state seeds corporation, it is difficult to ensure implementation of the plan. Further, this also would help in arresting the

unscrupulous seed dealers and agencies in supplying fake and sub-standard seeds to the gullible farmers. Rupees two crore is proposed in the plan for setting up the infrastructure.

6. Staffing at Extension centres : There are no adequate staff in existing departmental offices and extension centres. Urgent steps to fill up the vacancies need to be taken.
7. **Institute Of Fisheries and Livestock Research:** A dedicated research centre to develop suitable practices, breeds/species, etc in livestock and fish culture may be set up in Goria Karma Farm at Hazaribag**.** An outlay of Rs.2 crore is proposed as initial support for the Centre.
8. **Centre for Research in Millets**: Considering fact that about 12 districts of the total in the state suffer from droughts with regularity, a Centre for Research in Millets may be set up under the Birsa Agriculture University for coordinated research on dry land crops esp. in millets. An outlay of Rs.2 crore is planned under the SAP.

S N	Project	Unit Cost	Physical	Financial (in Rs.)
1	State Statistical Bureau	20000000		20000000
2	Institute of Fisheries and Livestock research	20000000		20000000
3	Research Centre on Millets	20000000		20000000
4	**Krishi Bhavans at Panchayat level**	500000000		500000000
5	**Assistance for State Seeds Corporation**	20000000	1	20000000
6	**Assistance for State Agro Industries Corporation**	20000000	1	20000000
	Total			**600000000**

CHAPTER-7

OUTCOMES

The proposed plan is aimed to meet the challenges posed by the critical gaps posing major hurdles in the development of the agriculture and allied sectors. The full implementation of the plan is expected to have positive impact on the net sown area, the gross cropped area as well as on production and productivity.

Though the potentials to increase the net and gross cropped areas are very high in the State given its low utilisation levels at present, only 20% of the current fallow land and 20% of cultivable waste is considered feasible to be brought under cultivation during the remaining period of the IXth five year plan, i.e. November 2008 to March 2011. The lack of infrastructure, poor extension network, absence of adequate personnel, inadequate rural connectivity, primitive farming practices etc. are major hurdles that impede the progress in the sector. It is envisaged that the implementation of the proposed plan will provide much needed impetus to place the sector on a growth trajectory. The full implementation under close monitoring shall help to significantly bridge several critical gaps, thus paving the way for full realisation of potential in the foreseeable future.

The major outcomes of the plan are discussed below :

1. Increasing agriculture production : Production of major cereal and pulses is sought to be increased through multi-pronged strategy with several interventions such as strengthening the research and extension services improving extension network, increase seed production and distribution efficiently, increase area under irrigation, focussing on soil-health enhancement etc. These measures is expected to increase the production of major foodgrains by 11.15 lakhs tonnes over the existing production of 20.15 lakh tonnes, i.e. an increase by 55% through improvement in productivity.

Table : No.1

Increase in production and productivity due to seed replacement, irrigation/ drought proofing, soil health enhancement, farm mechanisation, improved services, extension etc.

Crops	Existing area (ha)	Existing productivity (kg/ha)	Targeted productivity (kg/ha)	Incremental production (tonnes)
Paddy	1,354,700	1,150	1,850	948,290
Wheat	58,100	1,250	2,000	43,575
Maize	177,600	1,259	1,800	96,082
Pulses	217,900	541	600	12,856
Oil seeds	77,100	558	750	14,803
Total	**1,885,400**			**1,115,606**

1. Area expansion and crop intensification :The state has total cultivable area of 41.84 lakh ha. which constitutes 52% of the total geographical area. However, only 43% of the total cultivable area is under the net sown area in the State. The plan proposes, through concerted efforts to bring 3.14 lakh Ha. under the net sown area and 4.60 lakh ha. under gross cropped area by converting current fallows. The resultant incremental production of major foodgrains is given below:

Table : No.2

Area expansion and crop intensification :

Crops	Area Expansion proposed (ha)	Targeted productivity (kg/ha)	Incremental production (tonnes)
Paddy	270,940	1,850	501,239
Wheat	17,430	2,000	34,860
Maize	53,280	1,800	95,904
Pulses	87,160	600	52,296
Oil seeds	30,840	750	23,130
Total	**459,650**		**707,429**

Total Table : No. (1 + 2)

Crops	Area Expansion proposed (ha)	Targeted productivity (kg/ha)	Incremental production (tonnes)
Grand Total	**234,505**		**1,823,035**

1. Per capita nutritive availability : Jharkhand, unfortunately, suffers from severe nutrition and food deficiency. The proposed plan on full implementation is expected to significantly reverse the process. Rice which is the preferred staple diet of the people is currently available at about 160 gm/day which is 35% of the per capital requirement for cereals. The rice availability is expected to increase to 255 gms/day the overall availability of cereals which is 188 gms/day is expected to increase to 300 gms/day by the terminal year (2011-12).

   The plan proposes to bring surplus production of vegetables from per capital availability of 132 gms per day to 290 gms per day by increasing cropping intensity, use better planting materials and seeds, improved extension services etc.

   The per capita availability of fruits is expected to grow by 40% from the current low per capital availability of 32 gms per day. However this is on account of the longer gestation of fruit crops and the gap is expected to be significantly reduced in future years.

   Near self sufficiency (185 gms per capita per day) is expected to be brought in the case of milk by improving breeds and propagating profitable farming practices and better health care.

2. Employment Generation : The implementation of the plan is expected to generate employment as shown below :

Sr	Sector	Recurring employment
1	Crops	459.56 lakh mandays/ year
2	Fruits & Vegetables	332.78 lakh mandays/ year
3	Animal husbandry	78.08 lakh mandays/ year

In addition to this the various activities like earth work, infrastructure building etc. is expected to provide additional mandays to the tune of 518 lakh mandays during the plan period.

1. Institution Building : The plan proposes the setting up of several institutions that will provide sustainability to the development efforts in the agricultural and allied sectors.
   a. Krishi Bhavans in each Panchayat : As agriculture is the mainstay of 70% of the rural population, it is necessary to have professionally manned technical institutions in each Panchayat. This will require the recruitment of about 3,750 graduates in Agriculture and/or allied activities and 7,500 other with vocational training in the sector.
   b. Agro Industries Corporation : The establishment of one Agro Industries Corporation will provide much needed impetus to development of agricultural implements and machinery suitable to the local conditions and needs.
   c. State Seeds Corporation : The state has one of the lowest seed replacement rate at 10% in paddy in the country and the availability of good quality seeds for virtually any crop is not available in adequate quantities. The setting up of Seed Corporation will provide a long lasting solution to this problems.
   d. Centre for Research in Millets : The establishment of Millet Research Centre in BAU will provide fillip to research efforts to promote appropriate cropping systems in drought prone areas of the State.

e. Institute for Fisheries and Veterinary Research : This is a much needed facility in the State as integrated farming needs to be promoted to provide income and nutrition security to vast numbers of ST/ST and BPL population in the State.

f. Other Institutional Arrangements : Some of the other institutional arrangements that will be set up in the State are :

   i. Statistical Bureau for Agriculture and Allied activities.
   ii. Soil Testing Labs in each district.
   iii. Modern Veterinary Hospital.
   iv. Modal State Agriculture Farms.
   v. Establishment of Farmer Training Schools.

ANNEXURE-I

Consolidated Jharkhand State Agriculture Plan 2008-09 to 2011-12

Jharkhand State Agriculture Plan 2008-09 to 2011-12

Sl. No.	Projects	Unit Cost (Rs.)	Total	
			Physical	Financial
1	**Integrated Development of Major Food Crops**			
i	**Accelerated Seed replacement programme**			
a	Margin money assistance to seed villages for setting up of seed processing, Assistance for seed testing equipments, tractor, other	1500000	85	127500000
b	Subsidy on foundation seeds	500	268438	134219000
c	Buy Back of certified seed produced by seed villages (Qtl.)			
	Paddy	1625	505081	820756625
	Maize	2300	35170	80891000
	Wheat	3600	118006	424821600
	Pulses	5000	35484	177420000
	Oilseeds	5000	7723	38615000
d	Purchase of certified seeds from outside agencies			
	Paddy	1790	129810	232359900
	Maize	2530	8793	22246290
	Wheat	3960	29513	116871480
	Pulses	5500	8862	48741000
	Oilseeds	5500	1931	10620500
ii	**Support to State Seed farms**			
a	Comprehensive Agriculture Seed Farm Development Programme (No.)	5111500	12	61338000
b	Support to Govt. seed farms (No.)	3033250	87	263892750
iii	**Seed Testing Labs**	3153000	21	66213000

iv	**Integrated Pest Management**			
a	IPM kit distribution (No.)	1500	17800	26700000
b	Strengthening of Plant Protection Centre	500000	168	84000000
2	**Land Development programme - moisture conservation measures & Soil Health Improvement**			
a	Treatment of cultivable waste land	40000	49253	1970120000
b	Treatment of other fallow land	10000	89099	890990000
c	Soil amelioration programme for acidic soils under Current Fallow Land, which is deficient in micro nutrients to be brought under cultivation through soil amelioration and land reclamation	10000	181302	1813020000
d	Watershed Development	12000	39000	468000000
e	Soil Health Cards	450	486287	218829150
f	Micro nutrient testing (No)	200	10500	2100000
g	Micro nutrient enrichment (No. of farms of one acre coverage each)	1500	10500	15750000
h	Soil testing labs with micro nutrient testing at district level (No.)	1500000	22	33000000
i	Mobile soil and water testing lab cum mobile Agri school (No.)	1500000	21	31500000
3	**Subsidy assistance for Irrigation**			
a	Deep tubewells	120000	45	5400000
b	Shallow tubewells	50000	1269	63450000
c	Dug wells	102000	36564	3729528000
d	Water Harvesting Tanks	18250	32401	591318250
e	Checkdam -	270000	1730	467100000
f	Microlift Irrigation	172000	2641	454252000
g	Bamboo boring	2400	60	144000

4	**Farm Mechanisation**			
a	Plastic Drum seeder (No.)	3000	6040	18120000
b	Cono weeder (No.)	1000	7920	7920000
c	Sprayer to farmer groups/ farmers clubs (No.)	1600	5285	8456000
d	Winnower cum Thresher (No.)	15000	769	11535000
e	Power tiller (subsidy)	75000	1306	97950000
f	Paddy Paddle Thresher	4000	14110	56440000
5	**Horticulture Development**			
i	Assistance for Plantation of horticulture crops			
a	Mango (ha)	30000	3570	107100000
b	Guava (ha)	30000	1830	54900000
c	Jack fruit & other minor fruit crops (ha)	22500	2650	59625000
d	Amla (ha)	26250	250	6562500
e	Citrus (ha)	30000	1270	38100000
f	Spices (ginger, garlic, chilli & turmeric) (ha)	11250	300	3375000
g	Medicinal and aromatic plants (ha)	28500	450	12825000
h	Nursery - 1 ha unit (No.)	150000	39	5850000
ii	IPM & INM for horticulture crops	2000	5250	10500000
iii	Mulching - local haystack & plastics	15000	1950	29250000
v	Support for vegetable cultivation (Certified seed, compost, plant protection, etc.) (ha)	15000	120681	1810215000
vi	Floriculture (loose flower) (acre)	12000	2090	25080000
vii	Bulbulous Flowers (ha)	45000	375	16875000
viii	Tropical polihouse for off season vegetables and flower cultivation (500 sq mtr unit)	370000	346	128020000
	Integrated Mix Farming	250000	3603	900750000
ix	Integrated Agri Horti farming for livelihood improvement of Tribal families (acre)	32500	11000	357500000
6	**Promotion of sericulture/ setting up of tassar silk composite unit etc) (ha)**			

a	Tassar Production centre with Grainage House	14500000	3	43500000
b	Common Facility Centre	1500000	36	54000000
c	Tassar Plantation (per Ha)	30000	6000	180000000
d	Cocoon Bank	5000000	18	90000000
7	**Support for Lac cultivation - Supply of brood lac at subsidised rate (ha)**	225000	3100	697500000
8	**Bio-Fertlizer/ Vermi-compost/ NADEP compost units/ organic manure units**			
a	Setting up of 150 tonnes units	600000	18	10800000
b	Margin money assistance for setting up of organic manure units	10000	6120	61200000
9	**Strengthening Market Infrastructure**			
a	Pack House	250000	18	4500000
b	Market Yard	1500000	17	25500000
c	Grading / Packaging	1500000	22	33000000
d	Refrigerated Van	2400000	30	72000000
e	Cold rooms for vegetables (No.)	2500000	32	80000000
10	**Strengthening Extension**			
I	***Krishi Gyan Avam Udyog Kendra***	8500000	28	238000000
II	***Agri information centre***	250000	184	46000000
III	***Farmers Capacity building programme***			
a	**Agriculture**			
i	Skill development (10 days, for 30 farmers @Rs.180/Farmer per programme) (No.)	54000	736	39744000
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
iii	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	324	22680000
iv	Publicity material	10000	736	7360000

v	Awareness Programme like Kisan mela	100000	184	18400000
b	**Watershed**			
i	Skill development (04 days, for 50 farmers @Rs.180/Farmer per programme) (No.)	36000	156	5616000
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	78	2340000
iii	Exposure visit outside State (30 farmers @ Rs 3500 per farmer) (No.)	105000	78	8190000
iv	Publicity material	10000	78	780000
v	Awareness Creation Programme	25000	312	7800000
c	**Horticulture**			
i	Skill development (10 days, for 30 farmers @Rs.180/Farmer per programme) (No.)	54000	736	39744000
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
iii	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	164	11480000
iv	Publicity material	10000	736	7360000
v	Awareness Creation Programme	25000	184	4600000
d	**Animal Husbandry**			
i	Skill development (08 days, for 30 farmers @ Rs. 180/Farmer per day) (No.)	43200	736	31795200
ii	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
iii	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	84	5880000
iv	Publicity material	10000	760	7600000
v	Awareness Creation Programme	25000	184	4600000
vi	Trainers training program for Gokul Mitra @ 180 per day for 60 days - coverage (No)	10800	1260	13608000
e	**Fisheries**			

i	Skill development (10 days, for 30 farmers @Rs.150/Farmer per programme) (No.) - FFDA	45000	736	33120000
ii	Skill development (05 days, for 50 farmers @Rs.150/Farmer per programme) (No.) - NFDB	22500	84	1890000
iii	Skill upgradation programme for Matsya Mitra (3 days, 30 Matsya Mitra @Rs.200 per trainee per programme)	18000	84	1512000
iv	Exposure visit within State (30 farmers @Rs.1000/farmer per visit) (No.)	30000	184	5520000
v	Exposure visit outside State (20 farmers @ Rs 3500 per farmer) (No.)	70000	81	5670000
vi	Publicity material	10000	736	7360000
vii	Awareness Creation Programme	25000	184	4600000
11	**Animal Husbandry and Fisheries**			
I	**Animal Husbandry / Dairy**			
a	New veterinary institutions/strengthening Inst under Govt. (No)	700000	1014	709800000
b	New/Strengthening of AI Centres for equipments,semen bank and Liquid Nitrogen storage and 4 yrs operational cost (No.)	816000	246	200736000
c	Development of Community pasture/ Gauchar land/Silvipasture/ Grass land of 5 ha/ unit @ 1 silvipasture/50000 Adult Cattle Unit	219780	163	35824140
d	Modern Dairy Demonstration Centre/district - 50 animal unit	4000000	13	52000000
e	2 CB milch cow under prototype scheme - 80% subsidy	57600	6451	371577600
f	Mini dairy units of 5 CB cows @ 50% subsidy	92000	450	41400000
g	Assistance for Heifer rearing	13390	3102	41535780
h	Jharkhand Dairy project - for developing procurement and marketing system of Milk	39400000	11	433400000

i	Goat Breeding Unit of 10 Does +1 bucks for grading up of local population with Improved goat breeds	100000	12820	1282000000
j	Promotion of Improved pig breeds (T&D) 3+1 unit	105000	14523	1524915000
k	Duck Breeding cum Hatchery Unit with 5000 parent ducks	3000000	1	3000000
l	New Animal feed plant @ 100 MT/ unit	40000000	2	80000000
m	New Poultry feed plant 100 MT unit	40000000	1	40000000
n	Promotion of backyard poultry (60)	7000	7032	49224000
o	Promotion of Hybrid Khaki campbell ducks (30)	7000	2665	18655000
p	Distribution of fodder seed @ 10 kg per animal @ Rs. 20/kg	200	83288	16657600
q	Disease Diagnostic Labs	8000000	21	168000000
r	Strengthening/new Govt. goat farm	25000000	4	100000000
s	Strengthening / New Govt. piggery farm	25000000	4	100000000
t	Vaccination programme	25	12316184	307904600
u	Strengthening Govt. Poultry breeding farm	20000000	1	20000000
v	New Poultry breeding farm for low input technology birds	35000000	1	35000000
II	Fisheries			
a	Fish seed farms by farmers - Spawn and fry net to be supplied by Fisheries Department (20 Lakh Spawn/unit) (No.)	12500	1308	16350000
b	Fish seed Hatchery 2 to 3 crore spawn capacity	400000	123	49200000
c	Demonstration Farm for integrated fish farming (No.)	500000	14	7000000
d	Pilot project on Fresh water Prawn farming (No.)	275000	45	12375000
e	Construction of seed rearing tanks	55000	2500	137500000
f	Renovation of Govt. tanks	300000	420	126000000
g	Stocking of fish fingerlings in reservoirs @ 800 per ha (ha)	800	88204	70563200

h	Boat and gear for reservoir cooperative societies	100000	155	15500000
i	Vehicle for transporting fish seed and fish	300000	54	16200000
j	Landing Centres in reservoirs (No)	500000	29	14500000
k	Pen culture in reservoirs (No)	300000	15	4500000
l	Construction of Hygienic Fish Markets	1000000	3	3000000
m	Strengthening of Govt seed Farm and Construction of seed hatchery & other infrastructure	20000000	1	20000000
12	**Innovative Schemes**			
a	*Adoption of SRI technology in paddy Production including farm pond (Unit Area 1 acre)*			
i	Farm ponds (No.)	36400	1740	63336000
ii	Cono weeder (No.)	6000	1740	10440000
iii	Trainer's training (No.)	15000	27	405000
iv	Farmers Training (No.)	10000	40	400000
v	Seed 3 kg/acre @ Rs.15/kg (area covered)	45	1740	78300
b	Tea Cultivation (acre)	100000	50	5000000
c	Demonstration of Gravity drip system - Developed by Harp (No. of units)	132000	158	20856000
d	Demonstration of Sprinkler irrigation (2 Acre model) No. of units	17000	148	2516000
13	**Research & Development**			
a	Gene Seed Bank & Identification and Preservation of Indigenous Livestock	1000000	21	21000000
b	Ultra Decication unit for storage of germplasm	515000		515000
c	State Statistical Bureau	20000000		20000000
d	Institute of Fisheries and Livestock research	20000000		20000000
e	Research Centre on Millets	20000000		20000000
14	**Krishi Bhavans at Panchayat level**	500000000		500000000

15	**Assistance for State Seeds Corporation**	20000000	1	20000000
16	**Assistance for State Agro Industries Corporation**	20000000	1	20000000
17	**Plan Preparation**			19000000
18	**Contingency**			521566000
	Total			**26599895465**

ANNEXURE III

Land Utilisation

Sl. No.	Particulars	Area (in lakh Ha)
i	Geographical area	79.70
ii	Land under forest	23.34 (29%)
iii	Land for non agriculture use	6.88(8.63%)
iv	Barren land	5.76
v	Permanent pasture & other grazing land	0.87
vi	Cultivable wasteland	02.84
vii	Land under misc. trees	1.24
viii	Current fallows	13.63
ix	Other fallows	07.52

x	Net sown area	18.08
xi	Area sown more than once	02.63 (14.58 % of Net Sown Area)
xii	Gross cropped area	20.67
xiii	Net irrigated Area	01.57 lakh ha (8% of the net sown area)

(Source: Jharkhand : A Statistical Profile 2005, Government of Jharkhand)

ANNEXURE IV

Land holdings Pattern

Sl.No.	Size Class (in Ha)	Holdings		Area		Average Area per holding (Ha.)
		No. (in lakh)	%	Lakh Ha.	%	
i	Marginal (0-1)	15.45	62.60	8.03	20.60	0.52
ii	Small (1 - 2)	4.32	17.50	6.56	16.80	1.52
iii	Semi Medium (2 - 4)	3.54	14.30	9.94	25.40	2.81
iv	Medium (4 - 10)	1.11	4.50	10.06	25.70	9.06
v	Large (10 & above)	0.27	1.10	4.46	11.50	16.52
	All Holdings	**24.69**	**100.00**	**39.05**	**100.00**	**1.58**

(Source: Jharkhand : A Statistical Profile 2005, Government of Jharkhand)

ANNEXURE-Va

Agro-climatic Divisions with Broad Characteristics (classification as per Govt. of Jharkhand))

Sr. No.	Division	Districts	Characteristics
i	**Central and North Eastern Plateau**	Hazaribagh, Ramgarh, Chatra, Pakur, Godda, Deoghar, Bokaro, Dhanbad, Koderma, Giridih, Sahebganj, Dumka, Khunti and part of Ranchi.	i. Erratic and uneven distribution of rainfall ii. Coarse textured soils, crust formation on the soil surface iii. Low water retention capacity of the soil iv. Lack of safe disposal of runoff and drying of tanks.
ii	**Western Plateau**	Lohardaga, Gumla, Simdega Palamau, Latehar, Garhwa and rest of Ranchi.	i Erratic/ uneven distribution of rainfall ii. Low water retentive capacity of the soil.
iii	**South Eastern Plateau**	East Singhbhum, West Singhbhum and Saraikela-Kharsawan	i. Uneven distribution of rainfall ii. Low water holding capacity, eroded soils iii. Shallow soil depth iv. Poor soil fertility.

ANNEXURE-V b

Agro-climatic Zone VII (Eastern Plateau & Hills)
Classification as per Govt. of India - Districts and Characteristics

Sr.No.	Sub-zone	Districts	Characteristics
i	Sub-zone No. 3	Hazaribagh, Ramgarh, Chatra, Bokaro, Dhanbad, Koderma, Giridih, Deoghar, Godda, Jamtara, Sahebganj, Pakur & Dumka	a. Area of 4.14 million hectares b. Population of 15.32 million c. 6.58% irrigated area d. Coarse textured soils e. Crust formation on the surface of the soil f. Low water retention capacity of the soil g. Erratic and uneven distribution of rainfall h. Lack of safe disposal of runoff and drying of tanks
ii	Sub-zone No. 4	Palamau, Latehar, Garhwa, Lohardagga, Gumla, Simdega, Ranchi, Khunti, East Singhbhum, West Singhbhum & Saraikela	a. Area of 2.6 million hectares b. Population of 7.62 million c. Parts of Palamau, Latehar and Garhwa are drought prone areas d. 9.65% irrigated area e. Erratic/uneven distribution of rainfall f. Low water retentive capacity of the soil g. Lack of soil and water conservation practices

ANNEXURE-Vc

Area, Population, Cultivated area and forests in different agro-climatic zones of Jharkhand

Sub Zone	Sub Region	Total Geographical area (m ha)	Population (million)	Net cultivated area	Forest (%)
IV	Central North Eastern Plateau	4.1	12.3	55	13
V	Western Plateau	2.5	6	24	33
VI	South Eastern Plateau	1.3	3.5	31.6	24

ANNEXURE-VI

Farmer household accessing information on modern agricultural technology through different sources:

(in %)

Sl No.	Sources	Jharkhand	India
1	Extension Worker	0.00	5.70
2	TV	2.30	9.30
3	Radio	15.40	13.00
4	News Paper	4.70	7.00
5	Input Dealer	3.10	13.10
6	Other Progressive Farmers	8.70	16.70
7	Any Source	28.40	40.40

(Source - NSS Report No. 499 Year 2005)

ANNEXURE-VII

Source of irrigation in different agro-climatic zones of Jharkhand

ACR Sub Zone	Total Irrigated area (ha)	Irrigated area as % of total cropped area	Source of Irrigation (ha)			
			Canal	Tank	Tube well	Well & others
Zone IV	11237	6.58	1888	3433	534	5516
Zone V	21956	9.65	3732	801	3228	14381
Zone VI	15510	4.58	10211	2156	409	2733

ANNEXURE-VIII a

Agricultural Statistics Jharkhand
(Source:Vision document 2020 of BAU)

Name of the Crop	2004-05			2005-06			2006-07*		
	Area '000 Ha	Product-ion '000 MT	Product-ivity Kg/ ha	Area '000 Ha	Product-ion '000 MT	Product-ivity Kg/ha	Area '000 Ha	Product-ion '000 MT	Product-ivity Kg/ha
Paddy	1276.42	1908	1495	1354.73	1558	1150	1400.00	1680	1200
Wheat	64.50	101	1615	57.98	78	1340	60.50	85	1410
Maize	191.24	279	1457	177.56	223	1259	164.20	223	1360
Pulses	290.91	190	653	217.90	119	546	210.00	116	550
Oilseeds	94.27	53	564	29.49	19	655	20.30	14	670

*(Provisional figures for the year 2006-07)
Source : Jharkhand : A Statistical Profile 2006, Govt of Jharkhand

ANNEXUTE-VIII b

Coverage, Production and Productivity in Tonnes of Different crops of Jharkhand

PADDY

Year	Coverage in lakh ha	Production in Lakh tones	Productivity Tones/ha
2001-02	15.2	27.33	1.93
2002-03	13.83	20.71	1.64
2003-04	13.63	23.1	1.7
2004-05	12.76	19.08	1.5

MAIZE			
YearÂ	Coverage in lakh ha	Production in Lakh tones	Productivity Tones/ha
2001-02	1.4	2.09	1.76
2002-03	1.58	2.67	1.68
2003-04	1.88	3	1.6
2004-05	1.91	2.78	1.46
PULSES			
Year	Coverage in lakh ha	Production in Lakh tones	Productivity Tones/ha
2001-02	2.12	1.66	0.8
2002-03	2.43	1.49	0.81
2003-04	3.01	1.68	0.6
2004-05	2.91	1.9	0.65
OILSEEDS			
Year	Coverage in lakh ha	Production in Lakh tones	Productivity Tones/ha
2001-02	0.75	0.5	0.59
2002-03	0.94	0.6	0.62
2003-04	1.01	0.4	0.35
2004-05	0.94	0.53	0.56

(Source: SAMETI, Jharkhand website)

ANNEXURE-VIII c

Fruit Production in Jharkhand and India on the basis of Area, Production and Productivity

Fruit	Area(Hectares)		Production(Ton)		Productivity(Ton/He)	
	India	Jharkhand	India	Jharkhand	India	Jharkhand
Mango	128303	6040	10810357	61000	8.43	10.09
Leechi	48570	791	364613	6000	7.51	150.11
Guava	131625	3313	1501296	33000	11.41	9.96
Banana	433019	995	13095087	8000	30.24	10.32
Papaya	60921	4332	1327668	43000	21.83	9.92
Lemon	454082	3316	3998271	43000	8.37	12.96
Jackfruit	-	4096	-	41000	-	10.00
Others	574280	2543	7148052	25000	12.45	9.83

ANNEXURE-VIII D

Vegetable Production in Jharkhand & India - Area and Production

Vegetables	Area (Hectares)		Production (Ton)	
	India	Jharkhand	India	Jharkhand
Brinjal	434202	8190	64433062	98000
Cabbage	218381	5510	3861684	82000
Cauliflower	220025	9075	2473987	136000
Lady's Finger	430525	15385	4031811	154000
Onion	393500	5296	4080000	79000
Tomato	355684	11091	5441967	183000
Green Chilly	-	4021	-	4100
Others	1948165	12724	24077438	196000

ANNEXURE-IX

Crop season wise distribution and pattern of rainfall (mm)

Crop Season	Current Year (2001-02)	10 Years (mean) (1991-2000)	34 years (mean) (1957-1990)	44 years (mean) (1957-2000)
Kharif (June TO October)	1093	1424.2	1227.6	1278.7
Rabi (October - March0	211.8	178.4	167.8	175.1
Zaid (March-Jun))	662.8	361.4	346.6	329.7

ANNEXURE-X

Consumption of Chemical Fertilisers in Jharkhand

Types of Fertilizers	Year	Jharkand	India
Nitrogen (N)	2001-02	109.2	11,310.22
	2002-03	112.1	10,474.12
	2003-04	66.98	11,076.34
Phosphate(P)	2001-02	42.15	4,382.4
	2002-03	43.82	4,018.81
	2003-04	41.9	4,123.76
Potash(K)	2001-02	15.67	1,667.09
	2002-03	16.67	1,601.16
	2003-04	4.84	1,597.55
Total	2001-02	167.02	17,359.71
	2002-03	173.6	16,094.09
	2003-04	113.72	16,797.65
Per ha consumption (kg)	2001-02	54	90.12
	2002-03	67	84.82
	2003-04	44	NA

ANNEXURE-XI

Distribution pattern of rainfall sub zone wise of Jharkhand

Sub-zones	Annual rainfall (mm)	Kharif (June to October) in %age
Sub zone (iv)	1320	80.82%
Sub zone (v)	1246	70%
Sub zone (vi)	1400	80.85%

Annexure XII

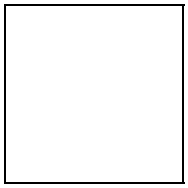
Employment Generation Potentials in Agriculture and allied Sector

Sr.No.	Types of Investment	Unit	Additional Generation (Person days per year)
1	Minor irrigation	1 ha	268
2	Horticulture	1 ha	365
3	Sericulture	1 ha	100
4	Dairying	02 animal unit	217
5	Paddy	1 ha	382
6	Ragi	1 ha	275
7	Mixed Farming (Animal Husbandry)	1 unit (1 ha)	526
8	Mixed Farming (Crop-Livestock)	1 unit (1 ha)	951
9			

ANNEXURE XIII

ANNEXURE-XIV

Per capita post plan nutrition availability-projection



Appendix-I

FEEDBACK FROM A FEW VILLAGES ACROSS THE DISTRICTS REGARDING THEIR PERCEPTIONS ON THE RESOURCE GAPS AND REQUIREMENTS

NABCONS team made extensive tour in the villages in a number of districts to gain first hand knowledge about their expectations and perceptions of the resource gaps. On the basis of their feedback, a few of the points came up which are mentioned hereunder.

Village level Assessment of Agriculture and Allied Sector Requirements are :

District : Khunti

Block : Khunti

I. Village : Bhut

i. Access to Veterinary dispensary
ii. Electricity
iii. Water for both irrigation and drinking.

II. Village : Buradih

i. Veterinary not available

ii. Only Paddy is grown even though .. a few wells and ponds are available in the village. Water .. facility is needed.

iii. Quality seeds for winter vegetables/crop

iv. Dairying potential

District : Dumka

Block : Kathikund

I. Village : **Bara Dhania Pahan**

i. Microlift irrigation.

ii. Extremely low paddy (Mono crop) yield estimated at about 3sq.ft./acre(7.5 qt/ha).

iii. Lack of seeds for souring.

II. Village : **Paharpur**

i. Irrigation

ii. Goat rearing

III. Village : **Ratanpur**

i. Very low mono cropped paddy productivity.

ii. Need for 2nd crop.

iii. No irrigation

IV. Village : **Balijone**

i. Two small rivers/streams are available and water lifting through micro lift is possible

ii. Need grand water recharge /retential structures.

V. Village : **Anycori**

i. Water shed development

ii. Run off prevention is a urgent need.

District : Hazaribag

Block : Churchu

I. Village : **Bali**

i. Introduction of pulses, oilseeds and HYV Paddy.
ii. Promote millets in fallow lands
iii. Potential for vegetable cultivation.
iv. Kitchen gardens.
v. Mushroom cultivation
vi. Seeding and Nursery raising
vii. Back yard paddy
viii. Piggery.

II. Village : **Ralo**

i. Piggery
ii. Fish production
iii. Goatery
iv. Dairying
v. Rain water harvesting ...

District : Sahibganj

Block : Rajmahal

Panchayat : Tetulia

I. Village : Bagrikorga

i. Dug wells at 6 places
ii. Supply suitable fruit trees.
iii. Training in modern agricultural practices.

Block : Churchu

Panchayat : Sdgachi Santhali

I. Village : Pakiyabedo

i. Check Dam
ii. Dug well
iii. HYV Paddy seeds
iv. Farmers training

District : Pakur

Block :

I. Village : Torai

i. Irrigation facilities (Minor Irrigation)
ii. Veterinary clinic
iii. Dairy Farm
iv. Training centre

Bokaro District

Sl no	Block	Village	Main issues/ requirements received from villages
1	Peterbar	Angwali	1) Construction of Microlift, 2) Training on off season vegetable cultivation, 3) Supply of quality vegetable seed, Dairy, 4) Cultivation of medicinal plants & 5) Dug well for irrigation
2	Peterbar	Koah	1) Mixed vegetable cultivation with spice inter-cropping, 2) Vermicompost, 3) Construction of polyhouse for off season vegetable cultivation and training, 4) Construction of Poultry shed, 5) Common Storage for Poultry feed, 6) Piggery & 7)
3	Kasmar	Kedla	1) Checkdams in local stream, 2) Micro lift 3) Quality seed for vegetable cultivation, 4) Vermicomost, 5) Dairy, 6) Piggery, 7) Training on vegetable cultivation, 8) Training on Fishery and supply of quality spawn & 9) Cultivation of Kurthi
4	Kasmar	Hissim	1) Checkdams in local stream, 2) Micro lift 3) Quality seed for vegetable & potato cultivation, 4) Vermicomost, 5) Dairy & 6) Construction of poly house for off season vegetable cultivation and training
5	Chas	Kurma	1) Checkdam in local stream, 2) Dairy, 3) Training on vegetable cultivation, 4) Vermicompost, 6) Quality seed & 7) Dugwell for irrigation
6	Chas	Pokhanna	1) Microlift near Gawai river, 2) Training on off season vegetable cultivation, 3) Supply of quality vegetable seed, 3) Construction of Polyhouse, 4) Dairy, 5) Piggery, 6) Vermicompost, 7) Plantation of Mango, Guava, etc., 8) Cultivation of Marigold
7	Jaridih	Saraibinda	1) Dugwell for irrigation, 2) Piggery, 3) Training on vegetable cultivation, 4) Cultivation of medicinal plant, 5) Vermicompost, 6) Dairy, 7) Plantation of Mango, Guava, etc., 8) Establishment of Market

VILLAGE LEVEL ASSESSMENT OF AGRICULTURE AND ALLIED REQUIREMENT

District : East Singhbhum

Sr No	Block	Panchayat	Village	Requirement
1	Potka	Haldipokhar	Mghuasahi	Lift Irrigation,Seed village
2	Potka	Dhirol	Dhirol	Check Dam, LI,
3	Ghatshila	Galudi	Subarnapur	LI, Seed Dev, Agri-Horti
4	Chakulia	B Kanpur	Biharipur	Check Dam,allied activity
5	Chakulia	Gohal Dangra	GohalDangra	Deep TW, Seed development
6	Baharagora	Gamharia	Sasan Gamharia	Deep TW,Seed Village
7	Baharagora	Chitreswar	Chitreswar	Deep TW,Seed Village

8	Musaboni	Sonagada	Sonagada	Integrated Farming,goatery
9	Dumaria	Dumaria	Dumaria	DTW, Seed Village
10	Jamshedpur	Dalapani	Dalapani	Agri-Horti,Veg Cultivation, Check Dam

RAMGARH-Village Level Assessment of Agriculture and Allied Requirements - based on field visits

Sl No	Block	Village / Panchayat	Name of SHG / Farmer clubs/farmer	Requirement
1	Mandu	Pochra	Kshetriya mm	Marketing facility - Vegetables, Chk Dam
2	-do-	Digbar	Jeevanam mm	(i) Quality milch animals (ii) enhancement in milk prices
3	-do-	-do-	Roop Dev Prajapati - Agriculturist	Supply of Quality Seeds of beans , onion etc
4	-do-	-do-	Dhaneswar Mahto	Remunerative price to farmers, Irrigation source , facility for agro processing
5	-do-	Marar	Kali Mahila Samiti	Supply of Quality seeds, timely bankloan, Training on High Quality Veg cultivation
6	-do-	Karma	Vishwa Vikash mm	Sale price falling down, Provision of poultry feed at cheaper rate and support during Birdflu
7	-do-	Digbar	Ranaji Mahto	Seed supply at low rate, Irrigation source
8	Ramgarh	Chittarpur	MaaDurga mm	Feed cost be less, marketing of milk, Vet facility, milk procurement

9	-do-	-do-	Kisan mahila samiti	-do-
10	-d-	Birhani	Sangam Yuva Sangh	Veterinary facility, support price during bird flu
11	-do-	Mandu	Jagriti mm	-do-
12	-do-	-do-	Jagadamba mm	-do-
13	Gola	Tyma Watershed	Sutri FC	Technology for weaving
14	-do-	-do-	Barlanga & Bhubul FC	Organised marketing of Baby corn, support price for vegetables, Veg processing , Irrigation source
15	-do-	-do-	Lipia FC	Irrigation facility
16	-do-	-do-	Betal, Soso, Rola	Quality seed/ fertiliser, Vegetable processing, Irrigation source
17	-do-	-do-	Hesapora FC	Marketing facility / Cheaper cold storage fees

Village-level Assessment of Agriculture and allied activities-GIRIDIH

S.No.	Block	Panchayat	Village	Requirement
1	Giridih	Akdonikala	Akdonikala	Checkdam, Water Harvesting pond
		Baxidih	Baxidih	Water Harvesting pond
			Jasbad	Land levelling
		Jaspur	Jaspur	Checkdam, Water Harvesting pond
		Leda	Leda	Checkdam, Dugwell
2	Gandey	Phuljharia	Arjunabad	Checkdam,Dugwell
		Phulchi	Jodhpur	Checkdam, Water Harvesting pond
		Jamjori	Bhadwankhurd	Checkdam, Repair of Ahar
3	Gawan	Amtaro	Amtaro	Land levelling, Dugwell
		Birne	Dehar	Repair of Ahar,Dugwell,Checkdam
4	Bagodar	Nagarkeswani	Nagarkeswani	Checkdam, Water Harvesting pond,Dugwell
5	Bengabad	Bengabad	Bengabad	Land levelling

		Taratand	Taratand	Repair of Ahar,Dugwell
6	Birni	Birni	Birni	Checkdam, Repair of Ahar,Dugwell
7	Deori	Chatro	Chatro	Water Harvesting pond, land levelling, Repair of Ahar,Dugwell
8	Dhanwar	Bhalutand	Bhalutand	Dugwell
		Badgo	Badgo	Land levelling, Dugwell
9	Dumri	Nagabad	Nagabad	Lift irrigation, land levelling, Dugwell
		Dumri	Dumri	Lift irrigation, land levelling, Dugwell
10	Jamua	Palmo	Surja	Dugwell
		Kendua	Palra	Jatropha plantation,Dug well
11	Pirtand	Nawadih	Nawadih	Ahar,Dugwell
		Madhuban	Madhuban	Water Harvesting pond, Dugwell
12	Tisri	Barwadih	Barwadih	Ahar
		Tisri	Pipratand	Water Harvesting pond, land levelling

HAZARIBAG- VILLAGE NEED ASSESSMENT

Sl No	Block	Village / Panchayat	Name of SHG / Farmer clubs	Activity of SHG /FC members	Requirement
1	Bishnug arh	Khambawa	Ujjwal Mahila Mandal	Agriculture + Dairy Units	Enhanced Milk procurement price
2	-do-	-do-	Kiran mm	-do-	-do- / supply of good seeds
3	-do-	-do-	Jyoti mm	-do-	Supply of Beetel variety Goat
4	Ichak	Jharpo	Gayatri mm	-do-	Quality cattle supply
5	-do-	-do-	Daya mm	-do-	Quality seeds
6	Sadar	Daru	Santoshi mm	-do-	Irrigation source
7	-do-	-do-	Saraswati mm	-d0-	Seed supply at low rate
8	-do-	-do-	Laxmi mm	-do-	Low cost Agriculture Inputs
9	-do-	-do-	Mirdha mm	Tokri making For storage	Quality Bamboo/ Bamboo regeneration
10	Bishnug arha	Darbhanga	Sahayog FC	Veg / Paddy/ wheat cultivation	Irrigation / Quality low cost inputs
11	-do-	Wandi, Khambawa	Navodaya FC	-d0-	Facility for agro processing & procurement
12	Ichak	Bharajo	Jharkhand KK	-do-	Fodder cultivation Tech guidance
13	Sadar	Mahesara	Vikash FC	-do-	Activation of defunct Cold storage
14	-do-	Meru	Pragati KK	-do-	Organised marketing
15	Churchu	Jerba	Chand mm	Agriculture	Irrigation facility
16	-do-	Kurra	Aradhana mm	-do-	Quality seed/ fertiliser
17	-do-	Dasokhab/ Jerba	Dinesh KK	-do-	Marketing facility / Uninterrupted powere supply
18	-do-	Chanaro	Patel KK	-do-	Tech support for cash crops

19	-do-	Hendgarha	Nehru KK	-do-	Agro processing/ procurement support/ Transport facility
20	-do-	Chainpur	Adarsha-Birsa kk	-do-	Technology for Horticulture
21	Katkamsandi	Pabra	Sanjivani mm	-do-	Good price for vegetables
22	-do-	Kusumbha	Azad mm	-do-	-do- / Irrigation facility
23	-do-	Gadokhar	Guleichi mm	DD + Veg cultivation	Veg processing & marketing
24	-do-	Pabra	Asha mm	-do-	Vegetable marketing at high price
25	-do-	Gadokhar	Jyoti	Dairy	Quality milch animal
26	Padma	Kultipisi / Nawadihi	Kultipisi mm	Vegetable cultivation	Irrigation source
27	-do-	Jihu	Jihu mm	-do- / Animals	Quality Sheep/ goat
28	-do-	Behari	Behari mm	Goatery	-do-
29	Ichak	Devkuli	Devkuli mm	Vegetable cultivation	Marketing facility-improvement
30	-do-	Punai	Punai mm	-do-	-do-
31	Keredari	Patrakund	Gautam SHG	Agriculture	SRI in Paddy cultivation
32	-do-	-do-	Adarsh mm	-do-	Timely bank loan for agriculture
33	Badkagaon	Badkagaon	Badakagaon KK	-do-	Agroprocessing,procurement

SAHIBGANJ-Village-level Assessment of Agriculture and allied activities

S.No.	Block	Panchayat	Village	Requirement
1	Pathna	Dharmpur	Dharmpur	Repair of Pond, Dugwell
2	Borio	Telo	Telo	Land levelling, Dugwell,Pond
		Powal	Powal	Pond, Dugwell
3	Rajmahal	Lalmati	Lalmati	Land leveling, pond
		Gunihari	Laldaga	Pond,Dugwell, Checkdam
4	Udhwa	Udhawa West	Udhawa	Land leveling, Pond repair
5	Bahrait	Labri	Labri	Pond, dugwell
6	Sahibganj	Harprasad	Harprasad	Pond
7	Barharwa	Pathariya	Pathariya	Checkdam,Dug well
8	Mandro	Simra	Bangalia	Dugwell, Checkdam
				Land levelling, Dugwell

9	Taljhari	Kalyani	Kalyani	Pond, Checkdam
		Taljhari	Lakhipur	Pond, Checkdam

Appendix-II

Integrated Mixed Farming : a few Models

Present Farming Situation in Jharkhand

The farming situation is based on two types of land ie land on upper slope, *Tanr* land, and the land following called *Don* land. The sub-classes of these are *Tanr I*, *Tanr II*, *Tanr III* and *Don I, Don II, Don III*. For technology generation, these are grouped again into three categories ie. Upland (*Tanr I & Tanr II*), Medium land (*Tanr III & Don III*) and Lowland (*Don I & Don II*). The uplands are characterised by red colour lateritic soil which has a low pH, poor in organic carbon and well drained. The midlands are yellow, medium textured, moderately acidic and poor in organic carbon & moderately drained. The lowlands are greyish, heavy textured, have neutral pH and poorly drained. The average rainfall is about 1200 mm per annum and no attempts are made to conserve water, protect the crops and increase the cropping intensity. Due to mono cropping system, the scope for farm employment is limited to very short period of 5 to 6 months. For rest of the period, majority of the rural population migrate to near by towns for livelihood.

Even though rainfed rice yields are low (less than 1 ton / ha.) and unstable, rice is being cultivated to meet the food demands of small and marginal farmers who possess 75% of total farm holdings. Small and marginal landholders face typical problems than large farmers as they have to be dependent on farming for their household needs and majority of these farmers are resource constrained, economically poor and poor in awareness about use of technology or improved practices. The benefits of technology developed in green, white or other agricultural revolutions have remained confined to large and resourceful farmers. From this small holding, it is not possible to sustain an average family size of 5 members with single crop production

enterprise. Hence emphasis on crop diversification and integrated development of both farm and non farm sector is crucial for better livelihood opportunities for the rural households.

Crop diversification possibilities

Technological options for rice substitution and crop diversification in rainfed uplands are rain water management, off-season ploughing, early sowing, closer spacing, early weeding, timely fertilizer application, plant protection measures, early harvesting and proper soil inter cultural practices. Other relevant technologies are selection of crop varieties and cropping systems in relation to rainfall pattern and crop growth period. Some of the parameters relevant to upland farming are :

- ✓ The crops to replace rice should be of short duration, low duty and/or deep rooted which can extract soil moisture from deeper soil layers during dry spell.
- ✓ Some of the promising crops for rainfed upland rice area are maize, ragi, black gram, pigeon pea, cow pea, groundnut, sesame, niger, cotton, mesta, sweet potato etc.
- ✓ Inclusion of legumes in the cropping system to improve soil fertility besides providing food and nutritional security.
- ✓ Pulses have inherent quality to trap the moisture from the low strata of the soil therefore, they are considerably moisture stress tolerant and fit well in rainfed conditions.
- ✓ Adopt dry land horticulture and agro-forestry systems in sloppy Uplands.
- ✓ Suitable forage crops to be grown to sustain dairy industry.
- ✓ In all crops, there must be emphasis on integrated weed management, nutrient management, rainwater management, plant protection measures and post- harvest technology.

Integrated Farming as an alternative

Small farmers are to be encouraged for production of food, feed, fodder, fibre, fuel, etc., on a small piece of land. Under such conditions, one alternative is to integrate more than one enterprise on the same piece of land. Suitable agricultural technologies are, therefore, required to be developed for small land holders for which concept of integrated farming may prove better than specialized or single crop farming system. This kind of farming produces more income and generates more employment than do arable farming systems which do not include animals. Integrated farming helps improve the economic conditions of resource constrained farmers and provide better opportunities for employment in the agriculture sector.

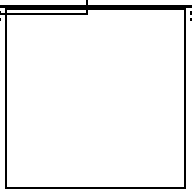
Integrated multi component farming systems, where the wastes from one operation or subsystem can be used a input for other subsystems/enterprises can reduce the risks as well as costs of production; improve soil fertility, provide balance nutrition and ensure enhanced holistic yields as well as income.

Several specific possibilities for integration of various livestock enterprises with crop production for small and marginal land holders under irrigated and dry land situations of semi-arid tropical regions are known.

The above situation clearly indicates the need for implementation of integrated farming aimed at achieving remunerative self employment to prevent migration, develop sustainable livelihood and improve the quality of life.

Integrated farming for uplands known in Eastern India

A small farmer usually has a farm pond in the homestead land and possesses 0.5 to 1.0 ha. of upland around his farm pond. The farm pond is meant to collect rainwater from the watershed. This rainwater could be utilised in giving a life saving irrigation during the dry spell to various upland crops, such as vegetables, groundnut, pigeon pea, maize, cow pea, mung bean, urad bean etc. Fruit crops viz., Papaya, Banana, Pine apple etc. could be raised on pond

embankments. A cow dung gas plant  provides fuel (methane gas) for cooking food for the family, compost for manuring the adjacent farm land and slurry to the farm pond to encourage growth of phyto-plankton and zoo-plankton which serve as fish feed in the tank. Catla, Rohu, Mrigal and Shrimp could be cultured in layers of water body for nutritious food and income to the family, ducks could be reared on the pond/tank which not only keep water body clean by eating the aquatic weeds but also increase the fertility of the water body of the tank by providing dropping/excreta through out the tank. A poultry cottage could be erected at one corner of the farm pond and these birds kept in the cottage should preferably be layers so that the farm family can earn extra money through sale of eggs. One or two dairy cows could easily be managed by the family with the help of feed, green fodder raised from the farm. Daily monetary income is ensured from the sale of milk, milk products, eggs, fish and vegetable grown the farm.

Profitability of small and marginal farmers who have diversified their activities are well established. Vertical integration of dairy with fodder crops can increase income and employment on a sustainable basis. Structural changes in consumption pattern of vegetable, meat, egg, fish, growth of income results in diversification favour of non-food grain crops and livestock products can generate adequate employment and income for small farmers.

Integrated farming for lowlands known in Eastern India

Threats of water logging and high rainfall and excessive ground water resources can be converted to poverty alleviation opportunities in many part of Eastern India. Diversification of rice monoculture into integrated farming system will be environmentally sustainable, economically viable and a risk avoiding strategy. The most popular models preferred in India and suitable for waterlogged situations are mainly (a) Pond-dyke integration, (b) Fish-rice-

duck/ poultry and vegetables and (c) Fish-Cow/ Pig - Duck/Poultry and vegetable. In addition to economic return, these systems are based on multiple recycling of carbon energy and nutrients from biomass to livestock- Poultry/ Piggery/ Fishing etc. and minimize environmental loading with pollutants. The overall system is most efficient for the absorption of inputs and production of goods and services. In these systems, marginal lands and wastelands are generally brought into productive use where pond services as a focal point for direct and indirect links with other components.

Integrated Farming Model proposed under SAP

Drawing from the experience after a visit to Charichas farm in Bokaro district of Jharkhand, it would be prudent to plan for suitable integrated farming models for individual small farmers as well as for medium farmers or a group of small farmers. The viable unit sizes to be considered for such models could be 1 ha. (2.5 acres) and 5 ha. (12.5 acres**).** The base 1 ha. model assumes that all three land categories are available within this 2.5 acre and the proportion of each are (i) Lowland *(Don I & II)*- 0.75 acre (ii) Medium Land *(Don III)* - 0.25 acre (iii) Medium Land *(Tanr III)* - 1 acre & (iv) Upland *(Tanr I & II)* - 0.5 acre. Although there could be region specific cropping sequences, the major three variants of the 1 ha. Model envisaged are (i) Agri - Veg- Horti- Agroforestry- Dairy- Poultry- Goatery (ii) Agri -Veg -Horti -Agroforestry -Dairy- Poultry- Piggery & (iii) Agri- Veg- Horti- Agroforestry- Dairy- Poultry- Fisheries- Duckery**.** Adoption of these activities to a certain extent would depend on the type of land available, for ex. fisheries could be taken up depending on the viability of having a pond, hence the need for having three variants.

The 5 ha. model at this stage envisages all the activities put together, however adoption of these would depend on specific interests of farmer groups. The cropping pattern and sequences could vary depending on type of land and agro-climatic conditions.

Interventions proposed for Integrated Farming

1. Food security - Considering that rainfed rice yields are low (less than 1 ton / ha.) and unstable, however rice alongwith other foodgrains and cereals are to be cultivated to meet the food demands of small and marginal farmers who constitute 75% of total farm holdings. At an average of 250 gm/person/day, the annual requirement for a family of say, six persons, would be around 6 quintals of rice OR say 1.2 tons of paddy. Going by the premise that proven high yielding varieties can yield 2 tons / acre, it would be prudent to consider rice cultivation on 1 acre of lowland (0.75 acre) & medium land (0.25 acre) during the kharif season.
2. Other Food crops & cereals for meeting needs & income generation : The 1 acre of medium land available during kharif season is proposed to be utilised for cultivation of Maize & Soyabean in 1:2 proportion (0.5 acre) and Pigeon Pea & Groundnut in 1:2 proportion (0.5 acre). During the rabi season, in the same plot of lowland (0.75 acre) where rice had been taken, it is proposed to take wheat (0.45 acre) & Berseem (0.15 acre) through zero tillage operation with the remaining 0.10 acre kept fallow.
3. Fodder crops : 0.10 acre of the upland is proposed to be utilised for raising Deenanath grass as an inter crop between horticultural plants besides cultivating berseem in 0.15 acre of lowland during rabi.
4. Additional income & risk mitigation through Vegetables as crop diversification - Potato is the most important vegetable grown in the State. Okra, Tomato, Cucumber, cauliflower and cabbage are the other vegetable crops that are grown in large areas and exported to nearby States of West Bengal & Orissa. Based on this premise, the medium land of 0.25 acres is proposed to be utilised for cultivation of Cauliflower & Cabbage in 0.125 acre each. The 1 ha. of medium land is proposed to be cultivated by Potato in 0.4 acre and Tomato,

Frenchbeans & Peas in 0.2 acre each. The cultivation of these vegetables is to be done during rabi season. The same land is proposed to be utilised for taking summer crop of vegetables given that irrigation source is available. The crops proposed to be taken are Capsicum (0.45 acre), Okra (0.25 acre), Cucumber (0.15 acre) and Brinjal (0.15 acre). However, before taking these crops, the soil has to be suitably tilled and mulched so that productivity of the land is maintained. Chillies (0.10 acre) & Arhar / Linseed (0.10 acre) are proposed to be taken as intercrops in the uplands.

5. Agroforestry - Subabul comprises good forage material for cattle & goats besides its pulpwood value. Since the same will be adequately protected during the initial stages therefore Subabul tree on the periphery of these lands can be grown as an agroforestry crop, hence 200 trees have been proposed. For raising of 160 agroforestry trees on the periphery of the Upland area of 0.5 acre, Sesam (60), Melina (Gamhar) (20), Teak (20) and Glyricidia (60) known for its green manure, has been proposed.
6. Horticulture : As a part of multi-tier cropping system, Mango (20) & Guava (10) as an orchard has been proposed in the uplands
7. Support Activities
    a. Fencing : Protection forms a necessity whenever horticulture, vegetables and animal husbandry activities are being proposed. Hence for fencing, use of Thorny bushes, cactus var. plants, bamboo supports have been proposed @ Rs. 50 / running metre for 1.5 acre of land.
    b. Water Resource Development : Providing support irrigation for rabi crops and summer vegetables forms the critical component for having a profitable enterprise. A borewell with pumpsets etc. estimated at a cost of Rs. 1 lakh leads to a huge investment for this small enterprise. Hence, it would to prudent to have a GroupWell shared between 5 farmers at a shared cost of Rs. 30,000 per enterprise. This cost would include pumpset

and pipelines. Further, Drumkit for gravity flow irrigation and sprinkler sets have also been provided in the 1 ha. model.

c. Vermicomposting : This activity has to be promoted form the beginning, if one has to give the desired thrust to organic farming. Therefore for having shed & pit alongwith procurement of worms has been included in the entire cost exercise.

8. Animal Husbandry : The demand for meat, meat products & eggs in Jharkhand is high since the consumption patterns of the tribals as well as those domiciled in the State as well as in the neighbouring States include meat. Therefore the cattle, goat, pig, poultry and ducks are the major animal products that need attention. However, animal husbandry is still to grow as per demand requirements. Integrated farming could provide the growth strategy tool which is very much needed for this sector.

d. Dairy - For a small farmer, management of Small Dairy units consisting of 2 Cross Bred Cows or Improved varieties such as Sahiwal, Red Sindhi, Rathi, or Indigenous cattle breed such as Tharparkar, Haryana etc. could provide a regular source of income to the farmer through sale of milk. Established cost norm of Rs. 50,000/unit has been taken. On a larger scale, 50 cows can be maintained in a 5 ha. Farm model. Jharkhand is a state where the milk production is in deficit, therefore there is an existing demand which needs to be met. The requirement of Green Fodder could be met through the production of Berseem & Deenanath grass as envisaged in the crop production. Thus, the integration is achieved for this activity. Further the cow dung could be utilised for preparation of vermicompost.

e. Poultry : Backyard poultry farming can be popularised by introducing BA/RIR dual purpose cocks. Shed and procurement cost of 20 chicks (Fighter / Desi breeds) have been built into this model. This is comparatively a low cost activity envisaging a cost of Rs. 2000/-.

The three variants of the 2.5 acre [redacted] activity will have one of these three activities ie. Goat rearing OR Piggery OR Fisheries-cum-duckery

f. Goat rearing : Local Black Bengal breed is the most preferred. In the 1 ha. model, 10 (Does) + 1 (Buck) has been proposed. Procurement cost of these goats along with shed arrangements & utensils forms part of the investment cost. Feed for 30 kids & 10 goats along with expenditure to be incurred for medicine & injections forms part of the recurring costs. The costs are taken as recommended through BAU.

g. Piggery : Most adaptable "T&D" pigs have to be maintained for better return. The 1 ha. model considers this activity as per preference of farmers in substitution of Fisheries-cum-duckery or Goatery activity. For easier management, 3 sows + 1 Boar unit has been considered at a high investment cost of Rs. 1,00,000/-. To maintain disease free condition alongwith regular vaccinations, there is a high recurring cost of Rs. 25,000/yr associated with this activity.

h. Fisheries : For fisheries to be developed, a natural collection point of about 0.2 acre needs to be developed through construction of a Dug out pond (30m X 25m) at a cost of Rs. 50,000/-. The input costs in terms of fries, medicines etc. has been built in the model at a cost of Rs. 25,000/yr. Catla, Rohu, Mrigal & Shrimp will be the fish varieties which can be raised.

i. Duckery : Duckery activity alongwith fisheries offers great scope for integration since ducks keep the required turbulence as well as weed free. Population of Khaki Campbell for more egg production forms the basis for expansion of this activity in the State. Therefore 200 ducks can be reared through the pond and which has the capacity to lay 240-300 eggs /year and hence provide additional source of income for the farmers.

Implementation Strategy

Dissemination of information pertaining to these models to small and medium farmers will require a huge co-ordinated effort in terms of planning, preparation of guidelines, hand holding in terms of financial & marketing support and above all close monitoring & feedback. Since this entire role might not be possible by the State Govt., therefore engaging of field level Voluntary Organisation having required expertise could be the way ahead. Integrated Farming also gives rise to the opportunity of organising small farmers groups into associations or producer companies which can lead to greater benefits for the farmers. To implement it through RKVY, it is envisaged that at least one demonstrative model per panchayat will be implemented through financial support of Rs. 2.5 lakhs per farm. Further, it is assumed that all individual beneficiary financial support for various sectors through RKVY will be under the Integrated Farming Model from the second year onwards.

Appendix-III

Integrated Agri-Horti-Silvi Farming Programme

Genesis of The integrated agri-horti Approach

1.1 In view of the complexities attached with tribal way of life, due to their historical, socio-cultural and geographical situations, the generalised approaches of development attempted earlier have not met with significant success. Nevertheless, efforts made by some government and NGOs in different parts of the country have made it possible to establish some demonstrative models. Among them, the **"The integrated agri-horti"** approach adopted by an

NGO - BAIF Development Research Foundation (BAIF), Pune has left a visible impact in a short span of time and stands out as a sustainable model suitable for replication in other tribal areas.

1.2 Dharampur block in Valsad district of Gujarat is inhabited mainly by tribals. The area is characterised by steep, undulating, inaccessible terrain, heavy rain fall with high run offs. Remote and scattered habitations provide only harsh living conditions. Only one third of the area is cultivable with negligible area under irrigation. The harsh livelihood conditions lead to high morbidity. The vicious cycle of poverty-malnourishment - morbidity - low work capacity - increased poverty has made the tribals lose confidence in themselves. BAIF, with its local associate DHRUVA, has demonstrated that these unproductive lands are good enough to lift tribal families above poverty line.

"*Integrated agri-horti*" Model of Tribal Development

2.1 In this model, the central focus is on "*Integrated agri-horti*". The other development interventions are built around "*Integrated agri-horti*".

2.2 "*Integrated agri-horti*" in Gujarati means a 'small orchard' covering one or two acres. The *''Integrated agri-horti''* as an effective tool for tribal development evolved gradually out of two decades of concerted efforts made by BAIF in Vansda, Gujarat. The "*Integrated agri-horti*" may be of mango or cashew or amla or any fruit crop suitable to the area or a combination of these tree crops, with forestry species on the periphery of the land holdings. Two or more tree crops are selected in the *''Integrated agri-horti''* model to minimise biological and marketing risks.

2.3 While the fruit plants generate income after 4-5 years, the forestry species provide a fence and also act as a shelter belt. The species mix planted meets the families' needs for fuel, fodder and small timbers. It also helps in reducing the pressure on existing forests.

2.4 An one acre model of "*Integrated agri-horti*" accommodates around 60 fruit plants (depending on spacing) and 600-800 forestry plants and provides adequate income and livelihood security under climatic

vagaries. In five years, a poor village of 100 families gets converted into an orchard of a 100-150 acre producing hundreds of tonnes of fruits.

2.5 Though the nucleus is *''Integrated agri-horti''*, community health and sanitation are essential components of the programme. Special emphasis is given to women in the programme. While taking care of the land holding tribals through *''Integrated agri-horti''* development, the programme has addressed the problems of landless as well by through creation of employment opportunities in farm and non-farm sectors in the programme area.

3. Components of 'Integrated agri-horti' Approach

3.1 The comprehensive tribal development through "integrated agri-horti" approach involves the following components / sectors:

I. Orchard development (fruit/ plantation/herbal crops & forest plants) as the core component
II. Soil conservation in the integrated agri-horti
III. Water resources management (conservation and use)
IV. Sustainable agriculture
V. Human resource development (community development)

I. Women development - A special emphasis is given for involvement of women in all spheres of the programme. The components include drudgery reduction measures, on-farm and non-farm income generating activities and self help groups for inculcating thrift and credit habits.

- Community Health
- Micro-enterprises for landless people
- Processing & marketing

- Other auxiliary components to dovetail with above activities.

3.2 Integrated agri-horti approach aims at the rejuvenation of the environment in an integrated and comprehensive manner leading to improved quality of life of resource poor tribal families. Thus, it involves the management of needs of the tribal community in such a way that their demands match the resources available within their reach, besides regeneration of the environment. The approach ultimately will lead to increased agricultural production augmenting food supply, fodder, fuel, timber and medicines. Thus, standard of living improves leading to reduction in poverty-induced migration.

4. People's Participation – Crucial for Success

4.1 There is a pervading influence of the environment on the tribal community living within that region, as they depend on it for food, water etc. When the economic condition of a community deteriorates, it leads to over-exploitation resulting in degradation of natural resources. It is necessary for people to understand the relationship between their poverty and the degraded environment in which they live in. They must also be provided with an equally good, if not better, economic alternative. Only then they will willingly let go their claims on the environment in favour of possible benefits that will accumulate in the long run from environmental regeneration through appropriate management.

4.2 Environmental regeneration is therefore possible only when the local community feels the need for it and they are fully in control of all aspects of resource mobilization, management and conservation. There can be no sustainable natural resources management unless it involves the participation of all inhabitants of the concerned environment/area in an active manner.

5.1 Selection of Area

9.1.1 Preference could be given to the districts/ blocks/ villages where percentage of tribal population is more than 50%. The selected area should be large enough so that a viable cluster, with at least 1,000 tribal families, could be covered for benefit under the project for effective management. However, 10% of these participants could be landless.

5.1.2 The physical, ecological and socio-economic characteristics of the area *vis-à-vis* their suitability for integrated agri-horti programme will be taken into account while selecting the area. Those villages with a known history of coming together for common causes and villages that have shown concern for resource conservation will be given priority. The replication of the integrated agri-horti programme model however, could be modified if warranted keeping in view the local situations.

5.2 Selection of Participants

5.2.1 Small and marginal farmers of ST communities owning not more than 5 acre would be eligible to participate in the programme. The support from the Fund will be to the extent of development of maximum one acre per family or equivalent cost. The participating families should be agreeable to work together with other families in groups and also provide family labour required for completion of core activity. Further, they should be agreeable adopt the project discipline.

5.2.2 The tribal participants should commit themselves to make periodic, regular contributions to create a common village fund and to constitute, at the village level, a

representative body for managing the programme and maintaining all the valuable assets created and generated by the project.

5.3 Selection of Project Implementing Agencies (PIAs)

5.3.1 The projects under TDF will be implemented through Community Based Organisations (CBOs) i.e. Non Governmental Organisations (NGOs), Voluntary Agencies (VAs), Trusts, Societies, etc. Broad basis for selection of PIAs for implementation of the project are:

a. PIA should have been registered and have been active in the area for a significant period (at least 3 years) before proposing a integrated agri-horti project for the area/ vicinity.
b. Reputation and financial management capacity. It should have audited balance sheet for the last 3 years.
c. Quality of governance of PIA.
d. It should not have been black listed by any other organisation and funding agencies.
e. Method of operation and rapport with people and local government agencies.
f. Nature of projects handled in the past – PIA should have experience in implementation of Natural Resources Management (NRM) projects.
g. Technical and managerial capability.
h. Sensitivity towards group action /conflict resolution and equity for poor and women.
i. Ability to motivate the community in the village where they propose to work.
j. It should be apolitical. Executive members of the PIA should not be sitting MLA/ MP.

On the basis of their application, information supplied, work done and site visits, NABARD will identify the PIAs suitable for participation in the TDF assisted projects.

6. Project - Prerequisites for Success

a. **Clarity about the project**: The project will include any income generating activity such as horticulture/ agriculture/ forestry, dairy, micro enterprises etc. Social engineering aspects such as women empowerment, health development etc. have an equal bearing on the over all success of the programme.

b. **Owning the project by the participants:** The project participants should wholeheartedly own the project and contribute for the successful implementation and maintenance thereafter.

c. **Family labour:** Each participating family is required to contribute entire labour component.

d. **Trained manpower:** It may be ensured that enough trained manpower is available and if necessary suitable orientation programme could be organised to develop such skills.

e. **Active involvement of women:** Women participation should be ensured in all the process of project implementation, as bulk of the farm related work are carried out by them, besides playing the role of transmitters of culture and values to the children.

f. **Seasonality:** The project activities should be undertaken keeping in view the appropriate season.

7. Implementation Stages

7.1 The project will be implemented with cluster approach, with each cluster having around 1,000 tribal families spread over a number of contiguous villages. It should be endeavoured that all eligible families in the given village are brought under the project.

7.2 State Govt. will identify the PIA based on the criteria laid down in the guidelines (Item No. 5.3). The identified PIA shall provide information in the PIA Data Sheet (Annexure – I) for selection/ ratification by the Project Sanctioning and Steering Committee (PSC) set up at State Govt. PIA has to identify the cluster/ village/s for implementing the programme. The identified area should be suitable for the programme and fulfil the criteria laid down in the guidelines. PIA has to submit information in the Project Area Data Sheet (Annexure - II) for selection / ratification by the PSC.

7.3 Main Steps in Implementation

a. Identification of PIA.
b. All the proposals received will be informed to the state level Review and Monitoring Committee.
c. After the selected area fulfils the criteria and the tribal families are interested and willing to implement the project accepting the discipline, the PIA and the participants will be permitted to implement the programme.
d. PIA shall prepare the Project Feasibility Report (PFR) and submit to Agriculture/Horticulture Department for approval and sanction. The duration of the project will vary from activity to activity.
e. PIA motivates the villagers through a series of meetings and discussions. During these discussions, the reasons for environmental degradation and various problems affecting the people like shortage of water, fuel and fodder, decreasing agricultural production and migration can be discussed. It should emerge during these discussions that the project activity will help them in addressing the problems.
f. Followed by these discussions, PIA may arrange for exposure visit of selected tribal families to similar projects.

g. A Letter of Consent, which contains the conditions and procedures for the implementation of the programme, roles and responsibilities of the participants, has to be executed and signed by both husband and wife of every participant family (Annexure-III).

h. After the signing of Letter of Consent by the participants, groups of 10 participants each may be formed keeping in view location of their land such that participants having land in proximity would come under the same group.

i. The individual project shall be developed by the participants under guidance of PIA.

j. Other components of the programme viz., water resources development, women development (SHGs, IGAs, drudgery reduction etc.), community health programme (chlorination, primary health care, referral services etc.) will commence concurrently with the core activity.

8. Programme Period

12.1 The project with "integrated agri-horti" approach is not an area based development effort, but relies on the voluntary participation of thousands of individual families calling for implementation in phases. The implementation of core activity shall be confined to maximum of three batches and each batch will be supported for a maximum period of six years. The total programme period shall not exceed nine years. During this period, the tribal participants (around 1,000 families per cluster) belonging to low income groups would be in a position to reap substantial benefits on a sustainable basis, which would ultimately enable them to lead a normal life in their village without the need to migrate to urban areas in search of employment.

9. Organizational Requirements

The following institutions/ organizations would be involved in the execution of integrated agri-horti programme. However, the institutions/ organizations would evolve as the programme progresses and the need of such institutions arise in programme implementation.

9.1 Project Level

(i) Participant Groups (PGs)

The core activity will be a family based programme and will be undertaken by the individual tribal family. For better planning, execution and management, the individual project participant will come together as small groups of about 10 members each.

(ii) Village Planning Committee (VPC)

These participant groups in turn will form village level organization, Village Planning Committee (VPC), for better coordination with the help / facilitation by the PIA. The VPC will form once the stable operations of the PGs are reached and when felt necessary for coordinated actions at the village level. The VPC consists of persons nominated by a consensus by the programme participants. For every 10 participants (one PG), one member will be nominated for the VPC. It should have due representation of women (minimum 30%). This body actually "owns" the project and is responsible for the planning, implementation, monitoring and maintenance of the project.

(iii) Cooperatives

The village level organizations will federate and form a cooperative at the cluster level. This cooperative will take shape once the base level institutions have fully stabilized and become functional. Each cooperative will have two representatives (one man & one woman) from each VPC. The cooperative will be instrumental in providing technical assistance to the project after the project period, inputs procurement, marketing of produce and necessary guidance to VPC for effective management of the programme.

(iv) Project Implementing Agency (PIA)

The Project Implementing Agencies of integrated agri-horti projects will be Non Governmental Organisations (NGOs). The PIA is responsible for motivating and involving the tribal community in planning and implementing the programme. The PIA is responsible for preparation of project report and project implementation, to receive funds and keep account for the same. The PIA is also expected to link with the government departments/ extension agencies/ support institutions in order to avail available facilities and resources. In the later years, PIA's major responsibility is to develop cooperative which will take the role of PIA once it withdraws on completion of the programme.

9.2 State Level

(i) Review & Monitoring Committee (RMC)

A Review & Monitoring Committee (RMC) at state level will be constituted to guide the programme.

Terms of Reference of RMC

a. RMC would monitor the progress of implementation of integrated agri-horti projects.
b. RMC would discuss the field level operational problems and try to evolve strategies to overcome these problems.

Periodicity of Meeting: RMC would meet once in every six months.

Appendix - IV

WATERSHED DEVELOPMENT

What is watershed development all about ?

Watershed development refers to the conservation, regeneration, and the judicious use of human and natural (like land, water, plants, animals) resources within a particular watershed**.** Watershed development attempts to bring about the best possible balance in the environment between natural resources on one side and man and grazing animals on the other. It requires people's participation because conservation is possible only through the whole hearted involvement of the entire community.

2. **Components/sectors of Watershed Development**

2.1 Watershed development involves the following components / sectors:

i) Human resource development (community development);

ii) Soil and land management (conservation and use);

iii) Water management (conservation and use);

iv) Afforestation;

v) Pasture (Fodder) development;

vi) Agricultural development;

vii) Livestock management; and

viii) Rural energy management

2.2 Watershed development involves continuous interaction and exchange between various sectors e.g. the livestock that can be maintained is dependent on the availability of fodder,

which in turn is related to soil and water management. The availability of firewood and other fuel is related to the amount of livestock in the area, the extent of forest cover, and the productivity of the land. The development of all the above sectors is crucially dependent on the **development of the human population** inhabiting that watershed.

2.3 When the environment gets degraded, the quality of life of the human community within that region also deteriorates. Watershed development thus aims at the rejuvenation of the environment in an integrated and comprehensive manner.

3. Why Watershed Development ?

3.1 The consequences of environmental degradation are all too well known. Activities of man like deforestation, wrong farming techniques, livestock over-grazing and faulty land use lead to the destruction of plant and tree cover exposing the earth to the natural forces like heavy rains, direct sunshine and high winds. These in turn lead to environmental problems such as soil erosion, floods or water scarcity. Agricultural yield is lowered and this results in decline in the income levels of the community resulting in poverty and eventually leading to migration of labour from rural to urban areas in search of livelihood.

3.2 Watershed development, therefore, involves not only regeneration of the environment, but also the management of needs of the human community in such a way that their demands match the resources available like land, water and vegetation within that particular watershed.

This equilibrium between need and availability of resources will lead to a better and increased resistance to drought and increased agricultural production augmenting food supply, fodder, fuel and, timber. Thus standard of living improves leading to reduction in poverty-induced migration.

4. People's Involvement

4.1 There is a pervading influence of the environment on the human community living within that region, as they depend on it for food, water etc. When the economic condition of a community deteriorates, it leads to over-exploitation resulting in degradation of natural resources. People, for whom agriculture is a low return and risky activity, expand their cattle herds for financial security. This leads to overgrazing and in turn to soil deterioration and erosion, especially in ecologically sensitive upper reaches of the watershed.

4.2 It is necessary for people to understand the relationship between their poverty and the degraded environment in which they live in. They must also be provided with an equally good, if not better, economic alternative. Only then they will willingly let go their claims on the environment in favour of possible benefits that will accumulate in the long run from environmental regeneration through appropriate management. Environmental regeneration is therefore possible only when the local community feels the need for it and they are fully in control of all aspects of resource mobilisation, management and conservation.

4.3 Human beings and their activities are the root cause of environmental destruction, and hence restoring of the health of the environment is their responsibility and only they can do it. There can be no sustainable natural resources management unless it involves the participation of all inhabitants of the concerned environment/area in an active manner.

4.4 The people voluntarily must come together and accept full responsibility for regenerating their environment from concept to planning, implementation, supervision, maintenance of project measures and associated practices. This would imply consensus in arriving at a common understanding regarding rules and regulations and the setting up of mechanisms for organisation of works, sharing of benefits and resolution of conflicts.

4.5 To make the project sustainable, it is necessary for all the key actors, like the Watershed Community, NGOs, Banks, Government Institutions and Technical Service Organisations, to participate actively and in close coordination with each other.

4.6 Participatory watershed development must be implemented on a "large enough scale" at different places to create many success stories, each of which can act as nuclei, becoming a source of inspiration and demonstration for neighbouring villages. This would provide a major impetus for the unfolding of a "people's movement" for regeneration of environment.

4.7 The relatively poorer families depend more on village commons, forest lands and on flocks of sheep and goat. Some of the measures of the project such as ban on free grazing and felling of trees affect poorer families more than others. Such families should be provided with alternative or compensatory means of livelihood right from the beginning. Attempts may be made for introduction of rotational grazing as a regular practice by the villagers.

5. Criteria for selection of watersheds

5.1 Watersheds covering villages with the following physical and socio-economic characteristics are preferred for inclusion in the programme :

5.2 **Physical characteristics**

a. Dry and drought prone villages. In any case the proportion of irrigated area may not exceed the average for the state or 30% which ever is lower.

b. Villages with noticeable soil erosion, land degradation, resource depletion or water scarcity problems.

c. Villages in the upper part of drainage systems.

d. The size of a watershed project should be around 1000 ha. (but not less than 500 ha.).

e. Well defined watersheds with the village boundaries coinciding to the greatest extent possible with the watershed boundary. As far as possible, **Watershed encompassing one village is ideal**.

f. Villages where the general cropping sequence does not include high water demanding and long duration crops like sugarcane, banana etc. and if such crops are grown in small pockets in the watershed, the villagers should agree that the area under such crops will not be extended during implementation or after completion of the watershed development project.

5.3 **Socio-economic characteristics**

a. Predominantly poor villages.

b. High proportion of SC/ST in the total population.

c. There should not be much difference in the size of the land holdings.

d. Villages with a known history of coming together for common causes.

e. Villages that have shown concern for resource conservation.

f. Villages with alternative sources of employment must not be selected as the past experience indicates that the programme in such areas would not pick up.

g. Villages that are willing to commit themselves to the following conditionalities :

(i) to ban clear felling of trees,

(ii) to ban free grazing and in treated areas for protecting vegetation,

(iii) to reduce the livestock population if in excess, and maintain the same at the carrying capacity of the watershed (number which can be supported by the watershed),

(iv) to ban cultivation of water intensive crops like sugarcane and banana or atleast not to increase the area under such crops from the present position,

(v) to contribute initially four days of "shramdan" on watershed treatment works by the entire village community and later, once selected for the programme to contribute by way of "shramdan" or otherwise 16% of the unskilled labour costs of the project and also to collect such contribution **EQUITABLY** (impartially and in a just manner) from the village community. The landless and poor single parent households are excluded from such a contribution,

(vi) promote equity for women and poor through preferential allocation of usufruct rights in common lands.

(vii) to start and contribute to a Watershed Maintenance Fund, from the second or third year onwards to maintain and upgrade the treatments and assets created under the project, at a rate of Rs.100/- per land owning families.

(viii) to take all such steps as are necessary for achieving and maintaining a sustainable production system,

(ix) to constitute, at the village level, a body called the Village Watershed Committee (VWC) which would have to be registered during the implementation phase within 6 months of the commencement of the work, so that it can undertake responsibility for maintenance of all the valuable assets created and generated by the project.

6. **Criteria for selection of NGOs**

6.1 The nodal agencies of the State Government may implement watershed development projects through NGOs which are funded out of WDF loan. Even if the Project Facilitating Agency (PFA) is other than NGO the same criteria could be utilised with necessary modifications. The following shall be the criteria for selection of NGOs.

a. Reputation and financial management capacity.

b. Method of operation and rapport with people and local government agencies.

c. Perspective on watershed development.

d. Nature of projects handled in the past.

e. Technical and managerial capability.

f. Sensitivity towards group action /conflict resolution and equity for poor and women.

g. Ability to motivate the community for providing 'Shramdan' in the village where they propose to work.

6.2 The NGO should have been active in the area for a significant period before proposing a watershed project for the area. NGOs and watershed communities willing to implement a watershed project, if selected, have to go through a Proofing Stage (please see Section IV for details) and meet the qualifying criteria before they undertake a large scale project.

7. Importance of Nursery & Plantation

7.1 The project involves a lot of plantation work on forest lands, private lands as well as on bunds in cultivated fields. Most projects face a shortage of good planting material. It is better and economical to start a nursery for the project well in advance (as raising of good seedlings in a nursery takes from six months to a year) and stock it with enough seedlings to use during the project.

8. Trained manpower

8.1 There should also be enough trained manpower before the project starts. A core team of village youth would have to first undergo an orientation program to develop a clear idea of the project and the responsibilities of all persons involved with it. They would also need to acquire certain specific skills like surveying, staking, nursery raising, horticulture and pasture development, etc. for project preparation, implementation and maintenance.

9. **Active involvement of women**

9.1 Women should be actively involved in all aspects of project implementation as they not only do the bulk of farm related work but are also the transmitters of culture and values to children.

10. **Ridge to Valley**

10.1 The work on the project is executed with a "Ridge to Valley" perspective, that is starting from the top and coming downwards. This would mean that the treatment of the hilltops and hill slopes would be completed first. Treatment of land should start from a higher elevation and gradually lands of lower elevations would be taken up. Thus lands at the bottom of the valley would be treated at the end.

10.2 Ridge to valley treatment ensures that the soil erosion is reduced and the treatments at the lower catchment are protected. This also helps water conservation and ground water recharge. The treatment must be on area basis, both public and private lands are to be treated.

11. **Check dams should be last**

11.1 If the physical measures in upper reaches and in the cultivated fields are carried out well, the whole watershed basin will act as a large reservoir with recharged ground water. The need for constructing expensive check dams in the lower portion of watershed will then get reduced considerably. Therefore, check dams are constructed at the end of the watershed to

impound the excess water after allowing water to seep into the acquifer through the entire course of the drainage line of the watershed.. However, one check dam could be built initially to create a water source for starting a nursery and/or for drinking water purposes, if it is felt absolutely necessary.

12. **Seasonality**

12.1 In most areas very little work except planting of trees and grass seeding can be taken up during the monsoons. Therefore the activities should be planned accordingly. To start a project during or just before the monsoon is not advantageous.

13. **Improving farming practices**

13.1 In addition to laying emphasis on physical measures equal or greater attention should be paid to agricultural programmes to help the farmers to take up improved farming practices and get maximum benefits from the infrastructure created under the project.

14. **Treatment of forest land**

14.1 Some of the watersheds may cover forest land and as mentioned earlier, all lands including forest lands need to be treated. As per existing law, the work on the forest land has to be planned and executed under the guidance of the Forest Department. Therefore, it is advisable to approach the local Forest Department for finalising the treatments of forest area in the watershed which could either be implemented by the VWC / NGO under the guidance of Forest Department or to be implemented by the Forest Department. Funds are available from WDF for treatment of forest lands also.

15. **Implementation**

15.1 The process of watershed development comprises of 2 phases. The first phase is called the "Capacity Building Phase" (CBP) or “Proofing Stage” and the second phase is called "Full Implementation Phase" (FIP).

15.2 **The Capacity Building Phase (CBP) OR Proofing Stage (Phase 1)**

The aim of the Capacity Building Phase is to establish that village community can work together and cooperate with each other and also work with NGO to develop a small portion of the watershed, say, 50 - 100 ha. The duration of the CBP is generally for 12 months. After successful completion of CBP, NGO would assist the village community in preparing the Project Feasibility Report for launching the Full Implementation Phase. During the CBP phase the following steps are undertaken:

a. After the selected watershed fulfills the criteria and the villagers are eager and willing to implement the project accepting the discipline, the NGO and the villagers will be permitted to take up CBP.

b. The NGO motivates the villagers through a series of meetings and discussions. During these discussions the reasons for environmental degradation and various problems affecting the people like shortage of water, fuel and fodder, decreasing agricultural production and migration can be discussed. It should emerge during these discussions that watershed development project can help the villagers in restoring the balance of their environment.

c. The villagers should demonstrate their commitment to take up watershed development by undertaking 4 days of shramdan. Landless and poor single parent households could be exempted. Voluntary contribution of bullocks, tractors, can also be valued and treated as shramdan. Shramdan should be for soil and water conservation activities.

d. After one or two days of shramdan, NGO may arrange for exposure visit of atleast one member from each family to a nearby developed watershed. After completion of 4 days

of shramdan, a meeting to be called for formation of Village Watershed Committee (VWC). At this meeting before formation of VWC, an Agreement Letter which contains the conditions and procedures for the implementation of watershed development project has to be read out to the people. The villagers have to orally agree to implement the Watershed Development Project and accept the conditions of community discipline. The community discipline consists of ban on 'free grazing', 'clear felling of trees' and 'eschewing growing of water intensive crops'. After this the VWC is formed and the VWC has to get the Agreement Letter signed by both husband and wife of every family in the watershed (Annexure-III).

e. The VWC also has to sign another Agreement Letter (Annexure-IV) which details their responsibilities. The members of VWC are selected by people of the watershed and it will have representatives from different social and class groups of the village. It should be ensured that there is adequate representation of the different geographical areas within the watershed.

f. After the formation of VWC and signing of Agreement Letters by the members of VWC and all the families, the villagers have to demonstrate the commitment to work with each other and also with the NGO in the development of the watershed by developing a micro watershed in the ridge portion. This micro watershed can be of the size of 50 to 100 ha and should include part of the ridge as well as the related valley. The criteria for selection of a micro watershed are:

(i) Proximity to the village so that it is easily noticed by the people.

(ii) Possibility of having different types of treatment like trenches, bunding, gully plugging, etc.

g. For developing this micro watershed the villagers will have to prepare a development plan, which is known as survey numberwise planning. Under this the Planning Team

has to go to each and every field where work has to be undertaken, discuss with the owner of the field the treatments to be carried out and then finalize the plan with the consent of the farmer and his wife.

h. After the preparation of this plan, it should be sent to NABARD for approval and sanction. NABARD's staff may visit the watershed and discuss with the members of VWC and the farmers having land in the micro watershed and verify the plan prepared. Thereafter, NABARD will sanction the plan for the development of the micro watershed and release funds for implementing the plan.

15.3. **The Full Implementation Phase (FIP)(Phase 2)**

15.3.1 Only those NGOs and Watershed Communities who have satisfactorily proved their capability to carry out watershed development under CBP are selected to take up FIP. The NGOs will be advised to prepare a Project Feasibility Report after 5-6 months of satisfactory implementation of CBP project. The preparation of the Project Feasibility Report is taken up concurrently with and implementation of the CBP. FIP of watershed development will be based on this Project Feasibility Report prepared by the NGO in consultation with the villagers. The terms and conditions for preparation of Project Feasibility Report are given in Annexure-V. The Project Feasibility Report is then forwarded to NABARD Regional Office for consideration.

15.3.2 On receipt of draft Feasibility Report NABARD staff will visit the watershed, discuss with the farmers and the members of VWC and verify the project report with the ground realities. If considered necessary they may suggest modifications to incorporate based on the knowledge and experience gained from the CBP. Thereafter the project would be considered for approval by NABARD. The duration of FIP is normally 4 years.

15.3.3 The FIP project is sanctioned by a core group headed by the Executive Director of NABARD with members from the Ministry of Agriculture, GoI and NGO sector, upto a

maximum outlay of Rs.50 lakhs. Projects beyond this outlay will be sanctioned by the Central Steering Committee.

15.3.4 The terms and conditions of watershed development project implementation are given in Annexure-VI. The sanctioned projects will be monitored and supervised by NABARD.

16. **Organisations Involved:**

16.1 The following institutions/organisations would be involved in the execution of watershed projects.

a. <u>At the Project level</u>:

i) <u>The Village Watershed Committee (VWC)</u> :

The VWC consists of persons nominated by a consensus, by the Gram Sabha attended by all adult members of the village, representing all the sections in the village and also the different geographical areas. It should have due representation of women (minimum, 30%). VWC is a registered body. **This body actually "owns" the project and is responsible for the planning, implementation, monitoring and maintenance of the project.**

ii) <u>Project Facilitating Agency (PFA)</u>

The PFA is responsible for motivating and assisting the village community in preparing and successfully implementing the watershed project. The PFA and the VWC are jointly responsible for preparation of project feasibility report and its implementation, to receive funds and be accountable for the same.

The PFA is also expected to link with the local Government Departments / support institutions in order to avail of existing facilites and resources.

b. <u>At the State level</u> :

i) <u>Linkage Building/Networking</u> :

The soil conservation depart will maintain a communication channel with different agencies and attend to problems faced by the participating NGOs and VWCs. On specific request from the NGO-VWCs, soil conservation department would be rendering help for project specific problems as well. soil conservation department will help NGOs and village communities in improving their skills for project implementation.

ii) Administrative Support :

Agriculture department will be responsible for overseeing and administering the individual projects at the ground level.

iii) Technical Support :

The soil conservation department is expected to provide the necessary technical support to the watershed communities implementing the projects. Suitably trained/qualified person(s) reporting to the Village Watershed Committee may have to be provided for.

17. **Key Principles to be adopted for Projects**

17.1 Following key principles are emphasised again and have to be adhered to in all watershed development projects funded out of WDF

- Community shall own and implement.
- No project without a proofing stage - rigorous qualifying criteria for participating communities and organisations
- Ridge to valley - treat every hectare that is required to be treated. Particular care to be taken for involvement of the forest department in treatment of forest areas on the ridge lines and implementation of joint forest management scheme with the community.
- Survey number wise planning involving every farmer.

- Uninterrupted flow of funds for implementation - arrangements for providing half-yearly requirements in advance and claiming subsequent requirements after exhausting 60% of the amounts released previously.
- Financial releases based on on field monitoring and satisfactory progress.
- Maintenance arrangements to be built in.

7. **Monitoring and Reporting Mechanism**

7.1 NABARD staff in the respective states, with the help of the concerned state government officials, will be responsible for monitoring of the projects. Apart from desk monitoring based on the prescribed reporting formats, half yearly field level monitoring will be mandatory.