

STRATEGIC RESEARCH  
AND  
EXTENSION PLAN  
*of*  
DUMKA  
DISTRICT

Prepared by

Agricultural Technology Management Agency ( ATMA )  
Dumka District, Bihar

National Agricultural Technology Project ( NATIP )

Under the guidance of



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## FOREWORD

National Agricultural Technology Project (NATP) is a bold initiative of Government of India to revitalise Indian Agriculture. Indian Council of Agricultural Research (ICAR) and Ministry of Agriculture (MOA) are jointly implementing the same covering 24 districts scattered across Six States all over the country. It is a World Bank funded project. As a part of the Innovations in Technology Dissemination (ITD) component, two thrust areas are being tested out.

- i) Introduction of decentralized strategic planning - It would integrate thinking and efforts of the agriculture and all allied departments.
- ii) Active participation of farmers through group approach in the preparation of these plans.

Strategic Planning is assumed to be the key towards planning and implementation of developmental activities in agriculture. It encompasses various stage and steps such as understanding of resource base and resource inventory of the area, identifying the agro-ecological situations within the district, identification of organizations, identifying the farming systems being operated over a period of time, identification of successes and experiences of farmers, identification of problems and needs of farmers by using Participatory Rural Appraisal (PRA) techniques, analysis of all the information collected, working out the strengths, weaknesses and opportunities available in the area, thus ultimately leading towards development of strategies for research and extension.

Based on these strategies an activity plan has also been worked out so as to guide the field personnel in their field programmes and also to help the AYMA, realize the potential of development and consequently allocate funds. Since this exercise of preparation of SREP has been new in all the districts, an intensive effort has been put up by the Consultants at MANAGE and also the core team in the districts. Their intensive efforts spread over 3-4 months have culminated in the development of SREP document, which is quite noteworthy. MANAGE appreciates the efforts put forth by the consultants and the core team.

I hope that this first set of documents in the district would go a long way in assisting and guiding the ATMAs and the activities of the officials to usher in a process of change towards developing Farmer Participatory Extension System (FPES) in the district.

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Place : Hyderabad



# CONTENTS

Chapter	Particulars	Page No.
<b>I</b>	Introduction	1-2
<b>II</b>	Background Information about the District	3-8
<b>III</b>	Analysis of ongoing development schemes	9-10
<b>IV</b>	Identification, description and analysis of existing farming systems and farming situation	11-33
<b>V</b>	Identification of critical issues, problems, opportunities and threats	34-35
<b>VI</b>	Proposed extension strategy	36-40
<b>VII</b>	Proposed research strategy	41-49
<b>VIII</b>	Annual Activity Plan	50-57
<b>IX</b>	Operational modalities for implementing the Annual Action Plan	58-67
<b>X</b>	Appendices	68-79



# I

# I N T R O D U C T I O N

The planning commission, as a result of mid-term appraisal of the planning targets of VII plan (1985-90), divided the country into 15 broad agro-climatic zones based on physiography and climate. The emphasis was on the development of resources and their optimum utilization in a sustainable manner within the frame work of resource constraints and potentials of each region. This implied a departure from the previous practice of planning with the focus on specific crops and fertilizers, treating the state as a unit of planning. The State Agricultural Universities were advised to divide each zone into sub-zones under the National Agricultural Research Project (NARP). Accordingly, 120 sub-zone map was prepared.

Thus, Bihar was divided into six agro-climatic sub-zones, and Dumka district falls under the sub-zone number IV, i.e., Central and North-eastern plateau zone of Bihar. This sub-zone falls under the jurisdiction of Z.R.S., Dumka, controlled by Birsa Agricultural University, Ranchi.

The agro-climatic regional planning approach was intended to take an integrated view of the agricultural economy in relation to resource base and linkages with other sectors implying that future agricultural development should be specific to agro-eco regions rather than extension of previous schemes. With an aim to optimize land use for increased agricultural production on sustainable basis, the Government of India has been increasingly keen to delineate agro-ecologically comparable resource regions for generating and transferring agro-technology to meet the country's ever-increasing needs of food and fibre.

Within a broad agro-climatic region, local conditions may result in several agro-ecosystems, each with its own environmental conditions. However, similar agro-ecosystems may develop on comparable soil landscape positions. A pronounced variation in climate, when expressed in vegetation and reflected in soils, may result in a variety of agro-ecosystems.

Thus, National Bureau of Soil survey and Land use planning of the ICAR has brought out an agro-ecological map of the country through several approximations.

The most fundamental mandate of NARP was to identify the location specific problems of the farmers, and formulate research projects accordingly, with a multidisciplinary approach. Thus, NARP has provided the basis for bottom-up approach in transfer of technology. But, still after completion of NARP, the existing network of extension system functions by passing standardized recommendations, evolved under controlled conditions by research organizations, over a wide area. The technological recommendations are also finalized and communicated from headquarters without active participation of users in the planning process. This has led to the extension / research personnel become used to the top-down approach.

In the past, the top-down approach had a considerable success in irrigated areas where profitability of new technology was high and where management conditions in farmers fields were not very difficult as compared to that of research farms. The above approach had, however, resulted in limited success in rainfed areas due to large heterogeneity and complexity in farming conditions. It is also being recognized that in such areas a wealth of indigenous technical knowledge is available which is constantly being upgraded through informal research process carried by scientists, farmers themselves to meet the needs of changing scenario in rural areas. Hence, for such areas, farmer participatory approach is crucial not only to increase the relevance of a programme but also to make best use of available indigenous knowledge. The fundamental qualitative difference between National Agricultural Technology Project and other existing projects lies in the fact that NATP is based exclusively upon bottom up approach.

During the last decade, a number of management tools have been developed which are helpful in facilitating farmers participation in an effective manner. Based upon these tools, a participatory methodology has been worked out for preparation of a Strategic Research and Extension Plan (SREP) at the district level. The present write-up has emerged through application of the above tools in the representative villages selected by agricultural / extension officers of Dumka district. It is hoped that this report shall serve as case study material for future use by those who are engaged in making the extension system farmer-driven.



### **Location, Extent and Population:**

The district Dumka is located at the Central and North-eastern plateau zone of Bihar. The district comprises of two sub-divisions namely, Dumka and Jamtara. There are 14 blocks in the district viz; Dumka, Jama, Jarmundi, Saraiahat, Ramgarh, Kathikund, Gopikandar, Sikariprara, Raniswar, Masalia, Jamtara, Narayanpur, Nala and Kiundhit. The district is having 4,119 villages under 282 panchayats. The total population is 14,95,628 which maintains an approximate male to female ratio of 1.04:1. The tribal population is 43% of the total population.

### **Agro-Climate :**

The climate of the district is characterized by hot summer and cool winter. The average annual rain-fall varies from 1300 to 1400 mm which covers about 80% of the PET. The district experiences a prolonged dry period from January to May which keeps the soil dry for more than 90 days in a year. As such the area, in general, qualified for typical soil moisture regime. The length of growing period varies from 150 to 180 days.

### **Physiography and Soils :**

The landscape of the district is characterized by gentle to very gentle slopes. Soils are sandy loam to clay loams, non-calcareous, slightly to moderately acidic and have location exchange capacity. The soils are generally shallow on the ridges and plateaus and deep in the valleys.

### **Land use :**

Total geographical area of the district is 5.58 lakh hectare out of which nearly 40% area comes under net cultivated area, 11% covered forests and the rest 49% area falls under barren, cultivable waste, pasture and other agricultural use. The details of land use pattern in the district are presented in table 2.1. Out of 2.18 lakh hectare net cultivable land, about 50% is under upland situation, 30% under medium land and 20% under low land situation.

**Table 1 : Land utilization pattern**

S. No.	Items	Area Lakh hect.
1.	Geographical area	5.58
2.	Forest	0.60
3.	Barren and uncultivated land	0.33
4.	Land put to other agriculture use	0.53
5.	Cultivable waste land	0.44
6.	Pasture land	0.29
7.	Current fallows	0.53
8.	Net cultivable land	2.18
9.	Total cultivated land	1.99
10.	Area under more than two crops	0.02

As per table 1 in Dumka district total cultivable land is 2.18 lakh consisting

Upland - 1.090 (50%)

Midland - 0.654 (30%)

Lowland - 0.436 (20%)

Majority of area comes under rainfed, only 11% area is used for irrigated condition which is in midland situation.

**Cropping pattern :** The principal agricultural crops grown in the district are rice, maize, pigeon pea, horsegram, nigar, mustard, groundnut etc.

### **Cropping Pattern, Area and Productivity of major agricultural crops in Dumka district :**

Rainfed farming system is the traditional practice followed by the farmers of this area. The Major crops grown in the district are rice, pulses such as moong, black-gram, pigeon pea and horse gram. Wheat is grown during rabi season mostly mustard and linseed, and pulses e.g. gram are also grown on stored or residual soil moisture. In some places, potato is also grown under irrigated condition. During the last five years there has been a marked increase in area under vegetables at some places in the district.

The important cropping patterns followed in different parts of the districts are as follows:

**I. Mono-cropping :** Rice/Maize/Pigeon Pea / Groundnut / Horse gram. In some areas, farmers follow inter-cropping of Maize with Pigeon pea / Cow pea.

**II. Double cropping :** Rice wheat, Rice-Mustard, Maize-Wheat, Maize-Mustard, Rice-Potato, Rice-Vegetable, Maize-Vegetables.

At few places in the district, where irrigation water is available in summer also, farmers take rice and / vegetables at very scanty level.

Area and productivity of major agricultural crops in the district are presented in table 2.

**Table 2 : Area productivity of major agricultural**

<b>crops</b>		
<b>Crop</b>	<b>Area (ha)</b>	<b>Productivity (Q/ha)</b>
<b>I. Kharif</b>		
a. Rice	150289	12.6
b. Maize	13000	16.0
c. Arhar	2394	9.0
d. Urad	998	4.7
e. Other pulses	3392	6.0
f. Oil seeds	1500	5.0
g. Finger millet	860	4.0
h. Mesta	998	4.0
<b>II. Rabi</b>		
a. Wheat	7000	11.0
b. Maize	399	14.0
c. Gram	4589	5.0
d. Masoor	598	6.0
e. Pea	598	5.5
f. Mustard	13000	7.0
g. Linseed	798	3.2
<b>III. Summer</b>		
a. Paddy	997	11.8

**Horticulture :**

The horticulture department was established in 1990 to promote fruits and vegetable cultivation in the district. The main objective of the department is to provide improved technologies and impart training to the farmers to boost up the production of fruits and vegetables. The total area under horticultural crops is 0.2 lakh hectare which is about 14% of the cultivated area.

The existing orchards of mango and litchi are very old and the yields are down due to lack of maintenance. There is one progeny nursery in Dumka, namely Shilandha. There are also five block nurseries in the district. However, the infrastructures of these nurseries are very poor and they can not cater to the demand of saplings.

### **Fisheries :**

There is a great shortage of fish production in the Dumka district. According to 1996-97, the area under fish cultivation is 32 acres with the production capacity of 2200 fingerlings per annum. Both government and private agencies are involved in distribution of fingerlings. There are only 15 tanks / reservoirs at five blocks in the district. Thus, the suitable lands lying fallow should be brought under inland fisheries.

### **Sericulture :**

Sericulture plays an important role in the development of economy of this district. A large number of tribals are engaged in this activity. There are tassar seed supply stations at Kathekund, Dumka (by central government) and few training centres and storage centres for starting of cocoon in the district.

### **Forestry :**

The total forest area in the district is 0.60 lakh hectare, which comprises 11% of the total geographical area of the district. A vast area in the district exists as barren lands where even grazing is not possible due to lack of adequate grass cover. This problem can be solved if waste land and uncultivable lands, are brought under silvi-pastural system. Thus, there is urgent need for

- i. Afforestation
- ii. Establishment of forest nurseries in different blocks
- iii. Social awareness of plantation works.

### **Irrigation :**

Very limited irrigation potential has been exploited in the district. Although, it is claimed that 15% of the total cultivated land is irrigated, the effective irrigated area during rabi is much less. Majority area under irrigation receives water mostly from wells and tanks, and at places from canal. The different irrigation schemes functioning in the district are as follows :

(a) Mayurakshi lift bank canal.

(b) Kairabani reservoir scheme.

A programme namely “Jal Dhara” is going on in the district at each block with an aim to cover about 84,000 ha. land.

### **Existing extension agencies & farmer organization :**

There are research and extension linkages with Z.R.S & Agriculture department like D.A.O, D.H.O, P.P.O, D.T.O and Krisa Vidyapith, Animal Husbandry, NGO's and other allied department for agricultural development. There are agriculture extension office and block level workers in each block to transmit the technical knowledge and information to the farmers in the district. Currently extension activities are being carried out not only under public sector but also under private and Voluntary sector, cooperative sector, ZRS of Birsa Agricultural University, line departments of agriculture, horticulture and animal Husbandry in Dumka district. All line departments have partial technical persons for extension activities.

### **Animal Husbandry :**

The district has one of the largest livestock population in the state. Strong cattle are common in the district. However, this cannot be taken as an index of the prosperity of cattle health. Despite the large population of cattle, the yield of milk in the district is very poor. Efforts have been taken by state government to improve the breed of milk cattle by the department of animal husbandry to boost up the milk production, and simultaneously economic growth of the tribal people of this districts. There are veterinary hospitals and dispensaries in each block for the treatment prevention and suppression of diseases of livestock.

As per the census 1992 the total livestock population of the district is 38.85 lakhs. The details of the bovine population, along with type of produce and annual productivity are as follows :

S. No.	Type of animal	Number	Type of produce	Annual Productivity per animal
1	<b>Cows</b>			
	a. Local	671054	Milk	360lit.
	b. Crossbreed	355	Milk	2160
2	<b>Buffaloes</b>			
	a. Local	106194	Milk	720 lit
	b. Crossbreed	65	Milk	1240
3	<b>Sheep</b>	274099	Meat wool Meat	
4	<b>Goat</b>	412967	Meat	—
5	<b>Bullock</b> (for draft purpose)	387554	—	—
6	<b>Pig</b>	151251	—	—
7	<b>Poultry</b>			
	a. Backyard b. Commercial	1681097	Egg - Meat	
8	<b>Others</b>	200745	—	—

Poultry and goatry are an important subsidiary occupation of the people of the district. Large part of poultry birds is of indigenous breed having low meat and egg yields. In order to improve the ordinary breed the state government have taken up the poultry department scheme. A number of poultry development centres and extension centres have been started in the district. There is vast scope for the development of poultry in the district. Rearing of goats, pigs and poultry is mostly done by the tribal community.

### III

## Analysis of on going developmental schemes carried out by different Line departments

At present a number of development schemes are operating within the district under line departments. These schemes have an extension component and also a developmental component. Under Agriculture department three schemes are operating in this district namely Integrated Rural Development Programme, Bihar Plateau Development Programme, and Watershed Programme. Likewise, under Horticulture development three schemes / programmes are under operation namely fruit production programme, Nursery development programme and Vegetable and Floriculture development programme under BPDPA.

In case of Animal Husbandry four schemes are operating in the district namely R.P. Scheme, B.D. Scheme, Post stage III C.D. Block Scheme of key village scheme.

Details about extension component and development component under each scheme are analysed with respect to the following aspects.

Which of the on going schemes are need based and hence should continue to operate in view of the real need emerging through bottom up planning process.

What type of new schemes should be initiated in the light of bottom up planning exercise being carried out in different agro-ecological situations.

Whether operational guidelines and technological content of these schemes are appropriate and likely to create the desired impact or should it be modified in the light of new approach envisaged under ATMA.

Whether present allocation of funds under extension component in the ongoing schemes is adequate to promote new technologies to a large number of families or should be increased out of the developmental component share of the scheme.

Whether concept of contributory, participatory approach could be promoted even for extension services so that the programme could reach a large number of families and also its relevance is increased.

The main purpose behind the proposed analysis is to reallocate resources from the existing schemes so that its relevance is further increased and also requirement of additional fund for extension component may be met out of existing schemes in order to make the main approach financially sustainable.

**Details about on going schemes  
implemented by different developmental departments in Dunka district**

S. No.	Name of department / organization	Name of scheme	Type of activities	
			Extension component	Development component
1.	Agriculture	<ul style="list-style-type: none"> <li>* Integrated cereal development programme</li> <li>* Bihar plateau development programme</li> <li>* Watershed programme - NWDPR</li> <li>- DPAP</li> <li>- RVP</li> </ul>	<ul style="list-style-type: none"> <li>* Extension of improved technology</li> <li>* Training and demonstration</li> <li>* Training</li>   <li>* Extension of improved Technology and training.</li> <li>* Training</li> <li>* Community organization</li>   <li>* Training</li> </ul>	<ul style="list-style-type: none"> <li>* Subsidy on seeds and agriculture equipment</li> <li>* Foundation and certified seed production</li>   <li>* 100% subsidy on soil &amp; water conservation.</li> <li>* Supply of input</li> <li>* 100% subsidy on soil &amp; water conservation</li> <li>* Supply of input --do--</li> </ul>
2.	Horticulture	<ul style="list-style-type: none"> <li>* Fruit production programme</li> <li>* Nursery development programme</li> <li>* Vegetable and floriculture development programme under BPDP</li> </ul>	<ul style="list-style-type: none"> <li>* Extension of improved technology and training and demonstration --do--</li>   <li>* Demonstration and training</li> </ul>	<ul style="list-style-type: none"> <li>* Subsidy on planting material</li>   <li>* Supply of planting materials in related scheme</li> <li>* Subsidy on planting material</li> </ul>
3.	Animal Husbandry	<ul style="list-style-type: none"> <li>* R.P. Scheme</li> <li>* B.D. Scheme</li> <li>* Post stage III CD block</li> <li>* Key village scheme</li> </ul>	<ul style="list-style-type: none"> <li>* To search out the R.P. disease</li> <li>* Treatment castration</li> <li>- do-</li> <li>* Collection of semen of A.I. work</li> </ul>	<ul style="list-style-type: none"> <li>* Subsidy</li> <li>-do-</li> <li>-do-</li> <li>-do-</li> </ul>
4.	Dairy development	<ul style="list-style-type: none"> <li>* Formation of dairy co-operative society</li> </ul>	<ul style="list-style-type: none"> <li>* Formation of society Training</li> </ul>	<ul style="list-style-type: none"> <li>* Supply of improved breed</li> </ul>



**4.1 Ownership pattern of natural resources under each agro-ecological situation :** Four agro-ecological situations were identified in Dumka district on the basis of topography and source of irrigation. One representative village was selected under each AES (vide Table 4.1)

The total cultivated area in the representative villages of four AES varied from 76.0 to 200.0 ha (vide Table – 4.2). The actual cultivated area under each AES in the respective representative villages varies from 30.0 to 120.0 ha. In AES – 3, which is the only irrigated situation among the four AES in the district, the source of irrigation is open wells only.

Hundred percent of the families in the representative village under AES-4 belong to ST Category, the majority of the families in the villages under AES-1 and AES-3 belong to ST families while the majority of the villagers under AES-2 belong to BC category (vide Table 4.3).

**4.2 Utilization pattern of natural resources :** Presently, more than 90% of gross cultivated area are used for raising agricultural crops in midland situations (i.e. under AES-1, AES-3 and AES-4, more than 8-% in AES-2, and the remaining land is put under vegetable crops. (vide Table – 4.4)

**4.3 Major farming systems under each resource situation :** The enterprises adopted by majority of the families in the representative villages under different AES are agriculture, horticulture (vegetables) animal husbandry (goats & pigs), agricultural labour and non-farm activities (table –4.6). In AES-2, a large number of families earn from fisheries. A general trend among the farmers in all the AES is seasonal migration to the adjoining areas of West Bengal to work as agricultural and casual labour.

**4.4 Trend in area and productivity of different agricultural crops :** There is a positive trend in area under paddy in each AES right from 1960, although AES-1 is having very less area (4.0 ha) under paddy (table 4.7). Horse gram is grown only in AES-1 and there has been an increase in the order of ten times in area under this crop

with respect to the year 1960 (table – 4.8). Pigeon pea is also the crop grown only in AES-1 and two areas under this crop have also been increased by about five times (table 4.12). Maize is grown in AES-1 and AES-3 and the trend in area under this crop is also positive (table 4.9). Rabi crops, namely mustard and wheat, are grown only in AES-3 and there are increasing trends in area under both the crops (table 4.10 & 4.13). Farmers have started wheat cultivation from 1980 onwards. The farmers of AES-2 grow kherua (a vegetable crop of cucurbit family) during summer season. The trend in area under the crop is also positive (table 4.11).

On an average, the trend in productivity of paddy is increasing (table 4.14) the trend in productivity of maize is increasing in AES-3, but decreasing in AES-1 (table 4.17). The productivity of horse gram and pigeon pea exhibits a relative trend (table 4.15 & 4.20). The trends in productivity of mustard, wheat and kherua are positive (table 4.16, 4.18 & 4.19).

## **4.5 Identification and analysis of major farming situations :**

**4.5.1 Farming situations of paddy:** Paddy is grown under 8 farming situations based on 2 factors namely previous crop and time of sowing (timely and late). The proportionate area (%) under different farming situations in each AES is given in table 4.21. Table 4.21 reveals that a large part of the cultivated area remains fallow during rabi season in all the AES. In rainfed situations, this can be reasoned by lack of irrigation water. But in irrigated situation, reason is under utilization of irrigation water.

**4.5.2 Improved technologies:** At present, only one generalized technological package for paddy is available which is partially specific to varieties with respect to land situations (i.e. upland medium land and low land). The details about the package are given in Appendix – 3.

**4.5.3 Gap in adoption of improved technologies:** A comparative description of gap in adoption for paddy among four AES is depicted in table 4.28. Gap with reference to variety is partial in AES-2, 3 & 4 while it is full in AES-1. Full gap is noted in all the AES with reference to seed treatment while the gap is excess with reference to seed rate in all the AES. Partial gap in time of sowing has been recorded for all the AES. The gaps with reference to N and P fertilizers are partial in all the situations, while the gap with reference to K is full in three AES except in AES-3 which exhibits

partial gap. In case of pest management, there is no gap with reference to control of gundhi bug in AES-1 & AES - 2, while the gap is partial in AES-3 and full in AES-4, no gap is recorded with reference to stem borer in AES-2 & 3, where as the same shows full gap in AES-4.

**4.5.4 Reasons for low yield / income:** Other than using less fertilizers the ten crucial reasons for low yield of paddy may be correlated to farmers preference for local varieties and low plant population due to use of wider spacing (reported in AES-30.) Farmers prefer local varieties as they require low inputs (i.e. fertilizers) and do not fail under drought condition.

**4.5.5 Farming situation of maize:** Maize is grown under 8 farming situations. The proportionate area (%) under different farming situations in each AES are given in table 4.22.

**4.5.6 Improved technologies:** The generalized package of practices for maize recommended for the agro – climate zone covering the four AES are given in Appendix-4.

**4.5.7 Gap in adoption of improved technologies:** Maize is grown in AES-1 & 3, and the gaps are shown in table 4.29. There is full gap with reference to variety and seed treatment in both the situations. The gaps with reference to time of sowing N and P fertilizers are partial in both the situations, while the gap is full in AES-1 and partial in AES-3 with reference to K fertilizer. There is full gap with reference to control of stem borer in AES-3.

**4.5.8 Reasons for low yield / income:** The main reason for low yield of maize is mostly due to preference of farmers for local variety. The underlying fact behind this is that the local Variety is harvested by middle of September and the farmers can take the advantage of Hathia rain for growing early rabi crops. Moreover the crisis period for feed of pigs (i.e. September to October) can be minimized.

**4.5.9 Farming situation of horse gram:** Horse gram is grown only in AES-1 under two farming situations. The proportionate area (%) under different farming situations is given in table 4.25.

**4.5.10 Improved technologies:** Only one type of package of practices is given in Appendix – 8

**4.5.11. Gap in adoption of improved technologies:** There are full gaps with reference to variety, seed treatment, fertilizers and pest management. The gap

with reference to seed rate is excess which, however, needs further verification.

**4.5.12. Reasons for low yield / income:** Further field visits are needed to analyze the reasons for low yield.

**4.5.13. Farming situations of pigeon pea:** Pigeon pea is grown only in AES-1 under two farming areas (%) under different farming situations given in table 4.26.

**4.5.14. Improved technologies:** Only one type of recommended package of practices is available which is given in appendix – 7.

**4.5.15. Gap in adoption of improved technologies :** There are full gaps with reference to variety seed treatment, pest management and disease management. So far as fertilizers are concerned, farmers do not apply it separately for pigeon pea as the crop is taken as inter crop with maize. The gap is excess with reference to seed rate.

**4.5.16. Reasons for low yield / income:** Further field visits are required to analyse the reasons.

**4.5.17. Farming situations of wheat:** Wheat is grown only in AES-3 under four farming situations. The proportionate area (%) under different farming situations is given in table 4.23.

**4.5.18. Improved technologies:** Two types of package of practices are available namely for timely sown and late sown as given in appendix – 5.

**4.5.19. Gap in adoption of improved technologies:** There are full gaps with reference to method of sowing, seed treatment and disease management. The gap is excess with reference to seed rate. The gaps in other times viz. Time of sowing, organic manure and fertilizers.

**4.5.20. Reasons for low yield / income:** The farmers highly prefer sonalika variety, which is now out dated. The main reason for their preference for sonalika is due to the fact that it can be easily threshed by wooden patta at home and farmers need not to depend on threshing machine.

**4.5.21. Farming situations of mustard:** Mustard is grown only in AES-3 under four farming situations. The proportionate area (%) under different farming situations is given in table 4.24.

**4.5.22. Improved technologies:** Only one type of improved package of

practice for mustard is available at present which is given in appendix – 6.

**4.5.23. Gap in adoption of improved technologies:** There are full gaps with reference to variety and seed treatment, while the gaps are partial in rest of the items.

**4.5.24. Reason for low yield / income:** Dependence of farmers on local varieties.

**4.5.25. Farming situations of kherua (cucurbits):** Kherua is grown as a popular vegetable in AES-2 under two farming situations. The proportionate area (%) under different farming situations is given in table 4.27.

**4.5.26. Improved technologies:** No package of practices for kherua is available of present . This requires research for developing suitable package of practices.

## **4.6. Animal Husbandry:**

Among various livestock animals, cow, goats, pigs, sheeps, and poultry are common in all AES in different relative proportions, while buffaloes are mostly present in AES-2 and very few in AES-1 (Vide table 4.34). The trends in population and productivity of milch animals were studied only for buffaloes and cows only, which are shown in table 4.36 and 4.37. Goats and sheep are mainly used for meat.

**Cow:** Improved technologies for management of graded breed of cow is given in appendix 9.

**Gap in adoption of improved technologies for cow:** There are full gaps with reference to tend up-gradation and health care in all the AES. In case of feed management, the gaps are partial with reference to green and dry fodder, while the gaps are full with reference to concentrate (except AES-2), minerals and vitamins (vide table 4.39)

**Reason for low yield / income :** Farmers do not follow breed upgradation and health care management. So far as feed management is concerned, they provide green and dry fodders as per their feasibility and availability of the materials. Almost all farmers cannot provide concentrates due to lack of resource.

**Buffalo :** Improved technologies for management of graded breed of buffaloes is given in appendix 10.

**Gap in adoption of improved technologies for buffaloes :** There is full gap with reference to breed upgradation (table 4.38). Incase of breed management, the

gaps are partial with reference to green and dry fodder and full with reference to minerals and vitamins. The gap is full with reference to concentrates in AES-1 and partial in AES-2. So far as health care is concerned, there is no gap with reference to HSBQ and FMD, while the gaps are full with reference to rinder pest and worms.

**Reasons for low yield / income :** The gaps in breed management are mostly due to lack of awareness and socio-economic factors.

**Goats :** Improved technologies for management of graded breed of goat is given in appendix-11

**Gap in adoption of improved technologies :** In all the AES, there are full gaps with reference to management practices for goat as the farmers follow traditional methods as permissible under their socio-economic conditions (table – 4.40)

**Sheep :** Improved technologies for management of graded breed of sheep is given in appendix-12

**Gap in adoption improved technologies :** There are full gaps with reference to each management practice for sheep as in the case of goat (table 4.42)

**Pigs and poultry :** Information on improved package of practices are needed. However, in both the cases, farmers follow traditional management methods.

Table-4.1 :  
List of representative villages under each agro-ecological  
situation in Danka district

S.No	Name of agro-ecological situation	Name of representative Village(s)	Block
1	Upland rainfed	Mandaldih	Jarmundi
2	Midland rainfed	Mohanpur	Nala
3	Midland irrigated	Dakri	Dumka
4	Low land rainfed	Madhuban	Saryahat

Table - 4.2 :  
Net cultivated area under irrigated and rainfed condition  
in representative villages of different AES in Dumka

S.No	Type of land	District			
		Cultivated area (ha) in representative village of each AES			
		AES-1	AES-2	AES-3	AES-4
1	Upland				
	- Rainfed	61.0	30.0	16.0	30.0
	- Irrigated	-	-	-	-
2	Midland				
	- Rainfed	18.0	120.0	20.0	28.0
	- Irrigated	-	20.0	30.0	-
3	Lowland				
	- Rainfed	34.0	30.0	10.0	46.0
	- Irrigated	-	-	-	-
	Total area (ha)	113.0	200.0	76.0	104.0

TABLE - 4.3 :  
Proportion of families belonging to different communities in representative  
villages of each AES in Dumka District

S.No	Type of Community	Proportion (%) of families in representative village of each AES			
		AES-1	AES-2	AES -3	AES-4
1	SC	-	6.0	1.5	-
2	ST	68.4	25.6	98.6	100.0
3	BC	28.9	68.4	-	-
4	OC	2.7	-	-	-
	Total	100.0	100.0	100.0	100.0
	Actual families (No.)	76.0	117.0	67.0	114.0

Table - 4.4 :  
Proportionate area under different types of land use in  
each AES of Dumka

S.No.	Type of land use	Proportion (%) of gross cropped area in representative village of each AES			
		AES- 1	AES-2	AES -3	AES-4
		1	Agricultural crops	95.7	83.0
2	Horticultural crops (vegetables)	5.3*	17.0	4.0	7.0
4	Sericulture	-	-	-	-
	Total	100.0	100.0	100.0	100.0
	Actual gross cultivated area (ha)	67.0	145.0	68.0	58.5

TABLE - 4. 5 : Number of families associated with different enterprises in representative villages of each AES in Dumka District

S.No.	Enterprises	Number of a families associated with different enterprises in representative village of each AES			
		AES- 1	AES-2	AES -3	AES-4
		A	Agriculture	76	116
B	Horticulture				
	-Fruits	2	5	-	-
	-Vegetable	1	25	60	-
C	Animal Husbandry				
	-Buffalo	10	-	-	-
	-Cow	50	87	64	29
	-Goat	76	70	24	15
	-Sheep	7	60	10	2
	-Pig	22	5	19	5
	-Poultry	56	35	65	6
	-Duckery	-	50	-	1
	-Pigeon	-	30	-	-
D	Agriculture labour	15	35	63	110
E	Fisheries	3	115	3	-
F	Tapping of Tadi	15	5	5	-
G	Non-farm activities				
	-Regular service	4	2	1	2
	-Casual worker in urban area / daily wage	-	20	63	110
	-Transport by / bullock	-	10	2	-
	-Basket making / Mat making	-	10	25	-
	-Rope making	-	-	30	-
	-Wood carving	1	-	-	1



Table - 4. 6 :

**Existing farming system in representative villages  
of each AES in Dumka District**

S.No.	Enterprises	Contribution of different enterprises towards annual income of the family in representative village of each AES									
		AES-1		AES-2		AES-3		AES-4			
		RS-1	RS-2	RS-1	RS-2	RS-1	RS-2	RS-1	RS-2		
A	Agriculture	P	P	P	S	P	S	P	P	P	P
B	Horticulture										
	-Fruits										
	-Vegetable	-	-	-	-	T	Q	S	S	-	-
C	Animal	S	S	S	T	S	P	-	Q	-	-
	Husbandry										
	-Buffalo										
	-Cow										
	-Goat										
	-Sheep										
	-Pig										
D	Fisheries	-	-	Q	-	-	-	-	-	-	-
E	Agriculture	T	T	T	P	-	-	-	-	-	-
	labour										
F	Non-farm	-	-	-	-	-	T	T	T	S	S
	activities										
	-Regular service										
	-Casual worker										
	in urban area /										
	daily wage										
	-Transport by										
	tractor / bullock										
	-Tailoring										

P= Primary, S= Secondary, T= Tertiary, Q= Quarterly, RS-1: Resource situation -1  
 RS-2: Resource situation -2. RS-1: Marginal & small farmers with bullock  
 RS-2 : Marginal & small farmers without bullock

Table - 4. 7 :

Trend in area of paddy in representative village of each

		AES in Dumka District			
S.No.	Year	Trend in area (ha) in each representative village			
		AES - 1	AES- 2	AES -3	AES - 4
1	1998	4.0	120.0	62.0	46.0
2	1990	2.0	110.0	59.0	36.0
3	1980	-	100.0	56.0	35.0
4	1970	-	95.0	53.0	32.0
5	1960	-	75.0	50.0	30.0

Table- 4.8 :

		Trend in area of horse gram in representative village of each AES in Dumka District			
S.No	Year	Trend in area (ha) in each representative village			
		AES - 1	AES- 2	AES -3	AES - 4
1	1998	31.0	-	-	-
2	1990	16.0	-	-	-
3	1980	7.0	-	-	-
4	1970	5.0	-	-	-
5	1960	3.0	-	-	-

Table -4.9 :

		Trend in area of maize in representative village of each AES in Dumka District			
S.No.	Year	Trend in area (ha) in each representative village			
		AES - 1	AES- 2	AES -3	AES - 4
1	1998	16.0	-	12.0	-
2	1990	12.0	-	11.0	-
3	1980	7.0	-	10.0	-

4	1970	4.0	-	9.0	-
5	1960	2.0	-	8.0	-

Table - 4.10 : Trend in area of mustard in representative village of each AES in Dumka District					
S.No	Year	Trend in area (ha) in each representative village			
		AES - 1	AES- 2	AES -3	AES - 4
1	1998	-	-	6.0	-
2	1990	-	-	5.0	-
3	1980	-	-	6.0	-
4	1970	-	-	3.0	-
5	1960	-	-	3.0	-

Table - 4.11 : Trend in area of Kherua (cucurbits) in representative village of each AES in Dumka District					
S.No	Year	Trend in area (ha) in each representative village			
		AES - 1	AES- 2	AES -3	AES - 4
1	1998	-	25.0	-	-
2	1990	-	22.0	-	-
3	1980	-	20.0	-	-
4	1970	-	18.0	-	-
5	1960	-	15.0	-	-

Table - 4.12 : Trend in area of pigeon pea in representative village of each AES in Dumka District					
S.No.	Year	Trend in area (ha) in each representative village			
		AES - 1	AES - 2	AES -3	AES - 4
1	1998	8.0	-	-	-

2 1990 6.0 - - -  
 3 1980 4.0 - - -

4	1970	2.5	-	-	-
5	1960	1.5	-	-	-
<b>Table - 4. 13 : Trend in area of wheat</b>					
<b>in representative village of each AES in Dumka District</b>					
S.No	Year	Trend in area (ha) in each representative village			
		AES - 1	AES- 2	AES -3	AES - 4

1 1998 - - 12.0 -  
 2 1990 - - 10.0 -

3	1980	-	-	1.0	-
4	1970	-	-	-	-
5	1960	-	-	-	-

<b>Table - 4.14 : Trend in productivity of paddy</b>					
<b>in representative villages of each AES in Dumka District</b>					
S.No	Year	Trend in productivity (Q/ha) in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4

1 1998 12.0 25.0 15.0 25.0  
 2 1990 12.0 18.0 12.0 20.0

3	1980	-	13.0	10.0	11.0
4	1970	-	10.0	8.0	9.0
5	1960	-	9.0	6.0	7.0

<b>Table - 4.15 : Trend in productivity of horse gram</b>					
<b>in representative villages of each AES in Dumka District</b>					
S.No	Year	Trend in productivity (Q/ha) in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4

1 1998 3.0 - - -  
 2 1990 3.0 - - -

3	1980	4.0	-	-	-
4	1970	6.0	-	-	-
5	1960	8.0	-	-	-

<b>Table - 4.16 : Trend in productivity of mustard</b>					
<b>in representative villages of each AES in Dumka District</b>					
S.No	Year	Trend in productivity (Q/ha) in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4

1	1998	-	-	4.0	-
2	1990	-	-	3.0	-
3	1980	-	-	3.0	-
4	1970	-	-	2.5	-
5	1960	-	-	2.0	-
<b>Table - 4.17 : Trend in productivity of maize in representative villages of each AES in Dumka District</b>					
S.No	Year	Trend in productivity (Q/ha) in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4
1	1998	5.5	-	10.0	-
2	1990	6.0	-	9.0	-
3	1980	6.5	-	9.0	-
4	1970	7.5	-	8.0	-
5	1960	9.0	-	7.0	-
<b>Table - 4.18 : Trend in productivity of kharua in representative villages of each AES in Dumka District</b>					
S.No	Year	Trend in productivity (Q/ha) in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4
1	1997	-	200.0	-	-
2	1990	-	200.0	-	-
3	1980	-	195.0	-	-
4	1970	-	190.0	-	-
5	1960	-	180.0	-	-
<b>Table - 4.19 : Trend in productivity of wheat in representative villages of each AES in Dumka District</b>					
S.No	Year	Trend in productivity (Q/ha) in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4
1	1997	-	-	15.0	-
2	1990	-	-	12.0	-
3	1980	-	-	5.0	-
4	1970	-	-	-	-
5	1960	-	-	-	-
<b>Table - 4.20 : Trend in productivity of pigeon pea in representative villages of each AES in Dumka District</b>					
S.No	Year	Trend in productivity (Q/ha) in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4

1	1997	3.0	-	-	-
2	1990	4.0	-	-	-
3	1980	5.0	-	-	-

4	1970	7.0	-	-	-
5	1960	7.0	-	-	-

Table - 4.21 : Proportionate Area under different farming situations of paddy in each AES of Dumka District

S.No.	Farming situations of paddy in representative village of each AES	Proportion (%) of area under different farming situations of paddy with previous crop			
		AES-1	AES-2	AES-3	AES-4
1	Fallow				
	-Timely	70.0	60.0	20.0	80.0
2	-Late	30.0	20.0	50.0	20.0
	Wheat				
3	-Timely	-	-	15.0	-
	-Late	-	-	5.0	-
4	Mustard				
	-Timely	-	-	8.0	-
4	-Late	-	-	2.0	-
	Vegetables				
	-Timely	-	12.0	-	-
	-Late	-	8.0	-	-
	Total (%)	100.0	100.0	100.0	100.0
	Actual Area (ha)	4.0	140.0	38.0	46.0

Table - 4.22 : Proportionate Area under different farming situations of maize in each AES of Dumka District

S.No.	Farming situations of maize with previous crop	Proportion (%) of area under different farming situations of maize in representative village of each AES			
		AES-1	AES-2	AES-3	AES-4
1	Wheat				
	-Timely	-	-	30.0	-
2	-Late	-	-	20.0	-
	Mustard				
3	-Timely	-	-	20.0	-
	-Late	-	-	5.0	-
4	Vegetables				
	-Timely	-	-	18.0	-
	-Late	-	-	7.0	-
	Fallow				

-Timely	60.0	-	-	-
-Late	40.0	-	-	-

	Total (%)	100.0	-	100.0	-
	Actual Area (ha)	16.0	-	12.00	-
Table - 4.23 : Proportionate Area under different farming situations of wheat in each AES of Dumka District					
S.No.	Farming situations of wheat with previous crop	Proportion (%) of area under different farming situations of wheat in representative village of each AES			
		AES-1	AES-2	AES-3	AES-4
1	Paddy				
	-Timely	-	-	33.0	-
	-Late	-	-	15.0	-

2	Maize				
	-Timely	-	-	40.0	-
	-Late	-	-	10.0	-

	Total (%)	-	-	93.0	-
	Actual Area (ha)	-	-	12.0	-
Table - 4.24 : Proportionate Area under different farming situations of mustard in each AES of Dumka District					
S.No.	Farming situations of mustard with previous crop	Proportion (%) of area under different farming situations of mustard in representative village of each AES			
		AES-1	AES-2	AES-3	AES-4
1	Paddy				
	-Timely	-	-	40.0	-
	-Late	-	-	10.0	-

2	Maize				
	-Timely	-	-	45.0	-

	-Late	-	-	50.0	-
	Total (%)	-	-	100.0	-
	Actual Area (ha)	-	-	6.00	-
Table - 4.25 : Proportionate Area under different farming situations of horse gram in each AES of Dumka District					
S.No.	Farming situations of horse gram with previous crop	Proportion (%) of area under different farming situations of horse gram in representative village of each AES			
		AES-1	AES-2	AES-3	AES-4

1	Fallow				
	-Timely	70.0	-	-	-
	-Late	30.0	-	-	-

	Total (%)	100.0	-	-	-
	Actual Area (ha)	31.0	-	-	-
<p>Table - 4.26 : Proportionate Area under different farming situations of pigeon pea in each AES of Dumka District</p>					
pea	Farming situations	Proportion (%) of area under different			
	S.No. of pigeon pea with previous crop	farming situations of pigeon in representative village of each AES			
		AES-1	AES-2	AES-3	AES-4

1	Fallow				
	-Timely	60.0	-	-	-
	-Late	40.0	-	-	-

	Total (%)	100.0	-	-	-
	Actual Area (ha)	8.0	-	-	-
<p>Table - 4.27 : Proportionate Area under different farming situations of kherua (cucurbits) in each AES of Dumka District</p>					
S.No.	Farming situations	Proportion (%) of area under different			
	of kherua with previous crop	farming situations of kherua in representative village Of each AES			
		AES-1	AES-2	AES-3	AES-4

1	Fallow
---	--------



-Timely - 95.0 - -

	-Late	-	5.0	-	-
	Total (%)	-	100.0	-	-

	Actual Area (ha)	-	25.0	-	-
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Table - 4.28 : Gap in adoption of improved technology for Paddy in representative villages of each AES of Dumka District

S.No	Item	Gap in adoption (F/P/-) of improved technology in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4
1	Variety	F	P	P	P
2	Seed treatment	F	F	F	F
3	Seed rate	E	E	E	E
4	Time of sowing	P	P	P	P
5	Organic manure	F	P	P	P
6	Fertilizer				
	- Basal N	P	P	P	P
		P	P	P	P
		F	F	P	F
	- Top dress N	P	P	P	P
7	Micro nutrient (ZnSO4)	*	*	*	*
8	Pest management				

	- BPH				
	-Gundhi bug	N	N	P	F
	-Stem borer	-	N	N	F
	-Case worm	**	**	P	F

9 Disease management  
 - Blast - - - -  
 F = Full, P = Partial, (-) = Nil E = Excess  
 \*There is no recommendation at Znso4 in Dumka district \*\* Not reported

TABLE - 4. 29 : Gap in adoption of improved technology for maize in representative villages of each AES of Dumka District

S.No	Item	Gap in adoption (F/P/-) of improved technology in representative village of each AES			
		AES - 1	AES- 2	AES -3	AES - 4
1	Variety	F		F	
2	Seed rate	N		P	
3	Time of sowing	P		P	
4	Seed treatment	F		F	
5	Organic manure	P		P	
6	Fertilizer				
	- Basal N	P		P	
		P		P	

S.No	Item	K	F	P	P	P
7	Micro nutrient (Magnesium Sulphate)	N	P	*	-	*
8	Pest management - Stem borer		**	-	F	-
9	Disease management - Stem rot		-	-	-	-
F=Full, P=Partial, (-)=Nil E=Excess * Not recommended for Dumka district ** Not reported and needs further verification						
TABLE - 4.30 : Gap in adoption of improved technology for horse gram in representative villages of each AES of Dumka District						
Gap in adoption (F/P/-) of improved technology in representative village of each AES						
		AES - 1	AES- 2	AES -3	AES - 4	
1	Variety	F	-	-	-	
2	Seed treatment	F	-	-	-	
3	Seed rate	E	-	-	-	
4	Time of sowing	P	-	-	-	

5	Organic manure		-	-	-	-
6	Fertilizer - Basal	N	F	-	-	-
		P	F	-	-	-
7	Micro nutrient (ZnSO4)	K	F	-	-	-
		N	-	-	-	-
8	Pest management - Hairy caterpillar		F	-	-	-
9	Disease management - Blight		-	-	-	-
F = Full, P = Partial, (-) = Nil E= Excess						
TABLE - 4. 31 : Gap in adoption of improved technology for pigeon pea in representative villages of each AES of Dumka District						
Gap in adoption (F/P/-) of improved technology in representative village of each AES						
		AES - 1	AES- 2	AES -3	AES - 4	
1	Variety	F				
2	Seed treatment	F				
3	Seed rate	E				
4	Time of sowing	P				
5	Organic manure		-	-	-	-
6	Fertilizer					



5	Organic manure		P		
6	Fertilizer				
	- Basal	N	P		
		P	P		
		K	P		
7	- Top dress	N	P		
	Micro nutrient		*		
8	Pest management				
	- Mustard aphid		P		
9	Disease management				
		-			

F= Full P = Partial (-) = Nil E= Excess Kherua (cucurbits) is grown in 20% area under midland rainfed situation for which recommended practices are not available \*Not recommended for Dumka district

Table - 4.34 : Livestock population in representative villages of different AES in Dumka District

S.No.	Type of livestock	No. of animals in representative village of each AES			
		AES-1	AES-2	AES-3	AES-4
1	Buffaloes	4	50	-	-
2	Cows	50	307	64	29
3	Goats	137	300	90	15
4	Sheep	40	200	97	8
5	Pigs	150	10	50	30
6	Poultry	200	200	250	30
7	Duck	-	500	-	-
8	Pigeon	-	1000	-	-

Table - 4.35: Trend about number of buffaloes in representative villages of each AES in Dumka District

S.No	Year	No. of buffaloes in representative village of each AES			
		AES- 1	AES - 2	AES -3	AES - 4
1	1997	5	50	-	-
2	1990	8	75	-	-
3	1980	10	100	-	-
4	1970	15	150	-	-
5	1960	22	200	-	-

Table - 4.36 : Trend about number of cows in representative villages of each AES in Dumka District

S.No AES	Year	No. of cows in representative village of each			
		AES- 1	AES - 2	AES -3	AES - 4
1	1997	50	307	64	29
2	1990	65	300	70	20
3	1980	70	340	120	60
4	1970	80	375	130	100

TABLE - 4.37 : Existing productivity of milch animals in representative villages of each AES in Dumka District

S.No	Milch animal	Average productivity of milk (lit/day) in representative village of each AES			
		AES- 1	AES - 2	AES -3	AES - 4
A	Buffaloes				
	- Graded	-	-	-	-
	- Local	4.0	4.0	-	-
B	Cows				
	- Cross breed	-	5.0	-	-
	- Local	1.5	1.0	1.0	1.0

Table - 4.38 : Gap in adoption of improved technology for buffaloes in representative village of each AES of Dumka District

S.No	Item	Gap in adoption (F/P/-) of improved technology in representative village of each AES			
		AES 1	AES 2	AES 3	AES 4

**1 Breed upgradation**

-Artificial insemination                      F                      F                      -                      -

**2 Feed Management**

-Green fodder                      P                      P                      -                      -

	-Dry fodder	P	P	-	-
	-Concentrate	F	P	-	-
	-Mineral	F	F	-	-
	-Vitamin	F	F	-	-
<b>3</b>	<b>Health care</b>				
	-HSBQ	N	N	-	-
	-FMD	N	N	-	-
	-Rinder pest	F	F	-	-
	-Worms	F	F	-	-

F = Full P = Partial (-) Nil E= Excess

Table - 4.39 : Gap in adoption of improved technology for cow in representative village of each AES of Dumka District

S.No	Item	Gap in adoption (F/P/-) of improved technology in representative village of each AES			
		AES 1	AES 2	AES 3	AES 4

<b>1</b>	<b>Breed upgradation</b>				
	-Artificial insemination	F	F	F	F
<b>2</b>	<b>Feed Management</b>				
	-Green fodder	P	P	P	P
	-Dry fodder	P	P	P	P
	-Concentrate	F	P	F	F
	-Mineral	F	F	F	F
<b>3</b>	<b>Health care</b>				
	-Vitamin	F	F	F	F
	-HSBQ	F	F	F	F
	-FMD	F	F	F	F
	-Rinder pest	F	F	F	F
	-Worms	F	F	F	F
F = Full P = Partial (-) Nil E = Excess					
Table - 4.40 : Gap in adoption of improved technology for goat in representative village of each AES of Dumka District					
S.No	Item	Gap in adoption (F/P/-) of improved technology in representative village of each AES			

AES 1      AES 2      AES 3      AES 4

<b>1</b>	<b>Breed upgradation</b>				
	-Artificial insemination	F	F	F	F
<b>2</b>	<b>Feed Management</b>				
	-Green fodder	F	F	F	F
	-Dry fodder	F	F	F	F
	-Concentrate	F	F	F	F
	-Mineral	F	F	F	F
	-Vitamin	F	F	F	F
<b>3</b>	<b>Health care</b>				
	-HSBQ	F	F	F	F
	-FMD	F	F	F	F
	-Rinder pest	F	F	F	F
	-Worms	F	F	F	F
<b>4</b>	<b>General management</b>	*	*	*	*
F = Full P = Partial (-) Nil E = Excess * Left for open grazing					
Table - 4.41 : Gap in adoption of improved technology for pig in representative village of each AES of Dumka District					
S.No	Item	Gap in adoption (F/P/-) of improved technology in representative village of each AES			

AES 1      AES 2      AES 3      AES 4

1	<b>Breed upgradation</b>				
	-Artificial insemination	F			
2	<b>Feed Management</b>				
	-Green fodder	F	**	**	**
	-Dry fodder	F			
	-Concentrate	F			
	-Mineral	F			
	-Vitamin	F			
3	<b>Health care</b>				
	-HSBQ				
4	-FMD -Rinder pest -Worms General management	*			
<p>F = Full P = Partial (-) Nil E= Excess *Open grazing **Information required</p> <p>Table - 4.42 : Gap in adoption of improved technology for sheep in representative village of each AES of Dumka District</p>					
S.No	Item	Gap in adoption (F/P/-) of improved technology in representative village of each AES			
		AES 1	AES 2	AES 3	AES 4
1	<b>Breed upgradation</b>				
	-Artificial insemination	F	F		
2	<b>Feed Management</b>				
	-Green fodder	**	F	F	**
	-Dry fodder	F	F		
	-Concentrate	F	F		
	-Mineral	F	F		
	-Vitamin	F	F		
3	<b>Health care</b>				
	-HSBQ	F	F		

S.No.	Issues, problems, opportunities and threats		Degree of relevance for different agro-ecological situations (H/P/N)			
			AES 1	AES 2	AES 3	AES 4
	-FMD	F	F			
	-Rinder pest	F	F			
4	-Worms	F	F			
	General management	*	*			
	F = Full P = Partial (-) Nil E= Excess * Open grazing ** Information required					
<b>A.</b>	<b>Management of natural resources</b>					
1	Large area remains fallow during rabi season		H	H	P	H
2	Soil erosion		H	P	P	N
3	Poor soil fertility and low WHC		H	H	H	P
4	Under utilization of irrigation sources		N	N	H	N
5	Utilization of residual moisture by introducing short duration rabi crop		N	N	N	P
6	Small and scattered land holdings		H	H	H	H
<b>B.</b>	<b>Management of Agriculture crops</b>					
1	Farmers' preference for local varieties in most of the agricultural crops		H	H	H	H
2	Major technological gaps in crop management practices		H	H	P	H
3	Non availability of quality seeds		H	H	H	H



4	Lack of marketing facilities for the marketable surplus	H	H	H	H
5	Introduction of new short duration varieties of paddy & maize	H	H	H	H
<b>C</b>	<b>Management of Horticultural crops</b>				
1	Very less area under vegetable cultivation, even in the irrigated situation	H	H	H	N
2	Non-availability of quality seeds and planting materials	H	H	H	H
3	Lack of storage and marketing facilities	H	H	H	H
4	Intervention by middleman	H	H	H	H
5	No existence of organized orchards of mango, guava, jackfruit, custard apples, ber, bael, citrus, etc.	H	P	P	N
6	Grazing by stray cattle	H	H	H	H
S.No.	Issues, problems, opportunities and threats	Degree of relevance for different agro-ecological situations (H/P/N)			
		AES 1	AES 2	AES 3	AES 4
<b>D</b>	<b>Management of Animal Husbandry</b>				
1	Use of local breeds of cow, buffalo, goats, pigs, poultry chicks, etc	H	H	H	H
2	Significant gaps in feed management and health care	H	H	H	H
3	Do not get good market price due to middlemen	H	H	H	H
4	Lack of chilling plant and collection centres for milk	H	H	N	N
<b>E</b>	<b>Management of Fisheries</b>				
1	Non availability of good quality of fingerlings	N	H	N	N
2	Follow traditional methods	N	H	N	N
3	Lack of marketing facility	N	H	N	N
<b>F</b>	<b>Management of Socio-economic factors</b>				
1	Seasonal migration of labourers	H	H	H	H
2	Lack of farmers' organizations i.e. FIG / SHG, etc	H	H	H	H

# VI

## Proposed extension strategy under each agro ecological situation in Danka district

3	Lack of basic education particularly among the tribal community				
4	Tribal farmers are used to easy going life and they forget everything for the sake of social festivals				
5	The tribal farmers do not make any effort for full utilization of their own resources				
6	Drinking of liquor is one of the main causes for the lack of socio-economic advancement of the tribal community				
H = High, P = Partial, N= No					
Relevance for different agro extension strategy		S.No. ecological situations (Y/-)		Proposed	
		AES 1	AES 2	AES 3	AES 4
<b>A</b>	<b>Natural Resource</b>				
1	Adoption of conservation measures e.g..Bunding across ploughing, bunding of fields, growing cover and catch crop, construction of check dams, full control measures with minimum vegetative support	Y	Y	Y	-
2	(a) Formation of WHS (water harvesting structure) / tank	Y	Y	Y	-
	(b) Intensification of “Jal and Jahan” scheme through digging the cluster of wells following the deep well techniques	Y	Y	Y	Y(P)
	(c) Utilization of natural perennial streams / tanks by lifting the water manually / small pump for meeting				

3	the water straus and irrigation	Y	Y	Y	Y
	(a) Mixing of manure, compost (b) Green manuring by growing dhincha,	Y	Y	Y	Y
4	sun hemp etc, and organic farming system	Y	Y	Y	Y
	(c) Cultivation of leguminous crops for fixing the environmental nitrogen etc.	Y	Y	Y	-
	(d) Practice of blue green algae, rhizobium culture / bio fertilizer etc.	Y	Y	Y	Y
	(e) Follow up of balance fertilizer and micro nutrient	Y	Y	Y	Y
	(f) Inter cropping of companion crops	Y	Y	Y	-
	(a) Practice of mechanical / manual intercultural operations, use of organic waste mulching (b) Poly bag / drip / pitcher / sprinkler irrigation system to be followed	Y	Y	Y	-
S.No.	Proposed extension strategy	Relevance for different agro-ecological situations (Y/-)			
		AES 1	AES 2	AES 3	AES 4
5	(c) Growing of short duration dry land crops, following the technique and operation	Y	Y	Y	-
	Follow up of intensive cultivation practices / agro-forestry / heavy organic composting / mechanical operations and vegetation	Y	Y	Y	-
6	Community farming system approach / co-operative farmer interest group	Y	Y	Y	Y
7	(a) Awakening of the forest uses among the population / FIG	Y	Y	Y	Y
	(b) Waste land afforestation				
	(c) Promotion of agro-forestry systems				
<b>B</b>	<b>Agricultural crops</b>				
1	Following the sequential / mixed farming system of crops mixed and different mixed enterprises	Y	Y	Y	Y
2	Education / awareness with suitable technological and managerial practice	Y	Y	Y	Y
3	Imparting the knowledge of controlling the insect pest of different crops through mechanical, chemical and integrated pest disease management through training and demonstration	Y	Y	Y	Y

4	(a) Demonstration of crop, fertilization following the balanced doses of fertilizer and motivation of potassium fertilizer application	Y	Y	Y	Y
5	(b) Visit of the farmers groups in respective season to successful stories area / field farmers / ZRS	Y	Y	Y	Y
	(a) Extension / intensive cropping following the recommended technology, varieties and management practices	Y	Y	Y	Y
	(b) Weed control through mechanical and chemical methods	Y	Y	Y	Y
	(c) Summer tillage / inter-culture operations	-	Y	Y	Y
	(d) Life saving minimum irrigation	-	Y	Y	Y
	(e) Use of bio fertilizer / rhizobium culture	Y	Y	Y	-
S.No.	Proposed extension strategy	Relevance for different agro-ecological situations (Y/-)			
		AES 1	AES 2	AES 3	AES 4
6	(f) Green manuring	Y	Y	Y	Y
	(a) Quality seeds of SAU's recommended varieties	Y	Y	Y	Y
	(b) Processed seed utilization	Y	Y	Y	Y
7	(a) Weed problem to be controlled by inter-cultural / mechanical / manual / chemical methods	Y	Y	Y	Y
	(b) Farmers uproot the weeds of sides and around the area before flowering and its seeds dispersal and no use of admixtured seeds	Y	Y	Y	Y
8	(c) Summer ploughing and burning				
	(a) Popularization and demonstration of SAU varieties	Y	Y	Y	Y
	(b) Research on IPM in SAU's level	Y	Y	Y	Y
9	(a) Area needs storage infrastructures with modern facilities	Y	Y	Y	Y
	(b) Linkage with co-operative / government market agencies	Y	Y	Y	Y
<b>C</b>	<b>Horticultural crops</b>				
1	Maximum acreage of upland / mid land be utilized for organized suitable orchard crops e.g. mango, guava,				

2	jack fruit, custard apple, amla, ber, chirranjee etc. Extensive and intensive cropping of different vegetables e.g brinjal, tomato,	Y	Y	Y	Y
3	cole crops tuber crops, potato, etc Floriculture scope marigold gladioli tuberose and roses, etc.	Y	Y	Y	Y
4	Storage / cold storage infrastructure may be developed through DRDA / social organization / NGO / banks / central government / state government etc.	Y	Y	Y	Y
5	Formation of SHG / FIG and other community organization	Y	Y	Y	Y
6	Training / demonstration of bee culture, sericulture, mushroom culture for allied benefits through ZRS, government agencies NGO	Y	Y	Y	Y
S.No.	Proposed extension strategy	Relevance for different agro-ecological situations (Y/-)			
		AES 1	AES 2	AES 3	AES 4
7	Demonstration of drip and sprinkler / pitcher irrigation system through ZRS and other institutions	Y	Y	Y	-
8	Demonstration of training of plant protection techniques	Y	Y	Y	Y
9	(a) Community education of users due to stray cattle grazing (b) Community trenching of the field (c) Vegetative fencing / mud wall fencing	Y	Y	Y	Y
<b>D</b>	<b>Livestock</b>	Y	Y	Y	-
1	(a) Improvement of local breeds by using artificial insemination / natural service through improved bulls / breeds (b) Rearing of recommended / developed goat, pigs, poultry breeds	Y	Y	Y	Y
2	Education / demonstration / training of health care techniques	Y	Y	Y	Y
3	Demonstration of growing green fodder and forage crops	Y	Y	Y	Y
4	Balance feeding demonstration	Y	Y	Y	Y

5	Development of village pastoral land proportionately	Y	Y	Y	Y
6	Strengthening of AI centers in the village	Y	Y	Y	Y
7	Marketing network with chilling and storage plant	Y	Y	Y	Y
8	(a) Group discussion for awakening and knowledge	Y	Y	Y	Y
	(b) Visit of government managed fish pond	Y	Y	Y	Y
	(c) Need of technological demonstrations for disease and pest control	Y	Y	Y	Y
<b>E</b>	<b>Farming system</b>				
1	Creation of extensive / intensive agriculture to support the live stock in goatery, piggery, poultry etc.	Y	Y	Y	Y
S.No.	Proposed extension strategy	Relevance for different agro-ecological situations (Y/-)			
		AES 1	AES 2	AES 3	AES 4
2	Visit of multiple cropped areas	Y	Y	Y	Y
3	Intensive farming of remunerative enterprises like vegetables flowers, improved breeds etc.	Y	Y	Y	Y
4	Research of agro ecological situation based farming system				
5	Keeping up high powered draught animal (bullock) / mechanical through bank	Y	Y	Y	
<b>F</b>	<b>Social constraints</b>				
1	Educational importance through discussion, group meeting through their own peoples / government effective education system	Y	Y	Y	Y
2	Menace of stray cattle grazing be				

	broken through education	Y	Y	Y	Y
3	Community education about the habit of drinking liquor / handia (rice beer)	Y	Y	Y	Y
4	Education for utilization of their resources and skills for their own production and development	Y	Y	Y	Y
5	Education of co-operative and constructive views through farmers groups / SHG / FIG / co-operative etc.	Y	Y	Y	Y

### **7.1 Synthesis of technological package for farming situation of each commodity.**

The district Dumka features three types of land situations i.e. upland, medium land and low land. The cultivation of these lands is under two conditions i.e 90% rainfed and 10% under irrigated condition through the natural water resources and wells. The region is predominantly mono-cropped area. The growing of second crop is under infancy stage in very limited pockets of the geographical area. The cultivation of commodity / enterprises are solely dependent upon the traditional innovative ideas and techniques either evolved by the farmers or followed by the community in the area.

Agro-ecological situation based technology is totally lacking for almost all crops / commodity. But the technology available for the necessary problems / limiting factor

needs testing in the following manner:

- Adaptive trails on the farmers field in each AES
- Refinement of the technology for its suitability to the problem
- Innovative technologies testing at ZRS and thereafter in each AES according to the need
- The location specific problems of each commodity / enterprises will be addressed for research followed by adaptive trials of each AES.

### **7.2. Farmer participatory on farm research :**

As the farmers of the Dumka district are mostly small and marginal with low literacy and social hindrances, this aspect is to be taken up for very small bottleneck problems of different commodity / enterprises of the agro-ecological situation in the farming system. The problems general in nature requiring community operation will be taken into account :

- Identification of specific problems affecting the productivity and income of the farmers – IPM/INM types
- Identification of available technological options from public / private sector
- Preference ranking of technology by farmers after adaptive trial
- Reputation of adaptive trials with suitable modifications in available technology
- Diversification of farming system for market demand and immediate local consumption specific needs

### **7.3 Contractual research – ZRS / private :**

Under all AES, the specific problem will be identified and its solution will be obtained through contract research under stipulated short time.

- Management of paddy false smut



– Technology for store grain pests

	Non pesticidal vegetable cultivation				
	Introduction of new remunerative crop				
	Study on utilization of small fragment of land				
	Intensification of cropping in small holdings				
	Micro-nutrient research in agriculture and horticultural crops				
	Animal husbandry, livestock, goatery & poultry disease and physiological problems				
	Frozen Semen research for storage and technique				
	<b>Agro-Ecological Situations</b>				
S.No	Commodity/ enterprises	Upland rainfed  1	Mid land rainfed  2	Mid land irrigated  3	Low land rainfed  4
<b>A</b>	<b>Agricultural crops</b>				
	1.Paddy problem	a)Short duration variety  b) Disease pest resistant variety  c) Draught resistant variety	a)Short duration variety  b)Less nutrient requirement variety  c)Draught/stress resistant/ tolerance	a)Short duration variety	a) Short duration variety  b)Draught resistant followed with disease resistant  c) Long duration soil remains water logged till January
	Research	(a) Adaptive trial on farmers field of available variety ie. Birsa 101	(a) Adaptive trial on farmers field of Birsa 102	(a)Testing of Birsa 202 and other varieties.	(a)Development of technology for draught to balance and variety

		(b) Screening of available varieties at ZRS for the short duration disease pest and draught resistance	(b)Screening of low input required varieties and development	screening	(b) Testing of long duration HYL
S.No	Commodity / enterprises	Upland rainfed 1	Mid land rainfed 2	Mid land irrigated 3	Low land rainfed 4
2	Maize (problem)	a) Low yielding(a) traditional varieties	Same as up land situation	(a)Same as up land situation	(a)Rabi maize introduction
		b)High infestation of stem borer and cob caterpillar c) Stem rot d) Stress and draught susceptibility depending on natural rains e)Loss of grains availability due to store grain pest and storage facility			
	Research	a) Introduction of SUWAN-1 variety and screening of HYV varieties to face the drought and insect pest	(a) -do-	(a) -do-	(a) -do-

		disease problem			
		b) Search for	(b) Birsa maize-1		
		second rabi crops	& ecology		
		technology and varieties in all AES	management of maize stem borer & cob borer		
3	Pigeon pea problem	(a) Use of long duration traditional variety	Adaptive trial on ecological & management of pigeon pea food borer		
		(b) Infestation of pod borer causing economic losses			
		(c) Arhar mosaic			
S.No.	Commodity/enterprises	Upland rainfed	Mid land rainfed	Mid land irrigated	Low land rainfed
	Research	1	2	3	4
		(a) Needs introduction of SAU varieties			
		birsa Arhar-1			
		(b) Screening and development of short duration and insect pest disease resistance variety			
		(c) Standardization of agro-technique for each AES			
4	Kulthi (Horse gram) problem	(a) No standardization of agro-technique and varieties with very less productivity and un-identified diseases			
	Research	(a) Development of agro-technique, nutrient management,	Selection of install varieties		

		variety and causal organisms of			
		disease and control measures			
<b>B</b>	<b>Rabi season crop</b>				
1	Wheat	(a) Small scale cultivation of market varieties near streams and well (b)No follow up of available technology (c)Rust and smuts			
S.No	Commodity / enterprises	Upland rainfed	Mid land rainfed	Mid land irrigated	Low land rainfed
	Research	1 (a)Screening of variety for all required problems like draught/stress resistance and low water requirement varieties development (b) Introduction of C306, UP262, HP 1744, HD-2402 etc (c) Agro-technique and nutrient management	2 Introduction of Sujata, HDR-72 (purely rainfed)	3	4
2	Oilseeds (mustard)	(a) Traditional variety, practice (b)Partial nutrient application (c)Infestation of aphids			
	Research	(a)Screening and development of suitable variety (b) Technology			

		development (c)Testing of INM and IPM			
B 1	Horticultural crops Orchard crops-Mango, Guava, Ber, Bael, etc.	(a) Total gap of existing orchard and its management practices. (b)Infestation of mango, mealy bug, hopper, powdery mildew etc, on indicative scattered plants of different species in each AES			
S.No	Commodity/ enterprises	Upland rainfed  1	Mid land rainfed  2	Mid land irrigated  3	Low land rainfed  4
	Research	(a) Varieties screening, agro technique standardization for most of the suitable fruit crops. (b)IPM & INM development (c)Establishment of mother plant for nursery at ZRS			
2	Potato problem	(a) No tested varieties (b)No standard INM practice (c) Bacterial and fungal blight			
	Research	(a) Developmental technology and screening for early, medium, late and rainy season potatoes			

		(b)Standardization of TPS technique for each AES			
		(e) INM & IPM testing etc.			
3	Tuleer & Rhizomes crops Sweet potato, elephant food yam, colocasia calcium etc	(a) No variety and agro-technique			
S.No	Commodity/ enterprises	Upland rainfed 1	Mid land rainfed 2	Mid land irrigated 3	Low land rainfed 4
4.	Cole crops (cauliflower, knol khol, cabbage etc)  Research	a) No tested varieties b) Lack of INM & IPM c) Aphid attack etc d) No application of micro nutrient  a) Screening of varieties for early, medium, late season and agro technique development b) Standardization of IPM & INM c) Micro-nutrient research			
5	Kherua	a)Standardization of agro-techniques b) Development of post harvest technology c) Evaluation of			

		fertility level of the soil green			
		manure by kherua			
	* There are possibilities of cultivating many different vegetable crops especially in upland and medium land throughout the year and during rabi season and summer in low land agro-ecological situations nearer water resources. Accomplishing the floricultural avenues especially mari gold for the support of the small and marginal farmers of the district in term of economic strengthening				
C1	Animal husbandry-cow, buffaloes, goatery, pigery, poultry etc.	a) Local breeds and feeds,feeding and poor management b) Disease and pest control measures not followed			
S.No.	Commodity/ enterprises	Upland rainfed 1	Mid land rainfed 2	Mid land irrigated 3	Low land rainfed 4
	Research	a) Introduction of improved animals breed by SAU cow, goat, pig, poultry, birds with recommended practices b) Testing of disease control measures			
2	Fishery problem Research	a)Mixture supply of spawn and no follow up of feeds and feeding a) Specific species / varieties spawn rearing techniques development and supply to the farmers b)Standardization of the technique of paddy fish culture for all AES under low land situation			

\* \* Allied enterprises like sericulture, mushroom culture, apiculture etc may

be standardized and proliferated among the farmers of the district for income generation and solving the seasonal unemployment of the farming community

D	Limiting social constraints problem	a) Ignorance, unawareness illiteracy, seasonal migration, group conflicts, liqueur, gender feeling, mono-culture stray cattle grazing etc	-do-	-do-	-do-
	Resolution / solution	b) Education, awakening, group discussion, community organization co-operative farming and community farming			

In view of the strategy formulation of diversification and intensification of farming systems, productivity improvement, income generation etc., of different enterprises / commodities have been worked out. Accordingly, the activity plan will be as per the following schedule. The budget estimate and quantification of the programme will be listed for the district. A guideline of the activities to meet the extension strategy is being developed as the solution to the problems which are the bottlenecks in our sustainability / diversification / intensification of farming systems under the specific AES and commodity based. Practical solutions are being suggested under the reach of small and marginal farmers of the district. The major strategy / interventions are being taken into account for practical adoption by the farmers, who are poor in respect of capacity and resource. Major emphasis has been placed on community farming and indicative community demonstrations in their agro-ecological situations for the intensification of crop cultivation suitable to



them. There is immense possibility to give dynamism in farming through bringing the fallow and waste land under cultivation. At any cost, mono-culture feature of our farming had to

be broken and brought into double or triple cropping annually through the available technology for the situation by the farming community. There is possibility of introducing new valuable crops to address the multiplying poverty under the existing circumstances and situation.								
Dumka district bears the unique character of providing the habitat to the major chunk of population mass being tribal – adivasi mainly Santhal, Pharia and other scheduled castes and backward community who comprise the living population in this territory of the country.								
Type of extension activities to be carried out for implementation of each strategy								
Component : Natural Resource management / development								
S.No	Strategy / Intervention	Proposed extension activity	AES No.	No.of Unit	Year	Area	Unit cost	Who Re-will marks do
1.	Adoption of soil conservation measures	<b>i.</b> Community awareness for bunding of fields by group discussion	I to IV	One in AES	1	-	12,000/-	Deptt. Of soil cons.
		<b>ii.</b> Demonstration of field bundings	-do-	-do-		1½ acre AES	5,000/-	Deptt. Of soil cons.
		<b>iii.</b> Exposure visit to success areas (interstate & within state)	-do-	One	1	-	11,000/-	Deptt. Of soil cons. & ZRS
		<b>iv.</b> Field demonstration of growing cover crops	-do-	One	1	½	6,000/-	Deptt. Of soil cons. & Agril.
2.	Formation of EHS	<b>i.</b> Demonstration of WHT for	-do-	One	1	(3omx 3omx	50,000/-	Deptt. Of SCO

recycling of water  
& checking of  
runoff water

em)

3.	Improvement of WHC of soils	i. Training on application of bio fertilizer	-do-	One	1	4 villages (2days) from 4 AES	10,000/-	ZRS	
4.	Waste & barren land afforestation	i. Community awareness for afforestation ii. Demonstration iii. Exposure visit	-do- -do- -do-	One One One	1 1 1	 ½ -	10,000/- 25,000/- 5,000/-	Deptt. Of - do - - do -	
<p>Type of extension activities to be carried out for implementation of each strategy Component : Agricultural crops</p>									
S.No	Strategy / Intervention	Proposed extension activity	AES No.	No.of Unit	Year	Area	Unit cost	Who will do	Re-marks do
1	Mixed cropping / inter-cropping	i. Demonstration ii. Exposure visit	All -do-	Four -do-	1 1	½ 1	3,000/- 10,000/-	Deptt. of Agril. -do-	
2	Introduction of new crop	i. Demonstration on groundnut ii. Demonstration on Niger iii. Demonstration on Linseed iv. Demonstration on Sunflower	I II III II	One One One One	1 1 1 1	½ ½ ½ ½	75,000/- 75,000/- 75,000/- 75,000/-	Deptt. of Agril. -do- -do- -do-	
3	Double cropping	i. Upland : Rice-Niger (Birsa-101) (Birsa Niger) Maize – Niger / Linseed Groundnut-Niger ii. Medium :Rice Niger/Linseed (Birsa-102) Rice-Mustard							

		Blackgram-Linseed Blackgram-Niger <b>iii. Medium :</b>	III	Four	1	½	32000	Deptt. of Agril.	
		Irrigated : Groundnut-mustard Groundnut- Wheat Maize- potato Maize-pea <b>iv. Lowland : R/F</b> (a) Introduction of HYV of rice (e.g pankaj) (b) Demonstration of nutrient management in rice (NPK) (c) Rice -vegetable Exposure visits	IV	Two	1	-do-	16,000/-	-do-	
			All	Two	1	-do-	16,000/-	-do-	

S.No      Strategy /      Proposed      AES      No.of      Year      Area      Unit      Who Re-  
Intervention      extension      No.      Unit                     cost      will marks  
activity      do

4	Expansion of area under rice, pulses and oil seeds	Demonstration : (a) Increase in area under upland rice e.g. Birsa-101 (b) Increase in area under Maize var. Swan-1 (c) Increase in area under black gram, moong, etc (d) Increase in area under Niger, linseed and mustard	All	Four	1	2 acres	20,000/-	Deptt. of Agril.	
			-do-	Four	1	-do-	20,000/-	-do-	
			-do-	Four	1	-do-	20,000/-	-do-	
			-do-	Four	1	-do-	20000	-do-	

Type of extension activities to be carried out for implementation of each strategy  
Component : Horticultural crops

S.No	Strategy/ Intervention	Proposed extension activity	AES No.	No.of Unit	Year	Area	Unit cost	Who Re- will marks do	
1	Expansion of area under fruit crops	(a) Community awareness through group discussion (b) Supply of required planting materials of different fruit crops,especially, mango, ber, jackfruit,	All	Four	1	-	20,000/-	Deptt. of ZRS & Hort	
			All				40,000/-	ZRS	

Type of extension activities  
to be carried out for implementation of each strategy

Component : Animal Husbandry

S. No	Strategy / Intervention	Proposed extension activity	AES No.	No. of Unit	Year	Area	Unit cost	Who will do	Re- marks
1	Introduction of improved breeds of milch animal	(a) Community awareness through group discussion	All	Four	1	-	12000	Deptt. A.H	
		(b) Introduction of cross-breed cows Jersey, Hoelstein frezen	All	Four	1	-	100000		-do-
		(c) Development of improved breeds through natural insemination jersey bull	All	Two	1	-	100000		-do-
		(d) Development of improved breeds of cow through artificial insemination	All	*	1	-	*		-do-
2	Introduction of improved breeds of livestock animals	(a) Introduction of improved breeds of goat (e.g. Jamunapahari, Bittal Barberi)	All	Eight	1	-	20000	-do-	
		(b) Introduction of improved breeds of he-goats for servicing	All	Eight	1	-	20000	-do-	
		(c) Introduction of improved breeds of pig	All	Eight	1	-	20000	-do-	
		(d) Introduction of improved breeds of he-pigs (birsa pig)	All	Eight	1	-	20000	-do-	
3	Introduction of improved breeds of poultry birds	(a) Exposure visit	All	One	1	-	12000	-do-	
		(b) Training on rearing of poultry birds	All	Four	1	-	30000	-do-	
		(c) Introduction of hybrid poultry chicks	All	Eight	1	-	10000	-do-	
		(d) Introduction of serviceable improved cocks	All	Eight	1	-	5000	-do-	

betel, Aonla, amla,  
custard apple, lime etc.  
(c) Management of -do-  
agro-techniques

		(d) Follow up of INM & IPM	-do-				40,000/-	-do-	
		(e) Exposure visit and training at ZRS	-do-				40,000/-	ZRS	
2	Expansion of area under vegetable crops	(a) Community awareness	All				20,000/-	ZRS & Deptt of Hort.	
		(b) Supply of quality vegetable seeds / planning materials	-do-				50,000/-	ZRS	
		(c) Training on agro techniques for different vegetable crops	-do-				40,000/-	ZRS	
		(d) Introduction of pea (Arkel)	-do-	Four	1	1/2	20,000/-	ZRS	
<p>Type of extension activities to be carried out for implementation of each strategy Component : Marketing</p>									
S. No	Strategy / Intervention	Proposed extension activity	AES No.	No. of Unit	Year	Area	Unit cost	Who Re-will marks do	
1	Creating marketing facilities for agricultural and horticultural commodities	(a) Formation of FIG/SHG	All	Four	1	-	12000	Deptt. of Agri. & Hort.	
		(b) Linkage between producers and merchants for easy sale of marketable surplus & glut	All	Four	1	-	-	Deptt. of Agri. & Hort. & ATMA	
		(c) Linkage of FIG/SHG with credit institutes to have own transport	All	Four	1	-	-	-do-	
		(d) Development of cold storage for perishable commodities	All	Four	1	-	*	* As per need (with the help of dist. Admin.)	
		(e) Training on fruit / vegetables	All	Four	1	-	40000	ZRS	

preservation

2	Creating marketing facilities for commodities related to animal husbandry	Community organization FIG/SHG Marketing the existing chilling center in the district, functioning and linkage with different milk collection centers of villages	All	Four	1	12000	A.H
<p>Annual work plan for extension / Training / Demonstration adaptive Research &amp; Technical support to be provided by Zonal Research station Dumka under NATP</p>							
S. No.	Type of adaptive research / training activities				Units to be implemented per year (No)	Unit cost (Rs.)	Total Cost (Rs.)
1	Improvement of WHC of soils				4	2500.00	10000.00
2	Supply of required planting materials of different fruit crops				4	10000.00	40000.00
3	Exposure visit and training for INM and IPM for fruit crops				4	15000.00	60000.00
4	Supply of quality vegetable seeds / planting materials				4	12500.00	50000.00
5	Training on agro-techniques for different vegetable crops				4	10000.00	40000.00
6	Introduction of Pea (Arkel)				4	5000.00	20000.00
7	Adaptive trial on Birsa – 101				1	15000.00	15000.00
8	Adaptive trial on Birsa – 202				2	15000.00	30000.00
9	Adaptive trial on long duration HYV				1	17500.00	17500.00
10	Screening of available upland rice varieties				1	20000.00	20000.00
11	Screening of available medium land rice vars.				1	20000.00	20000.00
12	Screening of available lowland rice vars.				1	20000.00	20000.00
13	Adaptive trial on Suwan –1 and Birsa Maize-1				2	12000.00	24000.00
14	Ecology and management of Maize stem and cob borer				1	15000.00	15000.00
15	Adaptive trial on ecology and management of Pigeon Pea pod borer				2	20000.00	40000.00
16	Development of agro-techniques				1	10000.00	10000.00

	for horse gram			
17	Adaptive trial on Sujata,	2	15000.00	30000.00
18	HDR-72 vars. of wheat Adaptive trials on C-306, UP-262, HD-2402 vars. of Wheat	1	18000.00	18000.00
19	Agro-techniques on nutrient management in Wheat	1	15000.00	15000.00
20	Screening of suitable vars. of Mustard	1	15000.00	15000.00
21	Testing of INM & IPM on Mustard	1	20000.00	20000.00
22	Standardization of TPS technique for each AES	4	25000.00	100000.00
23	INM & IPM testing in Potato	1	20000.00	20000.00
24	Screening suitable vars. of Mango, Guava, Ber, Bail etc.	1	25000.00	25000.00
25	Testing of INM & IPM in cauliflower & Cabbage	1	30000.00	30000.00
26	Training on management of major kharif crops	4	15000.00	60000.00
27	Training on management of major rabi crops	4	15000.00	60000.00
Annual work plan for extension activities to be performed by different Departments under NATP				
S No.	Name of Department	Type of Extension activities	No. of units/Year	Cost in (Rs)
1	Department of Soil Conservation	-Community awareness for bunding of fields	4	12000.00
		-Demonstration of field bunding	4	5000.00
		-Field demonstration of growing cover crops	4	6000.00
		-Field leveling	4	-
		-Exposure visit to success area	1	110000.00
		-Demonstration of WHT	4	50000.00
2	Department of Agriculture	-Demonstration on application of bio- fertilizer in rice, pigeon pea, black gram etc.	4	5000.00
		-Demonstration on mixed cropping / inter cropping	4	30000.00
		-Exposure visit	4	10000.00
		-Demonstration on groundnut, niger, linseed and sunflower	4	30000.00
		-Demonstration on introduction of double cropping in all	4	96000.00
		-Demonstration for increase in area under Birsa 101(Rice),Suwan-1(mure)Black gram / moong Niger, Linseed and mustard	16	80000.00
		-Exposure visit	2	10000.00
		-Creating marketing facilities for agricultural and horticultural commodities	4	12000.00
3	Department of Forest	-Community awareness of afforestation	4	10000.00
		-Demonstration	4	25000.00
		-Exposure visit	1	5000.00
4	Department of Horticulture	-Community awareness for cultivation of fruit plant	4	20000.00

	–Community awareness for expansion of area under vegetable crops	4	20000.00
	–Demonstration on kharif vegetables	4	30000.00
	–Demonstration on rabi vegetables	4	30000.00
5	Department of Animal Husbandry		
	–Community awareness for introduction of improved breeds of milch animal	4	12000.00
	–Introduction breeds of milch animal	4	100000.00
	–Development of improved breed of cow through natural insemination	2	100000.00
	–Introduction of improved breeds of Goat	8	20000.00
	–Introduction of improved breeds of He-Goat	8	20000.00
	–Introduction of improved breeds of Pigs	8	20000.00
	–Introduction of improved breeds of He-pigs	8	20000.00
	–Introduction of hybrid poultry chicks	8	10000.00
	–Introduction of serviceble improved cocks	8	5000.00
	–Exposure visit	1	12000.00
	–Community organization for creating marketing fertilizer	4	12000.00

District Dumka has been identified for testing a decentralized system of extension management project being named as “National Agricultural Technology Project – NATP”. A registered autonomous body under the society act is to be created at district level called as Agricultural Technology Management Agency (ATMA). This body will function under the overall guidance of its governing board represented by various allied departments, SAU, ZRS, NGO, farmers representatives etc. Operational modalities of planning and implementation of action plan and fund flow mechanisms will be as under:

### 9.1 Preparation of Annual action plan :

Based upon the Strategic Research and Extension Plan of the district, a detailed annual work plan is prepared for each block as a unit. The methodology for preparation of action plan for each block has been briefed in chapter –2. The annual action plan for 1999-2000 has been prepared by utilizing collected data from one representative village for each of the 4 – agro-ecological situations. The annual action plan for subsequent years may be prepared on the basis of overall future feedback.



Preparation of annual action plan for 1999-2000 for remaining 10 blocks of Dumka district will be carried out by taking the following steps:

- a) Identification of major agro-ecological situations in each of the remaining blocks.
- b) Using the available data from representative villages for preparing annual action plan for concerned AES to other blocks as well.
- c) Identification and survey of new representative villages for additional agro-ecological situation as the major situations. The minor situations will be considered during the second year for action plan preparation.

### **9.2 Technical approval of annual action plan:**

As per the set up of NATP, initial approval of annual action plan is to be carried out at block level by the Farmers Advisory Committee (FAC). This committee is to be chaired by an elected chairperson of similar committee constituted at Block level for rural development activities under the new Panchayati Raj System. The members of FAC may consist of representatives from different farmers groups being organized in pilot blocks under NATP. Till the groups are formed, representatives from operational villages dealing with major commodities may be nominated by different line departments. The subject matter specialists of ZRS and senior persons from line departments in the district may participate in the meeting of block level for approval of action and their improvement. The approved action plan by the above committee may be sent to ATMA for follow-up action.

### **9.3 Administrative Approval of Action Plan:**

The annual action plan of all blocks under NATP are to be consolidated at district level by ATMA and scrutinized by its Management Committee. In case of major envisaged changes representatives of concerned FAC may be invited for a joint meeting with the management committee for making relevant changes. Thereafter, the consolidated plan may be approved by the Governing Board of ATMA.

### **9.4 Financial Approval of Action Plan:**

The annual action plan should be sent to coordinated cell of NATP with a copy to nodal officers of line departments for their recommendation. The modifications suggested

by nodal officers of line departments may either be incorporated in consultation of Governing Board of ATMA or can be considered for preparing action plan in the following year depending upon the significance.

Based upon the comments of the nodal officer of different line departments, the coordinating cell of NATP may examine it from financial point of view before the release of fund.

### **9.5 Fund Flow Mechanism:**

The fund for extension and adaptive research component for four pilot blocks of Dumka district may be released directly to the account of ATMA as per the approved annual action plan. Thereafter, ATMA may release fund for each block directly in the official account of the senior most representative person of the concerned line departments at the block level. The block level person shall release funds to nominated persons of each line department of the block level for implementing the programme as per approved plan of the work.

The budget may be released for half year at a time, at all levels, based upon the progress of work and fund utilization. Hence, demand for fund should be made by each block representative which shall be consolidated by ATMA for sanction by the state level coordinating cell.

### **9.6 Operational Modalities for implementation of the programme:**

The annual action has been divided broadly into two separate parts (i) replication of proven technologies (success stories) and (ii) assessment and refinement of new research findings for new success stories generation.

Under the present conventional top down approach, many research findings emerging from public sector research are directly passed on to extension personnel for onward transfer to farmers without their proper assessment / refinement under farmers conditions. On the other hand, many research findings evolved through private sector, NGO, or even by innovation of farmers did not get adequate attention of public sector extension system for replication on a large scale. It is envisaged that the extension personnel from line departments (particularly block level and below) should focus their main attention on replication of proven technologies. A proven technology is that which is adopted and replicated by the farmers at their own cost. Such success stories may have been evolved through any source of innovations (public, private, NGO or innovative farmers). Hence,

the extension person should concentrate on identifying these successes, analyse them with regard to technological aspects and process aspects and also statistical replicability in similar situation else where.

It is also envisaged that farmers who are directly associated with these success stories may act as resource persons / trainers. In such kind of farmer driven / oriented extension the role of extension personnel becomes more and more of a facilitator provider, motivator rather than an agent for transferring impact points emerging from on station research or subsidized impact identified through macro-level planning.

The second part of the action plan relates to the assessment and refinement of new research findings. The activity is expected to be carried out directly by subject matter specialists working preferably in ZRS. Under this part of the programme, promising findings from on station research shall be systematically tested in farmers field. The actual replication of such technologies to other farmers by extension personnel would be taken up only after the new technology has become a success story. The subject matter specialists would keep on meeting with farmers not only to test and refine the technology but also to sort out non-technological constraints which shall enable farmers to adopt the new technology.

There shall be distinctly separate roles for extension personnel and the scientist subject matter specialist of ZRS as discussed above. The implication modality for each activity under the two parts of annual action plan are briefly discussed as below.

## **A. Replication of proven technologies (success stories )**

### **A.1 Survey of success stories :**

This activity shall be carried out essentially by the extension officers at Block level. The subject matter specialists of ZRS may also take-up such studies. A separate budget has been allocated apart for this purpose to cover the cost of TA/DA stationary etc./ During the preliminary field practical some success stories have already been identified. To being with these can be studied in detail. Other success stories would likewise be identified and studied in future.

### **A.2 Focussed exposure visit of farmers and extension personnel to successful examples:**

After the analysis of success stories a focussed exposure visit may be organized

for relevant farmers and extension personnel. The identification of farmers for such visits may be done through any of the two approaches.

\* Selection of limited number of interested farmers from only operational villages identified for implementation of the programme during a particular year. Make an open announcement regarding success stories through appropriate publicity mechanism and advice willing farmers to apply for the exposure visit on scheduled date.

\* It is, however, important that such exposure visits are made exclusively for educational purpose and also only for those farmers for whom it is likely to be relevant. It may be worth while if concerned farmers are asked to contribute a part of the cost towards such visit so that their genuine interest is ensured. If a success story consists of technology evolved by private sector, it may be appropriate to advise the concerned company to contribute remaining part of the cost towards the visit.

### **A.3 Organization of Demonstration :**

These activities are to be carried out under the direct supervision of Agricultural Officer of Department of Agriculture and equivalent Officer in other departments. It is needless to mention that demonstration shall be organized early on those technologies which have already be tested / refined by ZRS and found to be successful in villages where it was tested. Usually motivation of farmers should be achieved through a focussed exposure visit to such villages. However, if the site of the success story is too far, it may be desirable to conduct demonstration in the operational villages to reduce the cost.

### **A.4 Organization of skill oriented training programme :**

Focussed exposure visit to a success story shall lead to motivation of new farmers. Source of the new technology is simple enough and hence the farmers would be able to adopt them by themselves. However, in some cases it would be essential to organize skill oriented training programmes so that it would become easier for farmers to adopt new technology. It is essential that such training programmes are organized only for those farmers who are already motivated and for whom new technology is relevant. It may preferably include those farmers who have gone for exposure visit through other farmers. It would be desirable that such farmers will be used as trainers. The extension person may still have to perform a lot of other responsibilities regarding facilitating the whole process and whenever needed to build the training skill / communication skills among those farmers

who are going to become trainers.

It is also desirable to advise new farmers to contribute a part of the cost towards the training programme. This is meant to ensure that only willing and motivated farmers are joining the skill oriented course and also to recover a part of the cost to meet travel and honorarium to successful farmers.

#### **A. 5 Advisory service on diversification and intensification of existing farming system :**

Individual farmers are possessing their own system of farming within their existing resources and agro-ecological circumstances. This very system is having good opportunities of intensification or diversification for high farm economy and employment as well. Under the proposed extension programme, a high priority is to be given on diversification and intensification, of existing farming system through inclusion of new remunerative commodities and working possibilities. This aspects requires two kinds of skills on the part of the adviser. One skill relates to management aspect (usually known as farm management skill which deal with optimum allocation / reallocation of resources to manage new farming system); the second skill relates to technological aspect with regard to the new enterprises being considered under the new farming system.

It is proposed that one person at block level (Agri. Officer) would be identified and trained on the first skill (about management aspect) so that farmers could be advised on changes to be considered about choice of enterprises in the overall farming system. Afterwards, the farmers could go to the concerned technical person within the representation line department for advise / training exposure visit regarding technical aspects of the proposed enterprise.

At first it would be difficult for the Agriculture officer of block level to independently operate the advisory service on management aspects of the farming system. Hence, it may be useful to consider that similar advisory services (on management aspect) would be initiated at ZRS by a competent person having a degree and experience in Agri-economics. It is envisaged that there would be a close functional linkage between these persons on a regular basis preferably during proposed monthly / bio-monthly visits by SMS to each block.

#### **A. 6 Community Organisation :**

As discussed earlier farmers would be organized into formal and informal groups. It would be essential to organize only those interested farmers who are motivated to work as a group for performing a particular task which otherwise is difficult on an individual basis. The initial field surveys of representative villages had indicated that farmers of same enterprises may be organized for improving their marketing system and its problems. Milk producers, vegetable growing etc.

Further details about formalization of above groups at block / district level have already been discussed. Besides, this it has been recognized that resource poor families specially farm women will be able to improve their farming systems on proper credit support. Thus, SHG, for women can be formed to meet these poor farm women needs.

Organization of community groups requires a special skill. Hence, it is proposed to invite experienced NGOs for the purpose. It would, however, be essential that the field extension officers of development departments are also involved in the activity so that it would be easy for them to work with these groups for extension activities regarding the concerned enterprise. Organization of groups would obviously require not only identification of members who have common interests and who are socially compatible but also building their skills on human aspects (group work, leadership, organization of meetings, preparation of proceedings etc.) and also management aspect (survey of new markets, understanding of preference and perspective of consumers ; organization of transport for collective marketing, account keeping etc. )

## **B. Assessment and refinement of new technology ( generation of success story )**

In accordance with the action plan, the following are important

### **B.1 Monthly visits of scientist / SMS to concerned blocks / Sun-division:**

At present monthly visits are organized in such a way that extension persons from different levels in the district travel to a common place at district H.Q. or Z.R.S. to meet subject matter specialists and scientists. Now it is proposed that multidisciplinary team of scientists and SMS from KVK, Z.R.S., etc. would travel to the revenue blocks to meet extension persons, NGO, private sector, innovative farmers within the concerned blocks

on monthly / bi-monthly basis to perform the following functions:

- Facilitating for preparation and implementation of annual work plan
- Refinement of technological package as per farming situation
- Approval of success stories for replication
- Supervision of trials/ demonstrations
- Analysis of feed back
- Conducting Preliminary survey regarding diffusion of new technology through PRA
- Diagnostic survey

These visits should be made for one week in each month during which –2 workshops of 3 days each be organized to cover 2 – blocks. In each workshop participants from only one block belonging to all line departments, private sector, NGO, innovative farmers will participate. One of the three days may be set apart for field visit to a demonstration trial or success story field. During alternate months remaining two blocks under NATP shall be covered. Hence in every block, such workshop will be organized in alternate months.

## **B. 2 Organization of adaptive trials/ on farm research:**

These trials would be carried out by using the funds provided under the project on latest findings evolved through public sector research. The new findings may emerge through private sector also be tested by Scientists / SMS of Z.R.S. provided these findings are potential/ relevant operational changes for conducting trials paid by concerned organization.

These trials may be organized, as far as, possible in villages located near Z.R.S. centre provided relevant farming situation is available. Frequent visits and technical management support during the trial year as well as following years (until the technology has been refined and become a success story) is crucial; and hence member of villages for trials could be limited and located nearby.

Keeping the view of mandate and priority under the project these trials may be organized on following aspects.

- Integrated pest disease management
- Integrated plant nutrient management

- Diversified and intensified farming system approach
- Organization of seed village on latest variety
- New findings related to seed, herbicides, implements plant growth regulators etc
- Proportional methods
- Animal disease management etc.

### **B.3 Advisory service on diversification and intensification of farming system:**

Zonal Research Station, BAU is well equipped with infrastructure facility and multidisciplinary team of scientists, needing further strengthening. The centre may play a leading role in diversification and intensification of farming system in the district in view of changing scenario in rural areas and also energizing new market opportunities in urban areas. Existing scientist of Z.R.S. are able to meet the technical requirement for new enterprises in the proposed farming system. But, at present, Z.R.S. do not have a farm economist to provide farm management input for diversification and intensification of farming system.

Thus, it may be appropriate to post the farm economist scientists/SMS at the earliest. Wherever, if it is difficult, agronomist may take the responsibilities. It is needless to mention that necessary farm management skills may have to be developed in the new person.

### **B.4 Resynthesis of technological package as per farming situation of a particular crop / enterprise:**

The existing technological packages are generalized and not suiting to all different farming situations under which each commodity is managed. Refinement/resynthesis of technological package for each farming situation can be appropriately developed through farmer participatory research. The concerned scientist of ZRS are the proper persons for such assignments, which would be extended in monthly meetings at respective block levels. Each year one crop/ commodity may be considered for this purpose by each scientist of ZRS. If needed, the activity on the same commodity may continue for more than one year.

### **B.5 Survey for diffusion of new technology:**

Till now, the focus had been on conducting the trials demonstration in farmers field



and collecting the data with regard to their performance. It had been experienced that very often farmers do not continue even with those technologies which seem to be full proven for good performance during the trial / demonstration phase. It indicates that there is some other person/ social constraints which are beyond, the capacity of farmers or there are differences in perspectives of subject matter specialists and the farmers because of which even ‘good’ technology is not being continued. Survey during subsequent years should continue and should become an integral part of testing and refinement of technology so that scientists/ SMS would continue to work with farmers during following years until the new technology has become a success story (being continued by them at their own cost).

### **B.6 Development of training material:**

The existing literature on technological aspects is designed essentially to improve knowledge base of the user, which is able to serve the purpose of transferring those technologies for skill development.

Self study literature for skill development needs to be written in different manner. In this case more emphasis is to be given on “How to do” a particular operation rather than “What to do”. Initial expenditure towards development of such a literature may be borne by the project. There would be reasons to critically reexamine the need based materials. Hence, such a mechanism of contribution by users shall keep the whole system more and more need based and cost effective. Preparation of video film on different aspects is a worth while investment. However, video film should be made only on aspects of success story in the district or nearby areas. These video films may serve as a cost effective means of motivation of farmers particularly in cases where success story is located at a far off place. It is needless to mention that these video films could be prepared through experienced persons on job basis so that quality is maintained. A separate budget has been provided for this purpose.

### **B.7 Printing of training materials:**

A very small financial provision is made for the purpose with an understanding that literature would be provided to only those persons who are willing to pay for it. Hence, initial investment for printing a limited stock is provided which is expected to be self supporting subsequently.

<b>B.8 Farmers training for trainer-ship:</b>					
The scientists of Z.R.S. would be able to train limited number of farmers every year on production technology. It is important to organize these training to such a way that the farmers would not only learn new technology at the Training Center but also be able to practice them to their own fields during the same year. For this purpose it is essential to identify interested farmers for training and also supply critical inputs as a part of the training programme. Towards the end of the season, successful farmers may be identified based upon their performance. Afterward some of these farmers (who are willing to become trainers in future) may also be given training on communication method, training methodology etc., so that efficacy of training would be high.					
Z.R.S and MANAGE, have evolved a detailed methodology for conducting such training programmes which involves initial exposure visits to success stories and continues till farmers become trainers for replication of the technology. The details about the methodology may be separately referred.					
S.No.	Crops	Proportionate area (%) under major crops in representative villages of each AES			
		AES - 1	AES- 2	AES -3	AES - 4
1	<b>Agriculture crops</b>				
	-Paddy	7.5	83.0	54.0	93.0
	-Maize	25.0	-	17.5	-
	-Pigeon pea	13.0	-	-	-
	-Horse gram	50.0	-	-	-
	-Wheat	-	-	17.5	-
	-Mustard	-	-	9.0	-
2	<b>Green fodder crops</b>				
	-Fodder jowar	-	-	-	-
	-Para grass	-	-	-	-
3	<b>Horticulture crops</b>				
	-Vegetables	-	17.0	4.0	7.0
	-Bhindi				
4	<b>Sericulture</b>				
	Total				

Actual gross cultivated area (ha)                      67.0                      204.5 & 145.0                      97.8 & 68.0                      58.5

\*The figure includes areas under different vegetables crops i.e. tomato, potato, bhindi, brinjal, radish, cowpea, etc.

**Appendix - 2 : Existing productivity of major crops in representative villages of each AES in Dumka District**

S.No.	Crops	Proportionate area (%) under major crops in representative villages of each AES			
		AES - 1	AES- 2	AES -3	AES - 4
1	<b>Agriculture</b>				
	-Paddy	12.5	25.0	15.0	25.0
	-Maize	5.5	-	10.0	-
	-Horse gram	3.0	-	-	-
	-Pigeon pea	3.0	-	-	-
	-Wheat	-	-	15.0	-
	-Mustard	-	-	4.0	-
2	<b>Horticulture</b>				
	-Kherua	-	200.0	-	-

**Appendix - 3 :**  
**Details about improved technologies for management of paddy**

S.No.	Items	Recommended practices
01	Sowing time (late sowing)	June
02	Varieties	*
03	Seed rate (kg/per ha.)	40 kg / ha
04	Seed treatment	Agrosen GN
05	Organic manure (cl /ha)	10 t/ha
06	Fertilizer (kg/ha) - Basal N	40
	P	40
	K	20
	- Top dress(N) split doses	40
07	Method of fertilizer use : - Basal - Top dress	Basal & top dress
08	Micro nutrient (kg/ha) - ZnSO4	-
09	Pest management (per ha) - Stem borer	Carbofuram
10	Disease management (per ha) - Blast	Bavistin / Hinosan

- Blight

Seresan WP

11 Weed management - Mechanical

Mechanical

- Herbicide

Butachlor 50 EC @ 2lt/ha

12	Water management : - Number of irrigation	Need based
	- Method of irrigation	Flooding
13	Harvesting	By sickle
14	Land management : - Salinity / alkalinity	-
	Water logging	--
15	Any other	
	Potential yield (q/ha)	30.0 (U), 50.0 (M), 50.0 (L)
	* Upland : Birsadhan – 101, Birsadhan - 102	
	Medium land : IR-36, Kunak, Birsas-202, Pusa 2-21, Rajendra dhan 202	
	Lowland : Pankaj	
	** Gundhi bug - Folidol dust	
<p>Appendix - 4 :</p> <p>Details about improved technologies for management of maize</p>		
S.No.	Items	Recommended practices
01	Sowing time	Last week May to June
02	Varieties	Swan, Vijay, Ganga Safed-2
03	Seed rate (kg/per ha.)	18.0
04	Seed treatment	Thirum
05	Organic manure	10 t/ha
06	Fertilizer (kg/ha) -Basal N	50
	P	60
	K	40
	- Top dress (N split doses)	50
07	Method of fertilizer use : - Basal	50%, N+Full P&K
	-Top dress	Rest 50% N in 2splits doses

08	Micro nutrient -ZnSO <sub>4</sub>	-
09	Pest management (per ha)	
	- Stem borer	Carbofuran 36/ endosulphan
10	Disease management (per ha) - Blast	-
	- Blight	-
11	Weed management - Mechanical	-
	- Herbicide	Atratarb @ 2 kg / 1000 lt. Water
12	Water management :	
	- Number of irrigations	*
	- Method of irrigation	
13	Harvesting	Hand picking
14	Land management :	
	- Salinity / alkalinity	-
	- Water logging	Proper drainage
15	Any other	-
	Potential yield (q/ha)	50.0 to 60.0
	* Grown mainly under Kharif season	
<p>Appendix - 5 :</p> <p>Details about improved technologies for management of wheat</p>		
S.No.	Items	Recommended practices
01	Sowing time	Timely - November 15 to 30 Late - December
02	Varieties	HD-2402, UP-262, HD-2285
03	Seed rate (kg/per ha.)	Timely – 100 kg Late – 125 kg
04	Seed treatment	Bavistin @ 2g / kg seed
05	Organic manure (t/ha)	10.0
06	Fertilizer (kg/ha)	<u>Timely</u> <u>Late</u> 50
	-Basal N	40                              50
	P	40                              25
	K	25                              20
	- Top dress(N split doses)	50                              40
07	Method of fertilizer use :	

- Basal 50% N + full P & K
- Top dress 50% N in 2 splits

08	Micro nutrient -ZnSO <sub>4</sub>	-
09	Pest management (per ha)	-
10	Disease management (per ha) - Loobe smut	Seed treatment
11	Weed management - Mechanical - Herbicide	Isoproteran 75% @ 1.5 kg / ha at 25-30 DAS
12	Water management : - Number of irrigations - Method of irrigation	5 to 6 Flooding
13	Harvesting	By sickle
14	Land management : - Salinity / alkalinity - Water logging	
15	Any other - Method of sowing	Sowing behind the plough
Potential yield (q/ha) Timely 40.0 ; Late 25.0		
Appendix - 6:		
Details about improved technologies for management of mustard		
S.No.	Items	Recommended practices
01	Sowing time	October
02	Varieties	Varuna, Pusabold
03	Seed rate (kg/per ha.)	8.0 to 10.0
04	Seed treatment	Captan 75% @ 50g / q seed
05	Organic manure (t/ha)	10.0
06	Fertilizer (kg/ha)	
	-Basal N	25
	P	25
	K	10

- Top dress (N) 25

- 07 Method of fertilizer use :  
- Basal

50% N & full P+K

08	- Top dress Micro nutrient (Kg/ha)	50% N in 2 splits
09	-ZnSO <sub>4</sub> Pest management (per ha)	-
10	-Aphid Disease management (per ha)	Methul -0-demeton (0.025%)
11	-Blast -Blight Weed management	- -
12	- Mechanical - Herbicide Water management :	- - Isoproteran 75%
13	- Number of irrigations - Method of irrigation	3 to 4 Flooding
14	Harvesting	By Sickle
15	Land management : - Salinity / alkalinity - Water logging Any other	-
	Potential yield (q/ha)10.0 - 12.0	
<p>Appendix - 7 :</p> <p>Details about improved technologies for management of pigeon pea</p>		
S.No.	Items	Recommended practices
01	Sowing time	June 15 to July 15
02	Varieties	Birsa Arhar -1, Lakshmi T-21
03	Seed rate (kg/per ha.)	20.0
04	Seed treatment	-
05	Organic manure (t/ha)	-
06	Fertilizer (kg/ha)	
	-Basal N	20
	P	40
	K	20
	- Top dress (N)	-
07	Method of fertilizer use : - Basal	-

08 - Top dress Basal only  
 Micro nutrient (Kg/ha)  
 ZnSO4 -

09	Pest management (per ha) - Pod borer	Endosulfon (0.07%)
10	Disease management (per ha) -Blast -Blight	- -
11	Weed management - Mechanical - Herbicide	- -
12	Water management : - Number of irrigations - Method of irrigation	- -
13	Harvesting	Manual
14	Land management : - Salinity / alkalinity - Water logging	- -
15	Any other  Potential yield (q/ha)  * Long duration : 18-20.0 q/ha	*  *Short duration : 10.0 q/ha (T-21)
<p>Appendix - 8:          Details about improved technologies for management of          horse gram</p>		
S.No.	Items	Recommended practices
01	Sowing time	August
02	Varieties	Birsa Kulthi-1, Madhu
03	Seed rate (kg/per ha.)	10.0
04	Seed treatment	-
05	Organic manure (t/ha)	-
06	Fertilizer (kg/ha) - Basal N	20

P

40



	K - Top dress(N)	0* -
07	Method of fertilizer use : - Basal - Top dress	Basal
08	Micro nutrient (Kg/ha) -	ZnSO4
09	Pest management (per ha) - Hairy caterpillar	Endosulfan
10	Disease management (per ha) - Blast - Blight	
11	Weed management - Mechanical - Herbicide	
12	Water management : - Number of irrigations - Method of irrigation	
13	Harvesting	Manual
14	Land management : - Salinity / alkalinity - Water logging	
15	Any other Potential yield (q/ha) *Data required	*
<p>Appendix – 9 :</p> <p>Details about improved technologies for management of graded breed of cow</p>		
S.No.	Items	Recommended practices
1	<b>Breed upgradation :</b>	
	a. Artificial insemination : - Location - Breed	At door step Cross breed

b. Natural insemination :

- Location At door step

- Breed Cross breed

2	<b>Feed management :</b>	
	- Green fodder (kg/day )	7 kg
	- Dry fodder (kg/day)	8 kg
	- Concentrates (kg /day)	Halt at the milk yield
	- Minerals (gms / day)	20ml
	- Vitamins (ml. / day)	10ml
3	<b>Inter calving period :</b> (months)	12 months
4	<b>Health care :</b> (Vacc. per year)	
	- HSBQ	Once
	- FMD	Once
	- Rinder pest	Once
	- Worms	Once
	- Etc.	Once
	Average yield :	
	- Milk prod. (lit./day)	5-6 lit.
<p>Appendix - 10 :</p> <p>Details about improved technologies for management of graded breed of buffaloes</p>		
S.No.	Items	Recommended practices
1	<b>Breed upgradation :</b>	
	a. Artificial insemination :	
	- Location	At door step
	- Breed	Murrah

b. Natural insemination :

- Location At door step

- Breed Murrah

**2 Feed management :**

- Green fodder (kg/day) 25 kg

- Dry fodder (kg/day) 25 kg

- Concentrates (kg /day) 5.5 kg

- Minerals (gms / day) 50 gr

- Vitamins (ml. / day) \*

**3 Inter calving period :** (months) 15 months

**4 Health care :**(Vacc. per year)

- HSBQ Once

- FMD Twice

- Rinder pest Once

- Worms Thrice

- Etc.

Average yield : 7-8 lit.

- Milk prod. (lit./day)

\*Information required

Appendix - 11 :

Details about improved technologies for management of graded breed of goat under AES-1

S.No.	Items	Recommended practices
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**1 Breed upgradation :**

a. Artificial insemination :

- Location At door step

- Breed Jamunapari

b. Natural insemination :

- Location At door step

- Breed

Jamunapari

**2 Feed management :**

	- Green fodder (kg/day)	Grazing
	- Dry fodder (kg/day)	2.0 kg
	- Concentrates (kg /day)	130 gm
	- Minerals (gms / day)	5 gm
	- Vitamins (ml. / day)	5 ml
<b>3</b>	<b>Inter calving period :</b> (months)	6 months
<b>4</b>	<b>Health care :(Vacc. per year)</b>	
	- HSBQ	-
	- FMD	-
	- Rinder pest	-
	- Worms	-
	- Deworming	Twice
<b>5</b>	<b>Average yield :</b>	½ lit/ day
	- Milk prod. (lit./day)	
<b>6</b>	<b>No. of kids / year</b>	6 Nos.
<b>7</b>	<b>Gain in weight</b>	2 kg / month

Appendix - 12 :

Details about improved technologies for management of graded breed of sheep under AES-1

S.No.	Items	Recommended practices
<b>1</b>	<b>Breed upgradation :</b>	
	a. Artificial insemination :	
	- Location	At door step
	- Breed	Bikaneri
	b. Natural insemination :	

- Location At door step
- Breed Bekaneri

2	<b>Feed management :</b>	
	- Green fodder (kg / day)	Grazing
	- Dry fodder (kg / day)	1 kg / day
	- Concentrates (kg / day)	150 gm
	- Minerals (gms / day)	05 gm
	- Vitamins (ml./ day)	05 ml
3	<b>Inter calving period :</b> (months)	6 months
4	<b>Health care :</b> (Vacc. per year)	
	- HSBQ	-
	- FMD	-

- Rinder pest

- Worms

- Deworming

Twice

5 No. of kids / year

3

6	Gain in weight	2 kg
7	General management	Open grazing

Appendix - 13 : Details  
improved technologies for management of graded breed of  
fish

S.No.	Items	Recommended practices
1	Cleaning of pounds	Liming, dowering and eradication of predatory fish
2	Fingerlings density / ha	8000 fingerlings
3	Feed mangernent fertilizer application	22 nones / ha/ year
	i. Organic	N 450 kg / year
	ii.Inorganic	P 200 kg / year K 50 kg / year

4 Supplementary feeding

Mustard oil cake + rice bran

5 Periodical feeding

Once a month