STRATEGIC RESEARCH AND EXTENSION PLAN OF JAMTARA DISTRICT

Prepared by
Agricultural Technology Management Agency(ATMA)
Jamtara District, Jharkhand
National Agricultural Technology Project (NATP)

कृषि प्राद्यौगिकी प्रबंधन अभिकरण, आत्मा जामताड़ा, झारखंड ।

AGRICULTURAL TECHNOLOGY MANAGEMENT AGENCY

Sarkhel Dih, Sub Divisional Agricultural Farm, Jamtara, JHARKHAND

Contents

Chapter	Topic	Page No.
I.	Introduction	3-4
II.	Methodology	5-7
III.	Background Information about the District	8-20
IV.	Description of ongoing extension development activities in the district	21-22
V.	Identification description and analysis of existing farming system under each AES	23-58
VI.	SWOT Analysis of Existing Farming System in Different AES of District	59-64
VII.	Identification of critical issues problems and opportunities	65-71
VIII.	Proposed Extension strategies	72-78
IX.	Proposed Research Strategies	79-81
X.	Activities scheduled for Extension and research strategies	82-101
XI.	Operational Modalities	102-106
XII.	**SUCCESS STORIES AND ITKs**	107-110

I. INTRODUCTION

The Public Extension System has undergone several transformations since independence and a lot of investment have been spent on public research and extension system. These investments have been a major contribution on national success in raising food grown production from 51 million tons in 1950–51 to over 209 million tons today, thereby maintaining food security in the face of a huge increase in population.

Previous research and extension plannings of Government no doubt made an important contribution to agriculture development, but it needed to be overhauled to meet the technological needs of farmers during 21st century.

Past extension planning were more fruitful in irrigated areas where profitability of new technology was high and management conditions in farmers field were not very difficult as compared to that of research farms. The above approach could not show significant impact in rainfed areas due to large heterogeneity and complexity in farming conditions.

Recently it was recognized that extension should be broad based on the basis of the farming system approach. Issues like financial sustainability, lack of farmers participation in executing programme planning and weak research extension linkage are some constraints are arises as in present extension system.

Government of India with assistance to world Bank, the National Agricultural Technology Project (NATP) has be launched with ongoing reforms and innovations, consolidate earlier investments and address constraints and gaps not received focus earlier. 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 and demand drive programme. Basically there are three major components of NATP viz. (a) Development of the ICAR Organization and Management System (b) Support for Agro-Eco System Research and (e) Innovation in Technology Dissemination (ITD).

The Main Objectives of ITD Components are to:-

To increase the effectiveness of the technological support services by making them more demand drive and responsive to location specific problems of farmers. Develop and strengthen institutional linkages. Empowerment of farmers through farmers organization / association to play a dominant role in the management of the newly envisaged Extension System. Developing new partnership with private institutions including extension NGOs. Encourage the financial sustainability of the public technology dissemination system.

There is a scope of convergence of thoughts and ideas of both the wings to develop a Research Extension (R-E) unit at the pilot district level. In each Project district, an Agricultural Technology Management Agency (ATMA) is established to serve as a decentralized decision making body for the Agriculture Technology System and a focal point for integrating research and extension activities. All research and extension units within each pilot district, including KVK, ZRS or sub-station of research, Key Line Departments and farmers representatives would became constituents members of the ATMA. The institute would provide a mechanism to decentralize decision making, to support local needs, to strengthen-research-extension-farmer linkage and to integrate technology dissemination activities across different institutions.

The ATMA would be a registered society which would eventually became responsible for all the technology dissemination activities at the district level. It would have linkage with all the departments of the Government and Research Organization and other Non-government Organizations (NGOs) and agencies associated with agricultural development in the district. For this ATMA has to develop a demand driven situation specific multiactor oriented Strategic Research and Extension Plan (SREP) to accelerate agricultural development in the project district. The SREP is the basic document, which does not only decide, the development activities that need to be carried out, but also in which manner and by whom it has to be done. The SREP prepared for Jamtara district will provide a guideline for promotion and implementation of action plan for all the 4 blocks of district.

II. METHODOLOGY

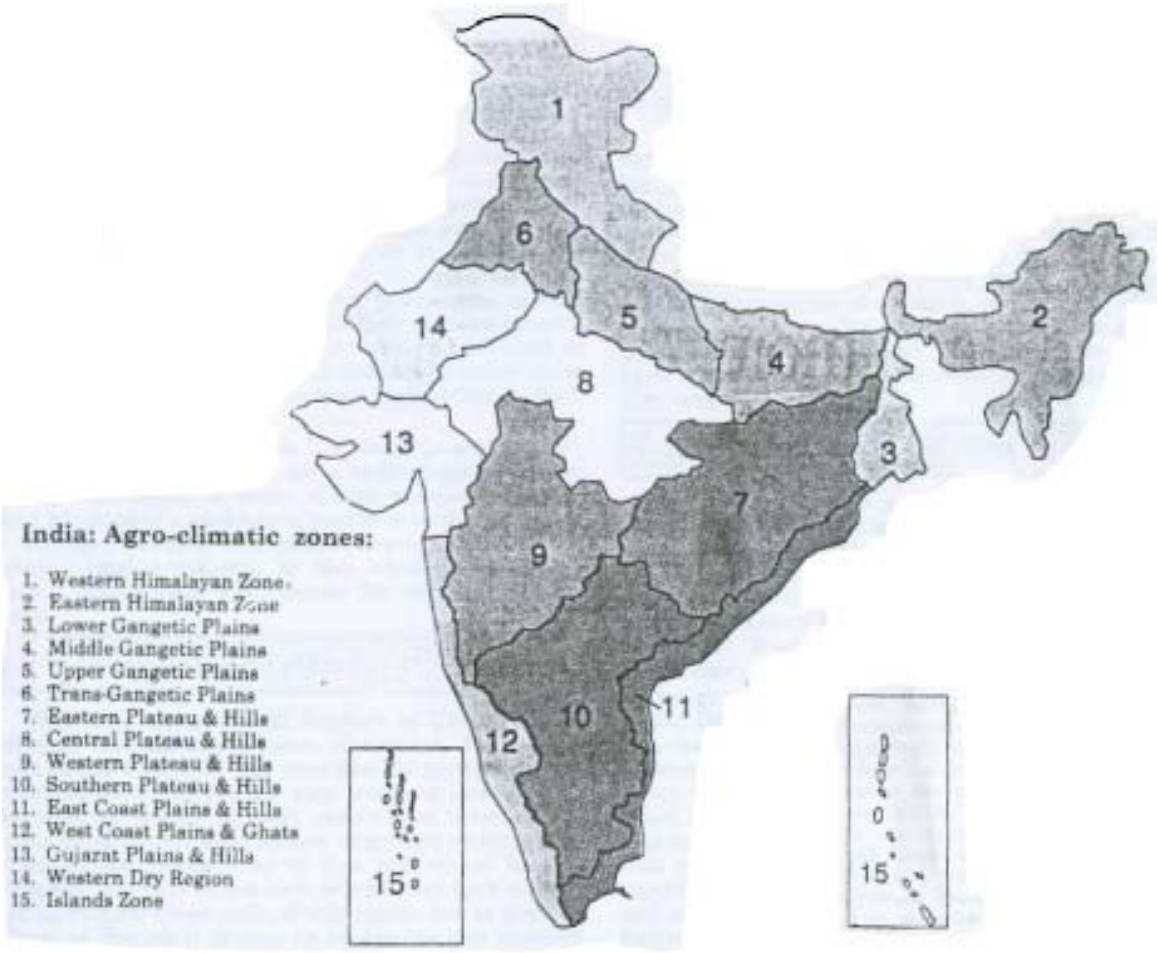
SREP is a basic document, which decides a systematic approach of development activities in ATMA district. Development of SREP involves participatory and bottom up approach from the planning stage. For preparation of SREP of Jamtara district following steps and methodology have been adopted.

2.1 Orientation of District / Block level Officers and scientist on NATP.

Two orientations programme for district and blocks level officers were conducted jointly by SAMETI and MANAGE at Ranchi on a systematic approach and NATP concept respectively on dated 22nd to 26th April and 11th to 16th May 2003. District and blocks level officers of district line department from Jamtara district have been participated in orientation programme.

2.2 Identification of Agro-Ecological Situation (AESs) and constitution of AES team

Agro-ecological situation of district were identified with the discussion to consultant NATP, Director SAMETI, Jharkhand State and scientist of ZRS, Dumka on climate, rainfall, variation in temperature Topography, irrigation, soil type and its depth affected by erosion and how these factors affected the farming system within the district. After sound discussion, the district is divided in to four Agro-Ecological Situations (AESs) as follows:



Agro-Climate Zone	Agro-Ecological Situation	Selected Village	Panchayat	Block
VII Eastern plateau and Hills	I Upland (Tar)-Eroded soil-Rainfed	Jagarnathpur	Ranitar	Narayanpur
	II Medium land Sandy loam- Rainfed	Banderdiha	Kariya	Nala
	III Medium land-Sandy loam- Tank Irrigated	Mohanpur	Nala	Nala
	Low land-Alluvial Soil-Rainfed	Khajuriaya	Fatehpur	Kundhit

For participatory data collection from representative village of each AES a multidisciplinary team had been constituted by PD, ATMA, Jamtara. The team comprising ATMA level and block level officers from different line department and also some progressive farmers to view identify problems prevailing in the village to interact with the farmers in their local language.

2.3 Participatory data collection

Most of the data from the representative villages collected by constituted team in the month of May and June, 2003 using PRA tools like participatory mapping, transacts, matrix and profential ranking trend analysis, Venn diagram, time line, seasonality calendar, scoring, community problem analysis, semi-structured interview, focussed group discussion, direct observation etc. addition to participatory extension management tools like FSBE, PPM, PINM, ITK and PNRM were used for collection of data. NATP, Jharkhand State Consultant and Director, SAMETI had checked collected data on 11th July by visiting representative villages. After their valuable suggestion a second phase data collection field exercises completed in between 15th July to 30th July 2003.

2.4 Rechecking, analysis of data and prioritization of extension and research issues.

Secondary data / information about the district was collected through Project Director and Deputy Director. Primary data of representative villages and secondary data of the district first analyzed by the district technical team under leadership of Dy. Project Director, ATMA, Jamtara and finally by the scientists of Birsa Agricultural University and Director SAMETI and NATP Consultant, Jharkhand to identify the critical issues, problems, needs, opportunities, threats and risks through SWOT analysis.

2.5 Developing strategies for research and extension.

Through the facilitation of SAMETI, DTT, AES team and scientist of B.A.U. Kanke Ranchi were made various extension and research strategies. These strategies were finalized on the basis of need for crop diversification, intensification, extension and policy support and also sustainable issues of the farmers. These issues were worked out through the Relative Spread Index (RSI) and Relative Yield Index (RYI) for crop zonation. In addition, various strategies for public-private partnership, involvement of NGOs, sustainability of the product community organization and HRD were also developed for rich input of our SREP.

2.6 Development of activity Schedule

For the successful action of the planned strategies, DTT, AESs team and scientists have decided the unit cost, Number of unit and also years of the each activity during the project period.

2.7 Role of MANAGE, Hyderabad

National Institute of Agricultural Extension Management (MANAGE), Hyderabad the premier institute in the field of agricultural extension bears the mandate of providing technical back up to the ITD component of NATP. With the collaboration of SAMETI, Jharkhand, MANAGE has been organized so many training programme to built a strong technical team in the Jamtara district to perform the goal of NATP.

The working guideline (ITD series 1, 2 and 3) developed by MANAGE acted as template for understanding the corrupt and are preparing the SREP for the Jamtara district. Continuous interaction, visit of representative villages, help in all respects to preparation of SREP by State Consultant (NATP, MANAGE) will never forget.

III. BACK GROUND INFORMATION OF THE DISTRICT

3.1 General features of the district.

Jamtara is a newly formed district of Jharkhand state. It comes in existence on 26th April 2001. District is located at lower altitude of chotanagpur plateau and its latitude and longitude varies from 23^0-10' to 24^0-5' north and 86^0-30' to 87^0-15' east, respectively. It is a small district of Jharkhand State Comprises only 4 blocks surrounded by Deoghar, Dumka, Giridih and Dhanbad district, its whole east side boundary touch with the boundary of West Bengal and we can see significant effect of Bengal culture on the people of Jamtara district. Chittranjan, Jamtara, Vidyasagar are three railway station (on main line Delhi to Howrah) situated in Jamtara district. Education facilities for the people are not so good only six colleges; Twenty-three high schools, one hundred one middle and five hundred three primary schools are running in the juridiction of the district. Literacy percentage of the district is only 42%. As like education health care facility is also not satisfactory only one referral hospital and 165 primary health centers including other centers are available in the district.

Map of Jamtara District

3.2 Socio-economic features

Demographic pattern:

Total area and population of the district is 1,78,643 Lakhs and 4,89,991 Lakhs respectively so its population density is 274 per sq km which is much less than the density (.338 per sq km) of Jharkhand State (Census 1991). The tribal population in the district is 29% of total population; where as percentage of schedule cast population (10%) is comparatively much less in the district (census 2003). From table 3.1 it is clear that variation percentage between male and female ratio is not much wider (51:49) in the district.

Table - 3.1 Block Wise Area & Demographic Pattern of Jamtara District

Sl. No	Block	Area in (ha.)	Total Population (Lakhs)	Male	(%)	Female	(%)
1	Narayanpur	33553	91461	46096	50.40	45365	49.60
2	Jamtara	46111	143304	73335	51.17	69969	48.83
3	Nala	53995	153763	78270	50.90	754934	49.10
4	Kundhit	44984	101463	51583	50.84	49880	49.16
Total		**178643**	**489991**	**249284**		**240707**	

3.3 Irrigation potential and land utilization pattern

Major and minor irrigation facility is not available in the district only rain water harvesting in tank is the major source of irrigation. Total area in all four blocks comes under irrigation facility is 11,400 ha, which is only 11% of the total cultivable land (Net sown + current fallow). Area sown more than once is more in Jamtara block (5478 ha) followed by Nala (4267 ha), Kundhit (4174 ha) and very less area comes under double crop (754 ha) in Narayanpur block (Table 3.2). Pattern of average rainfall per year in all blocks are similar and average rainfall in the district recorded 1342 mm annually.

Table - 3.2 Block Wise Irrigation Potential of Jamtara District

Block	Area under Irrigation (ha.)	Area sown more than once (ha.)	No. of Panchayat	No. of Villages	Average Rainfall (Per year)
Narayanpur	1974	754	19	288	1355
Jamtara	3400	5478	25	248	1377
Nala	3200	4267	20	268	1364
Kundhit	2826	4174	22	344	1271
Total	**11,400**	**14,673**	**86**	**1,148**	**(Av.) 1,342**

Total forest area in the district is 9218 ha. Which is only 5% of the total geographical area of the Jamtara district (Table 3.3). It is a matter of threat because our state have 24% forest area of the state geographical area. Available forest area of the district is more in Narayanpur (33%) followed by Kundhit (27%), Jamtara (25%) and Nala (15%) block (Fig 3.1). Net sown area (78184 ha) in the district is only 44% of the geographical area and a large area comes under uncultivable waste land, current fallow and other categories (Table 3.3). This problems arises a challenge to the scientist, extension workers and planners in the district. Block wise present distribution of uncultivable waste land and current fallow illustrated in Fig 3.2 and 3.3, respectively.

Table - 3.3 Block Wise Land Utilization Pattern (ha.) of Jamtara District

Sl. No.	Block	Forest Area	Land under Tree & others	Un Cultivable Waste Land	Permanent Charagah	Current Fallow	Others Fallow	Net Area Sown
1	Narayanpur	3030	576	2207	1523	5842	4620	11852
2	Jamtara	1381	220	4720	2900	3336	4705	14700
3	Nala	2309	861	8340	3083	9218	9618	20994
4	Kundhit	2498	129	6136	120	2184	3342	30638
Total		**9218**	**1786**	**21403**	**7626**	**20580**	**22285**	**78184**

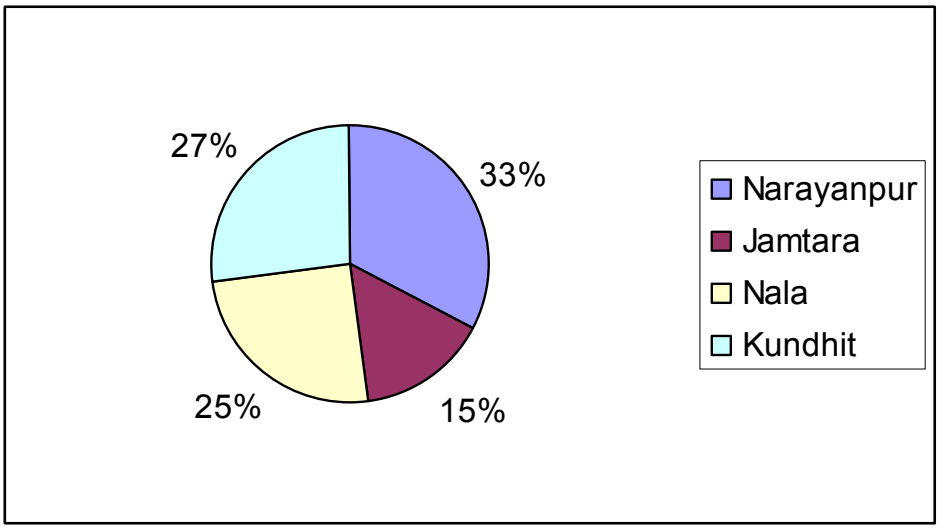


Fig 3.1 Percent Distribution of Forest Area in different blocks of Jamtara District

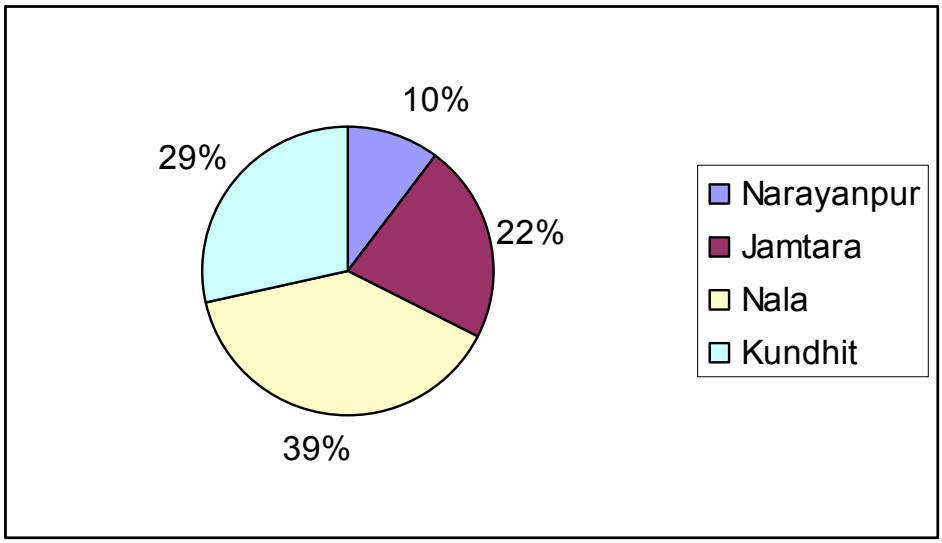


Fig 3.2 Percent Distribution of Uncultivable waste land in different blocks of Jamtara District

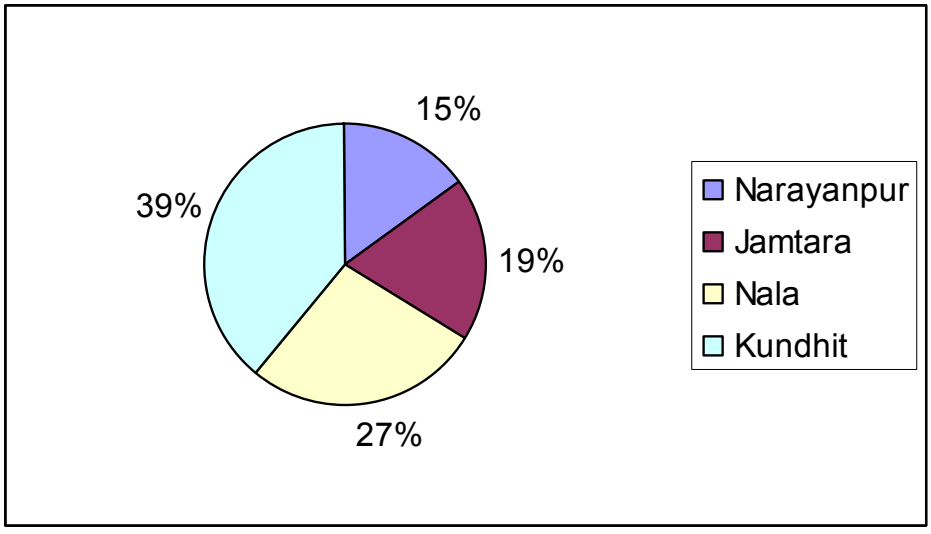


Fig 3.3 Percent Distribution of Net area Sown in different blocks of Jamtara District.

3.4 People below poverty line

It is obvious from table 3.2 that 1,148 villages spread in 86 panchayat of four blocks of the Jamtara district. Table 3.4 shows that 95060 rural families line in villages among them 68340 families comes under below poverty line. The percentage of BPL families of total rural families is 72%, this is a major thrust in Jamtara district for Government and district administration.

Table - 3.4 Information About the District People Below Poverty Line

Sl. No.	Block	No. of Rural Families	No.of BPL Families
1	Naryanpur	23831	16451
2	Jamtara	25741	17026
3	Nala	23747	19516
4	Kundhit	21741	15347
Total		**95060**	**68340**

3.5 Market facility

Very least number of organized markets is available in Jamtara district. In this regards Narayanpur block has only one market where as Kundhit block is comparatively rich in this respect has 4 organized markets. This shows the exploitation of farmers through middleman in villages or in daily market (Table 3.5).

Table - 3.5 Block Wise List of Market in Jamtara District

Block	Name of Market	Time	Material Available
Narayanpur	Narayanpur	8.00 pm to 2.00pm 4.00 pm to 8.00 pm	All essential material available which are required by the local people
Jamtara	Jamtara	--Do--	--Do--
	Mihijam	--Do--	--Do--
	Karmatar	--Do--	--Do--
Nala	Nala	--Do--	--Do--
	Kuldangal	--Do--	--Do--
Kundhit	Kundhit	--Do--	--Do--
	Khajuri	--Do--	--Do--
	Phatehpur	--Do--	--Do--
	Babupur	--Do--	--Do--

3.6 Operational land holding

Operational land holdings of farmer of Jamtara district are very low specially in Narayanpur and Jamtara blocks where 80 and 97 percent families have less than 2 ha land holding. In Nala block a unique feature comes out that there is joint land holdings are more than to personal land holding (Table 3.6). Joint landholders are also in good number in kundhit block and Jamtara block but in very less number in Narayanpur block. This unique variation in the land holding attracts the attention of the agricultural planners and arises special opportunities for the extension and research work in this areas.

Table - 3.6 Block Wise Operational Land Holding in Jamtara District

Block	Operational Holding	No. of Operational Holding						
		Personal	%	Joint	%	Institutional	%	Total
Narayanpur	<1 ha.	9305	53	138	52	-	-	9443
	1 to 2 ha.	4688	27	70	27	-	-	4758
	2 to 4 ha.	3414	20	55	21	-	-	3469
	4 to 11 ha.	35	-	-	-	-	-	35
	>22 ha.	2	-	-	-	-	-	2
Total		**17444**		**263**				**17707**
Jamtara	<1 ha.	12703	66	1001	39	71	90	13775
	1 to 2 ha.	5966	31	744	29	8	10	6718
	2 to 4 ha.	560	3	812	32	-	-	1372
	4 to 11 ha.	-	-	-	-	-	-	-
	>22 ha.	-	-	-	-	-	-	-
Total		**19229**		**2557**		**79**		**21865**
Nala	<1 ha.	4068	55	2805	35	103	99	6976
	1 to 2 ha.	971	13	1210	15	1	1	2182
	2 to 4 ha.	1285	17	2408	30	-	-	3693
	4 to 11 ha.	902	12	1307	16	-	-	2209
	>22 ha.	140	2	278	3	-	-	418
Total		**7366**		**8008**		**104**		**15478**
Kundhit	<1 ha.	6353	53	825	38	14	67	7192
	1 to 2 ha.	2032	17	308	14	2	10	2342
	2 to 4 ha.	1978	16	458	21	2	10	2438
	4 to 11 ha.	1370	11	475	22	2	10	1847
	>22 ha.	220	2	120	5	1	5	341
Total		**11953**		**2186**		**21**		**14160**

3.7 Bank Credit

Table 3.7, 3.8, 3.9 and 3.10 shows the networking of Bank and loan provided by them to the farmers for kharif crop, 2001-2002, respectively in the block of Narayanpur, Jamtara, Nala, and Kundhit. Number of application for providing Bank loan was maximum submitted in Nala block (498) followed by Narayanpur (367), Jamtara (327) and Kundhit (236). This data also shows the awareness of the farmers regarding Bank loan in different blocks for agriculture purpose. Against application form, trend of Bank loan sanction was 19.03 > 11.49 > 10.52 > 3.52 Lakhs respectively in Narayanpur, Nala, Jamtara and Kundhit block of Jamtara district.

Table - 3.7 Loan Provided by Bank for Kharif Crop, 2001-2002 in Narayanpur Block

Name of Bank	No. of appli-cation form	Total amount against application form (lakhs)	No. of accepted application form	Sanctioned amount against accepted application form (lakhs)	No. of application form for loan distribution	Distributed Amount (Lakhs)
S.B.I Narayanpur	84	13.47	84	7.47	84	7.47
S.B.I Chainpur	38	3.80	19	1.05	19	1.05
S.B.I Pandehdih	23	3.10	5	0.35	5	0.27
S.B.I Murliphari	95	9.50	51	7.00	51	7.00
S.B.I Kuruwa	50	8.20	20	2.00	20	1.14
Central Bank of India Mohanpur	41	6.50	30	4.50	20	0.90
S.P Gramin Bank, Pabiya	36	4.80	21	1.45	17	1.20
Total	**367**	**49.37**	**230**	**23.82**	**216**	**19.03**

Table - 3.8 Loan Provided by Bank for Kharif Crop, 2001-2002 in Jamtara Block

Name of Bank	No. of appli-cation form	Total amount against application form (lakhs)	No. of accepted application form	Sanctioned amount against accepted application form (lakhs)	No. of application form for loan distribution	Distributed Amount (Lakhs)
S.B.I Jamtara	68	6.59	28	1.90	28	1.90
S.B.I,Bodma	30	1.78	18	0.87	18	0.87
S.B.I Karmatar	68	3.72	24	1.61	24	1.61
S.P Gramin Bank Mejhiya	54	4.57	22	1.39	22	1.39
S.P Gramin Bank Pabiya	21	1.82	14	1.40	14	1.40
S.P Gramin Bank Dakhin-bihal	16	0.90	2	0.15	2	0.15
S.P Gramin Bank Jamtara	20	1.50	13	0.70	13	0.70
S.P Gramin Bank Mihijam	16	1.33	4	0.30	4	0.30
S.B.I, Mihijam	34	3.07	25	2.30	25	2.20
Total	**327**	**25.28**	**150**	**10.62**	**150**	**10.52**

Table - 3.9 Loan Provided by Bank for Kharif Crop, 2001-2002 in Nala Block

Name of Ban k	No. of appli-cation form	Total amount against application form (lakhs)	No. of accepted application form	Sanctioned amount against accepted application form (lakhs)	No. of application form for loan distribution	Distribut ed Amount (Lakhs)
S.B.I Nala	94	6.65	53	3.38	46	2.90
S.B.I Binda Pathar	47	6.63	20	2.06	20	2.06
S.B.I Palajori	37	4.04	10	0.80	7	0.56
S.B.I Kistopur	131	11.03	54	3.54	51	2.91
S.P Gramin Bank Kuldangal	77	7.06	40	2.00	40	2.00
S.P Gramin Bank Gediya	28	2.80	15	1.35	9	0.70
S.P Gramin Bank Mohanabank	84	5.92	5	0.36	5	0.36
Total	**498**	**44.13**	**197**	**13.49**	**178**	**11.49**

Table - 3.10 Loan Provided by Bank for Kharif Crop, 2001-2002 in Kundhit Block

Name of Bank	No. of appli-cation form	Total amount against application form (lakhs)	No. of accepted application form	Sanctioned amount against accepted application form (lakhs)	No. of application form for load distribution	Distribut ed Amount (Lakhs)
S.B.I kundhit	41	2.44	5	0.22	5	0.22
S.B.I Bagdehri	32	2.45	19	1.70	9	0.45
S.B.I Babupur	21	0.55	3	0.16	3	0.16
Allahabad Bank, Dhshniya	45	2.64	25	1.95	25	1.95
S.P Gramin Bank, Amba	12	0.85	4	0.36	2	0.15
S.P Gramin Bank, Khjuri	25	1.35	16	0.65	8	0.38
S.P Gramin Bank, Phtehpur	60	3.82	13	1.04	5	0.25
Total	**236**	**14.10**	**85**	**6.08**	**57**	**3.56**

3.8 Fertilizer consumption

Very peculiar result shows in table 3.11 of fertilizer consumption in different blocks. It is significantly related to the land holding of the farmers of different blocks. Farmers of Narayanpur and Jamtara are mostly small landholders (Table 3.6) as compare to Nala and Kundhit block. Where as the trend of consumption of fertilizer in 2001-2002 was as follows.

Urea: Narayanpur > Jamtara > Nala > Kundhit
DAP: Narayanpur > Nala > Jamtara > Kundhit
MOP: Kundhit > Narayanpur > Nala > Jamtara

Table - 3.11 Block wise Consumption of Fertilizers (2001-2002)

Name of Block	Fertilizer (M T)					
	Urea		DAP		MOP	
	Target	Distribution	Target	Distribution	Target	Distribution
Narayanpur	1500	325	1000	540	40	12
Jamtara	750	290	500	310	30	7
Nala	750	221	500	320	40	8
Kundhit	750	205	500	220	40	15
Total	**3750**	**1041**	**2500**	**1390**	**150**	**42**

3.9 Rainfall pattern

Monsoon wise rainfall distribution and number of rainy days indicated in table no. 3.12, 3.13, 3.14 and 3.15 respectively of Narayanpur, Jamtara, Nala and Kundhit block.

Table - 3.12 Distribution of Rainfall in Narayanpur Block (2002-2003)

Period	Month	Normal Rainfall	No. of Rainy Days	Percentage of total rainfall	Rainfall during 2001-2002
Pre Monsoon	March	0.00	-	-	6.1
	April	44.4	3	3.03	2.80
	May	78.2	9	5.33	130.8
	Total	**122.60**	**12**	**8.36**	**139.70**
Main Monsoon	June	313.8	14	21.39	405.6
	July	283.4	12	19.31	166.4
	August	300.8	18	20.50	251.2
	September	382.5	19	26.07	138.4
	Total	**1280.50**	**63**	**87.27**	**961.60**
Post Monsoon	October	NA	-	-	258.8
	November	NA	-	-	0.00
	December	0.00	-	-	0.00
	Total	**-**	**-**	**-**	**258.8**
Winter	January	4.8	1	0.33	7.0
	February	59.4	5	4.05	7.0
	Total	64.20	6	4.38	14.0
Annual rainfall		**1467.30**			**1374.10**

Table - 3.13 Distribution of Rainfall in Jamtara Block (2002-2003)

Period	Month	Normal Rainfall	No. of Rainy Days	Percentage of total rainfall	Rainfall during 2001-2002
Pre Monsoon	March	8.8	2	0.65	0.0
	April	45.4	4	3.36	10.4
	May	112.6	6	8.33	170.4
	Total	**166.80**	**12**	**12.34**	**180.80**
Main Monsoon	June	278	15	20.57	376.0
	July	261.2	10	19.33	169.6
	August	305.4	18	22.60	169.8
	September	195.8	16	-	219.6
	Total	**1040.40**	**59**	**77.00**	**935.00**
Post Monsoon	October	79.8	2	-	250.4
	November	00.0	-	-	00.0
	December	00.0	-	-	00.0
	Total	79.8	2	5.91	250.4
Winter	January	4.8	1	-	12.8
	February	59.4	5	-	5.4
	Total	**64.20**	**6**	**4.75**	**18.20**
Annual rainfall		**1351.20**			**1384.40**

Table - 3.14 Distribution of Rainfall in Nala Block (2002-2003)

Period	Month	Normal Rainfall	No. of Rainy Days	Percentage of total rainfall	Rainfall during 1997-98
Pre Monsoon	March	1.2	2	0.12	-
	April	50.0	4	4.96	-
	May	80.8	8	8.02	-
	Total	**132.00**	**14**	**-**	**-**
Main Monsoon	June	190.1	13	18.86	143.0
	July	314.5	7	31.20	236.5
	August	177.3	16	17.59	412.9
	September	169.2	17	16.78	175.2
	Total	**851.10**	**53**	**-**	**967.60**
Post Monsoon	October	-	-	-	145.0
	November	-	-	-	40.0
	December	00.0	-	-	-
	Total	-	**-**	-	185.0
Winter	January	00.0	-	-	-
	February	25.0	4	2.48	-
	Total	**25.0**	**-**	**-**	**-**
Annual rainfall		**1008.10**	**4**		**1152.60**

Table - 3.15 Distribution of Rainfall in Kundhit Block (2002-2003)

Period	Month	Normal Rainfall	No. of Rainy Days	Percentage of total rainfall	Rainfall during 2001-2002
Pre Monsoon	March	5.2	-	-	-
	April	16.8	-	-	-
	May	84.5	-	-	-
	Total	**106.5**	**-**	**-**	**-**
Main Monsoon	June	193.3	-	-	-
	July	316.4	-	-	-
	August	218.6	-	-	-
	September	380.0	-	-	-
	Total	**1108.3**	**-**	**-**	**-**
Post Monsoon	October	NA	-	-	-
	November	NA	-	-	-
	December	00.0	-	-	-
	Total	**-**	**-**	**-**	**-**
Winter	January	-	-	-	-
	February	-	-	-	-
	Total	**-**	**-**	**-**	**-**
Annual rainfall		**-**	**-**		**-**

In Jamtara district 76% rainfall (Fig 3.4) comes in main monsoon (June, July, August, and September). Only 11 % and 10 % comes in post and pre monsoon and very merge rain (3%) receive in winter monsoon (Table 3.16). In year 2002-2003 only 78 days in year was rainy day. In four month of main monsoon 58 days (Fig 3.5) rain was fell and rest 20 days rainy days distributed in 8 months (Table 3.17)

Table 3.16 Rainfall distribution pattern in Jamtara district

Block	Year	Pre Monsoon	Main Monsoon	Post Monsoon	Winter Monsoon	Total
Narayanpur	2001-2002	139.70	961.60	258.80	14.0	-
	2002-2003	122.60	1280.50	-	64.20	-
Jamtara	2001-2002	180.80	935.00	250.40	18.20	-
	2002-2003	166.80	1040.40	79.80	64.20	-
Nala	1997-1998	-	967.60	18.00	-	-
	2002-2003	132.00	851.10	-	25.0	-
Kundhit	2001-2002	-	-	-	-	-
	2002-2003	106.50	1108.30	-	-	-
Average	-	141.40	1020.51	151.75	37.12	1350.77
Percentage of total rainfall		10	76	11	3	-

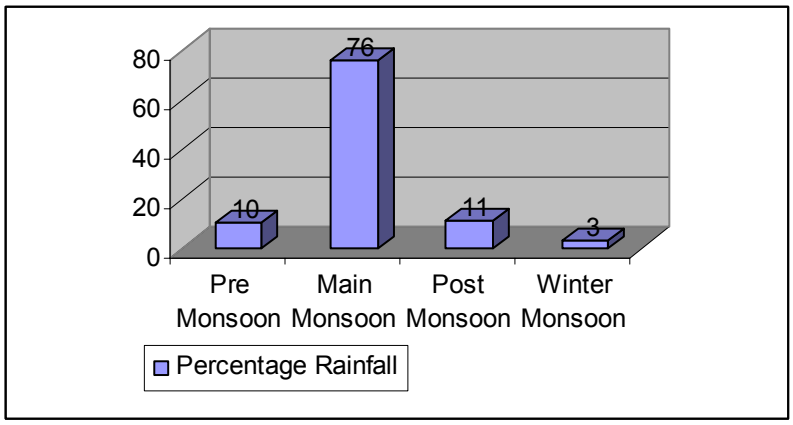


Fig 3.4 Average rainfall distribution pattern in Jamtara District

Table 3.17 No. of Rainy days in each block of Jamtara district (2002-2003)

Monsson	**Block**				
	Narayanpur	**Jamtara**	**Nala**	**Kundhit**	**Average rainy days in district**
Pre Monsoon	12	12	14	NA	13
Main Monsoon	63	59	53	NA	58
Post Monsoon	NA	2	NA	NA	2
Winter Monsoon	6	6	4	NA	5
Total	-	-	-	-	78

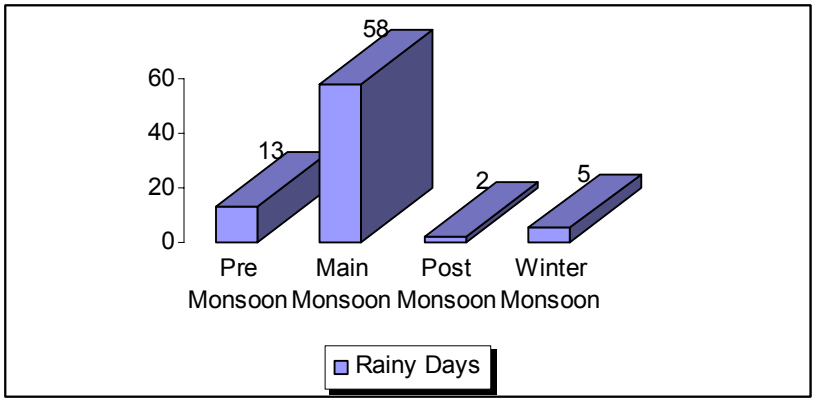


Fig 3.5 Average rainy days in different monsoon season in Jamtara

List of NGOs Working in Jamtara District

1. **Md. Kudush Ansari**
   Secretary
   Sidhukanu Alpsankhayak Vikas Samiti
   Dhenkipara, Mihijam
   Dist Jamtara, Jharkhand

2. **Smt Rahil Tudu**
   Secretary
   Lok Chirag Seva Sansthan
   Malpara, Mihijam
   Dist Jamtara, Jharkhand

3. **Smt Bula Dey**
   Pravala Samaj Sevi Sansthan
   Krishna Nagar, Mihijam
   Dist Jamtara, Jharkhand

4. **Smt Ila Sarkar**
   Mahila Vikas Samiti
   P. Banerji Road, Mihijam
   Dist Jamtara, Jharkhand

5. **Smt K. Sushila**
   Secretary
   Srishti
   Mihijam
   Dist Jamtara, Jharkhand

6. **Sri B.B. Thakur**
   Secretary
   Durgesh Lok Lalit
   Kayasthapara, Supaydih Road
   Dist Jamtara, Jharkhand
   Phone – 06433 – 222938

7. **Sri Sompal**
   Secretary
   Jharkhand Jagriti Sanstha
   Mihijam Road, Jamtara
   Dist Jamtara, Jharkhand
   Pin – 815354

8. **Sri Onkar**
   Secretary
   Chetna Vikas Sansthan
   New Colony, Pokhartalla
   Mihijam, Dist. - Jamtara
   Jharkhand,

9. **Sri Subhash Ray**
   Secretary
   Mihijam Viklang, Mahila
   Val Vikas Samiti
   New Colony Pokhartalla
   Mihijam, Dist. - Jamtara

10. **Sri Pramod Kumar Singh**
    Secretary
    Vidyasagar Samajik
    Suraksha & Sodh Sansthan
    Kayasthapara, Jamtara
    Dist.–Jamtara, Jharkhand

11. **Sri Ram Vinod Singh**
    Sri Shaila Seva Sansthan
    Chatadangal, Mihijam
    Dist. – Jamtara, Jharkhand

12. **Smt. Sarita Singh**
    Secretary
    Gramoday Sansthan
    Paredih, Jamtara
    Dist.- Jamtara, Jharkhand

13. **Smt. Nanda Singh**
    Secretary
    Adishakti, Nari Vikas Sanstha
    P.O.- Vidyasagar (Karmatar)
    Dist Jamtara, Jharkhand

14. **Ashok Kumar Mahto**
    Secretary
    Gram Unnayan Foundation
    Vill.- Amlachatar
    P.O. Asanchua, Dist.- Jamtara
    Jharkhand, Pin – 815354

15. **Sri Anil Sinha**
Secretary
Madanpuri Seva Vikas Sansthann
Court Road, Jamtara
Dist Jamtara, Jharkhand

16. **Sri Bajrang Singh**
Secretary
Badlao Foundation
Station Road, Mihijam
Dist Jamtara, Jharkhand
Pin – 815354
Phone – 06433-228592

17. **Smt. Saloni Hembram**
Secertary
Gram Seva Samiti Gopalpur
Vill.- Gopalpur, PO.- Ranitar
Dist. – Jamtara, Jharkhand

18. **Okar Seva Sansthan**
Block Road, Jamtara
Dist. – Jamtara, Jharkhand

19. **Virsamunda Samajik Seva Sansthan**
Block Road, Jamtara
Dist. – Jamtara, Jharkhand
Mihijam

20. **Sri Mithilesh Kumar Singh**
Kishor Chetana Manch
Vishwakarma Mandir Road
Kurmipara, Mihijam
Dist Jamtara, Jharkhand

21. **Gram Seva Jivan Jyoti Campus**
Vill.- Gopalpur
P.O. - Ranitar
Via. - Narayanpur
Dist Jamtara, Jharkhand

22. **Rungti Chandra**
Jago Bahna Samiti
Block Road, Jamtara
Dist Jamtara, Jharkhand

23. **Sri Lashkar Tudu**
Ashish
Vill. – Kala Jharia
P.O. - Madankatta
Dist Jamtara, Jharkhand

24. **Sri Ashok Sinha**
Ashok Electronic Development
Matri Ashram, Jamtara
Dist.–Jamtara, Jharkhand

25. **Smt. Subhashini Kisku**
Vidyasagar Women Dev. Society
Vidyasagar, Kalitalla
Dist. – Jamtara, Jharkhand

26. **Sri Dinesh Chaudhari Dinesh**
Secretary
Jago Jharkhand
Dumka Road, Jamtara
Dist.- Jamtara, Jharkhand

27. **Sri B. C. Setthi**
Johar
Paredih, Jamtara
Dist Jamtara, Jharkhand

28. **Smt. Jayanti Devi**
Sanklap
Jamtara
Dist.- Jamtara, Jharkhand

IV. Description of Ongoing Extension and Development Activities in the District

Jamtara is a newly established district of Jharkhand State. In this district very scanty facilities are available in all line departments as compare to well establish district.

4.1 Ongoing scheme of Agriculture department

A. Centrally sponsored macro-management scheme.

1. Demonstration of coarse millet.
2. Construction of wells in selected seed multiplication farms.
3. Up-gradation of farm buildings.
4. Trench fencing of selected seed multiplication farms.
5. Construction of water harvesting tank.
6. Aforestation in selected farm.
7. Conducing Kharif workshop in district, blocks & panchayat level
8. Production of certified seed.
9. Demonstration on cultivation of green manuring crops.
10. Demonstration on integrated pest management.
11. Distribution of metal bins, pumps sets & sprayers.
12. Distribution of vermin compost to farmers.
13. Conducting two days training programme under ICDP scheme.
14. Technical demonstration on wheat products.
15. Demonstration of wheat production using zero tillage.

B. State Scheme (2003)

1. Holding kishan mela in district head quarters felicitating the progressive farmers.
2. Paddy seed exchange programme.
3. Distribution of improved seed in subsidised rate.
4. Creation of information center in district head quarter.

4.2 Horticulture

1. Fruit production programme.
2. Nursery development programme.
3. Vegetable and floriculture development programme.

4.3 Animal Husbandry & Dairy development

1. R.P. Scheme (NPRE)
2. B.D. Scheme
3. Post stage III CD block
4. Key village scheme
5. Formation of dairy co-operative society.

4.4 Information of Infrastructure.

District level infrastructure is not available in newly formed Jamtara district in any line department. While Jamtara was an old sub divisional so it has following infrastructure facilities in different line department.

Agriculture

1. Seed multiplication farm: Three farms with farms house, threshing floor are available in depicted condition.
2. One sub divisional office building is in good condition.
3. Information center building is in good condition.

Animal Husbandry

1. Well-established sub divisional Animal husbandry hospital in Jamtara.
2. Block Animal husbandry hospital in each 4 blocks.

Horticulture

1. Flower nursery with one room quarter in Jamtara.

Fisheries

1. Office building with breeding and rearing tank at Jamtara but present status is not satisfactory.

Forest department.

1. Well-established office in good condition at Jamtara.
2. Three permanent nurseries and two temporary nurseries.

V. Identification Description and Analysis of Existing Farming System under AES

5.1 Agro-Ecological Situation

Planning commission, Govt. of India has divided whole country in 15-agro climatic Zone. Jharkhand State falls under VIIth Agro climatic Zone. This State also divided in to three-agro climatic region i.e, IVth , Vth, VIth. Among three Jamtara district comes under IVth (central and North Eastern plateau region) Agro climatic region. Based on the variation in topography, soil types and its problem, availability of irrigation and cropping pattern, Jamtara district has been divided in to four Agro-Ecological Situations (AESs) for the purpose of SREP preparation. One representative village of each AES was selected for participatory data collection through multidisciplinary AES team. The village selected for such study is given in table 5.1. All the villages selected are located 15 to 50 km from the district head quarter, Jamtara.

Table - 5.1 AES and selected villages for participatory data collection

Agro-Climatic Zone	Agro-Ecological Situation	Selected Village	Panchayat	Block
VII Eastern Plateau And Hills	**I Up land (Tar) – Eroded Soil – Rainfed**	Jagarnathpur (Pradhan Tola)	Ranitar	Narayanpur
	II Medium land – Sandy loam – Rainfed	Bandardiha	Kariya	Nala
	III Medium land – Sandy loam – Tank Irrigated	Mohanpur	Nala	Nala
	IV Low land – Alluvial Soil – Rainfed	Khajuriya	Fatehpur	Kundhit

5.2 Demographic pattern

Small villages are scattered in all-around the district. Average population of the selected villages is 477. The male and female population varies 54 Percent and 46 Percent respectively of total population. Agriculture is the main occupation of the villagers work in either their own field or as labour in others field, only 7% people are engaged in Non-Agricultural job.

Cast distribution is also very peculiar and all four representative villages are dominated by ST, BC and SC category. Literacy percentage varies from 20 to 80 Percent in representative village, while average literacy rate 43 Percent (table 5.2) is very close to average literacy rate of Jamtara (42%) district.

Table - 5.2 Demographic Pattern of Representative Village Under Four AES

Sr.No.	Indicator	Numbers in different AES				
1	**A. Population**	**AES I**	**AES II**	**AES III**	**AES IV**	**Average**
	Male	60	270	420	275	256
	Female	90	230	357	205	220
	Total	**150**	**500**	**777**	**480**	**477**
2	**B. No. of Workers**					
	Agriculture	75	340	500	350	316
	Non – Agriculture	-	-	20	50	35
3	**C. Caste distribution**					
	S.C.	-	-	40	-	40
	S.T.	150	440	100	-	230
	OBC	-	60	637	480	392
	General	-	-	-	-	-
4	**D. Literacy (%)**	**33%**	**20%**	**80%**	**40%**	**43%**

5.3 Land Utilization pattern

Total geographical area of the four representative villages is 527 ha. Out if which 306 ha is cultivable land but really cultivated area in all four villages is 304 ha, it is only 58% of the total geographical area. Cultivable wasteland is more (24 ha) in rainfed (Tar) eroded situation followed by 8 ha in AES-III. Details of land utilization pattern of 4 villages are given in table 5.3 and Fig 5.1.

Table - 5.3 Land Utilization Pattern of Representative Village Under Four AES

Sl. No.	Particular	Area in ha.				
		AES I	**AES II**	**AES III**	**AES IV**	**Total**
1	Geographical area	83	79	208	157	**527**
2	Cultivable area	63	59	106	140	**368**
3	Cultivated area	32	54	98	120	**304**
4	Cultivable waste land	24	-	8	-	**32**
5	Current fallow	7	5	2	20	**34**
6	Forest	16	12	-	-	**28**
7	Pasture	4	8	4	8	**24**
8	Land put to non-agriculture use	-	-	-	1	**1**
9	Land under misc. plantation	-	-	10	-	**10**
10	Barren & uncultivable land	-	-	-	8	**8**

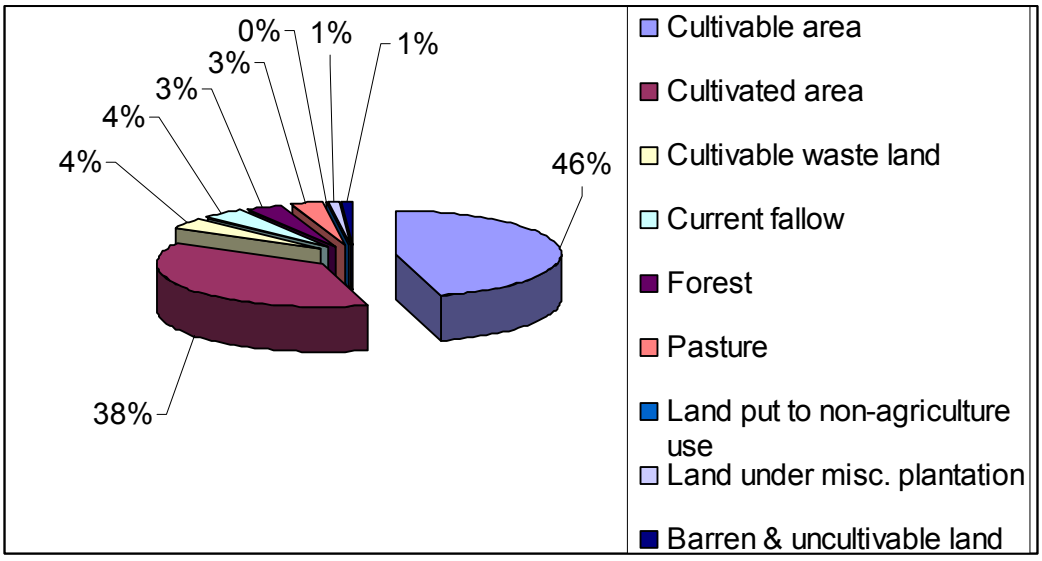


Fig 5.1 Average Land utilization pattern of representative village.

5.4 Operation land holdings

Most of the families are marginal (< 1 ha) and small (1-2 ha) in all representative villages (Fig 5.2). Only 3,4,7 and 10 are medium farmers (2-4 ha), respectively in AES-I, II, III and IV (Table 5.4).

Table - 5.4 Information on Operational Land Holding in the Representative Village

		Numbers and Area in each AES							
		AES I		AES II		AES III		AES IV	
Sl.No.	Size	No.	Area	No.	Area	No.	Area	No.	Area
1	**Landless**	-	-	-	-	-	-	-	-
2	Marginal (<1ha.)	10	8	45	20	54	50	55	49
3	Small (1-2 ha.)	12	15	21	25	7	12	13	35
4	Medium (2-4 ha.)	3	9	4	9	7	18	11	30
5	Large (4-10 ha.)	-	-	-	-	2	18	1	6
6	Very large (>10 ha)	-	-	-	-	-	-	-	-
Total		**25**	**32**	**70**	**54**	**70**	**98**	**80**	**120**

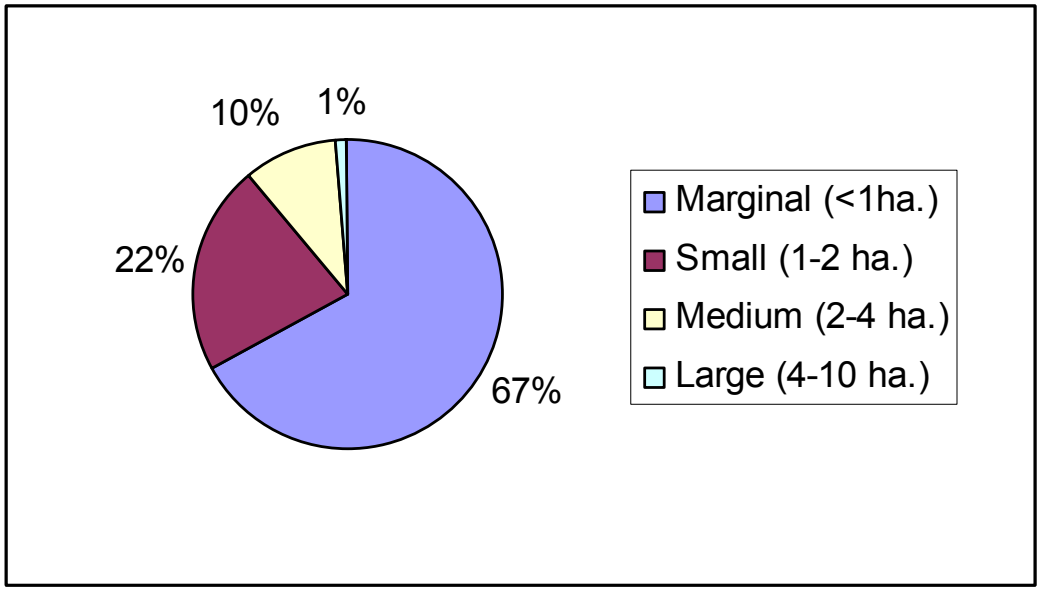


Fig 5.2 Average distribution of operational land holding in four AESs of Jamtara district.

5.5 Soil

Whole the district has unique type of topography; lands are undulating and clearly divided in to upland, medium land and low land situation. This special feature of land has direct correlation with cropping pattern, depth of soil, soil problems and its management, it also provides a challenge for the agricultural extension workers and scientist for better agricultural management in this area. Uplands soil has erosion and degradation problems and these soils are slightly to moderately acidic in nature. Medium land soils are more deep, sandy loam and less acidic to upland. Lowland soils have alluvial soil, neutral in reaction and more suitable for paddy crop but poor drainage facility created problems in productivity of these soils. Information of soils from 4 selected villages is presented in table 5.5.

Table – 5.5 Information on Soils of Selected Villages

		Area under different soils in ha.			
Sl.No.	**Type of Soil**	**AES I**	**AES II**	**AES III**	**AES IV**
1	Red or mixed red laterite	27	37	79	56
2	Alluvial	5	17	17	64
3	Black	-	-	-	-
4	Brown Forest	-	-	-	-
5	Soil Problem	-	-	-	-
1	Iron toxicity	-	-	-	-
2	Water Logging	-	-	0.5	-
3	Alkaline	-	-	-	-
4	Saline	-	1	4.0	1
5	Micronutrient	-	-	-	-

5.6 Irrigation

Very merge irrigation facility is available in this district. Out of 4 selected villages almost 3 villages have to adopt rainfed cultivation. Only in AES III 50 Percent area of cultivated land are irrigated through WHT (20 ha), Wells (4 ha) and small canals (10 ha). From the table 5.6 it is much clear that rainwater harvesting and its proper utilization is only option to increase irrigation facility in the district.

Table – 5.6 Irrigated Area of Representative Villages Under Five AES

Sl. No.	Source of Irrigation	Area under different irrigation sources in ha.			
		AES I	AES II	AES III	AES IV
1	Major	-	-	-	-
2	Medium	-	-	-	-
3	Lift Irrigation	-	-	15	-
4	Water Holding Tank (W H T)	-	2	20	-
5	Wells	-	1	4	-
6	Small Canal (Joriya)	-	1	10	5
	Total	**-**	**4**	**49**	**5**
	Rain fed area	32	50	49	115

5.7 Production and Productivity of important commodities under different enterprises.

A. Agriculture

Rainfed paddy based farming system is dominated in whole the district. The main crop grow by the farmers are Paddy, Maize, Arhar, Kulthi, Rangi and recently wheat crop becomes popular specially in irrigated area. Table 5.7 also shows that area of Ragi and Kulthi in all AES drastically reduced and area of (Maize + Arhar, Paddy + Arhar) mixed cropping is in increasing trend. Productivity per hactare in all AES almost shows similar trend and recently increase in productivity over 1997 only significant in paddy and maize crop, rest does not show any significant increase in yield during last five year.

Table 5.7 Trend in area and productivity of main Agriculture crops.

Crop	Year	Area in ha in different AES				Productivity in q / ha in different AES			
		I	II	III	IV	I	II	III	IV
Paddy	2002	25	48	86	70	18	20	30	25
	1997	28	50	86	75	18	18	22	22
Maize	2002	7	4	33	20	25	27	30	28
	1997	2	4	30	15	20	20	21	20
Arhar	2002	7	4	15	10	6	6	7	7
	1997	0.5	1	5	5	6	6	7	7
Kulthi	2002	3	5	1	8	5	5	6	5
	1997	7	7	4	8	5	5	5	5
Ragi	2002	1	0.5	-	1	8	9	-	8
	1997	4	5	1	3	8	9	7	8
Wheat	2002	-	4	33	3	-	15	20	20
	1997	-	-	10	-	-	-	15	-

B. Horticulture

In table 5.8, productivity trend of some important vegetable are indicated. Actually due to rainfed farming and stray cattle grazing farmers do not adopt this important enterprises commercially. They grow vegetables only for own consumption in a small area, while in AES-IV. Bitter guard and tomato cultivation in kharif season recently has been very popular and established as one main enterprise. This table shows the vast scope of vegetable production in the Jamtara district.

Table - 5.8 Trend in Productivity of Vegetables in Different AES

Crop	Year	Productivity in Q. / ha in different AES			
		AES I	AES II	AES III	AES IV
Tomato **	2002	70	120	120	150
	1997	70	100	100	120
	1992	70	80	70	100
Onion *	2002	-	180	190	190
	1997	-	175	190	180
	1992	-	175	150	180
Bitter Guard **	2002	50	70	80	90
	1997	40	70	70	80
	1992	40	70	60	80
Okra *	2002	70	90	100	120
	1997	70	80	100	100
	1992	70	70	80	100
Brinjal *	2002	-	110	140	120
	1997	-	110	135	120
	1992	-	110	120	120
Pumpkin *	2002	-	120	130	100
	1997	-	120	130	90
	1992	-	120	130	90
Cauliflower *	2002	-	100	120	120
	1997	-	100	120	120
	1992	-	100	120	120
Palak Sag *	2002	-	70	60	70
	1997	-	60	60	-
	1992	-	-	-	-

* *Grow in kitchen garden in Kharif season for own consumption.*

** *Kharif crop of Bitter Guard and Tomato grow in large scale for commercial purpose in AES IV only.*

C. Livestock Production System

I. Dairy animals:-

Milk production per year per animal (cow/Buffalo) is very poor in Jamtara district, where as cattle population is very large. The main reason of this is local breed and scanty feed management and faulty health care facility in the district. Goat and sheep does not use for milk purpose in this region (Table 5.9).

Table - 5.9 Trend in Productivity of Dairy Animals

Animals	Year	Average yield per animals \ year (in lit)			
		AES I	AES II	AES III	AES IV
Cow	2002	80	150	170	180
	1997	80	150	170	180
	1992	80	150	170	180
Buffalo	2002	-	320	500	240
	1997	-	300	500	240
	1992	-	-	500	240
Goat	2002	*	*	*	*
	1997	*	*	*	*
	1992	*	*	*	*
Sheep	2002	*	*	*	*
	1997	*	*	*	*
	1992	*	*	*	*

*(* Used only for meat purpose)*

II. Meat animals

As like meat animals is also not satisfactory in all AES of Jamtara district. An effect of different AES significantly shows their affect on annual meat production by per meat animal. Goat rearing is common in all AES by most of the families. While sheep reared by some farmers in these AES. Pig farming is notice only in AES-I and AES-II. Increase in trend of meat production slightly increased in AES-I, AES-II and AES-III in goat only over past (Table 5.10).

Table - 5.10 Trend in Productivity of Meat Animals

Animals	Year	Average yield (kg) / year			
		AES I	AES II	AES III	AES IV
Goat	2002	8	13	12	10
	1997	7	10	10	10
	1992	7	10	10	10
Sheep	2002	8	12	15	8
	1997	8	10	15	8
	1992	8	10	15	8
Pig	2002	50	50	-	-
	1997	45	50	-	-
	1992	40	50	-	-

III. Poultry Birds

Hen and Duck rearing is a common practice in all AES of Jamtara district except AES Iof Jamtara district, where duck rearing is not common due to lack of WHT. Meat and egg production per bird per year is not satisfactory and it varies in different AES. Minimum egg production by hen recorded in AES-I and maximum in AES-II, where as number of egg per duck per year was highest in AES-III and lowest is AES-IV (Table 5.11)

Table - 5.11 Trend in Productivity of Poultry Birds

Poultry	Year	Average productivity per / hen year							
		AES I		AES II		AES III		AES IV	
		Meat	Egg	Meat	Egg	Meat	Egg	Meat	Egg
		Kg.	No.	Kg.	No.	Kg.	No.	Kg.	No.
Hen	**2002**	4	32	6	50	6	55	5	60
Duck	**2002**	-	-	7	45	8	60	5	40

IV Fish Production System

A fishery is not an enterprise in AES-I and AES-IV, while some families of AES-II and AES III are associated with this important enterprise. Area of fish production is also very limited due to the lack of perennial WHT. Most of the tanks in this region dry up after winter season, so it affects the production of fish significantly (Table 5.12).

Table - 5.12 Yield of fish / prawn in different AES

Commodity	Year	Yield in q / ha of water spread area in different AES							
		AES 1		AES 1I		AES 1II		AES 1V	
		A	P	A	P	A	P	A	P
Fresh Water Fish	**2002**	-	-	1	4	2	5	-	-
	1997	-	-	0.5	4	1	4	-	-
	1992	-	-	0.5	2	1	4	-	-

5.8 Analysis of Existing Farming System

In each Agro-ecological Situation several Existing farming system is in practice. At the time of PRA some farming system noticed more predominant in all four AES of Jamtara District.

EFS – 2 Agriculture – Animal Husbandry
EFS – 3 Agriculture – Animal Husbandry – Horticulture
EFS – 4 Agriculture – Animal Husbandry – Horticulture – Fisheries

The landless labourers mostly depend on wages. They get work in village or around the village only at the time of sowing and harvesting of Kharif Crop. Rest of the year they have to migrate in town or metropolitan city to search their wages. The number of families associated with different enterprises in representative villages of each AES presented below:-

Table - 5.13 Number of Families Associated with Different Enterprises in each AES

Sl.No.	Enterprises	Number of families associated with different enterprises in representative villages of AES			
		AES I	AES II	AES III	AES IV
1	**Agriculture**	25	70	70	80
	Irrigated crops	-	-	35	-
	Non irrigated crops	25	70	35	80
2	**Horticulture**				
	Orchard	*	*	-	-
	Vegetables	*	*	*	11
3	**Animals Husbandry**				
	Sheep	3	10	3	4
	Goat	25	60	10	60
	Buffalo	-	4	5	6
	Cow	15	45	60	70
	Pig	10	42	-	-
	Poultry	25	70	15	40
4	**Duckery**	-	7	5	10
5	**Fishery**	-	5	9	-
6	**Agril. Laboures**	5	52	65	72
7	**Non-farm enterprises**	-			
	Regular service	-	-	3	4

(In very Limited Area grow by all families for their own consumption)*

In each farming system various commodities are grown, the area and parentage of each farming situation under a particular commodity are mentioned in following tables :-

Table - 5.14 Spread of Paddy Area in Different Farming Situation

		Spread in Different AES (A - Area) in ha. of area							
Sl.No.	Farming Situation	AES I		AES II		AES III		AES IV	
		A	%	A	%	A	%	A	%
1	Direct Sown – Rainfed	10	40	10	21	2	2	10	14
2	Transplanted – Rainfed	13	52	27	56	60	70	25	36
3	Transplanted – Irrigated	2	8	9	19	13	15	35	50
4	Transplanted – Rainfed – Water logged	-	-	2	4	11	13	-	-
Total		**25**	**100**	**48**	**100**	**86**	**100**	**70**	**100**

Table - 5.15 Spread of Area of Non-Paddy Crops in Different Farming Situations

Crop	Farming Situations	Spread in different AES (A = Area in ha, % of area)							
		AES I		AES II		AES III		AES IV	
		A	%	A	%	A	%	A	%
Maize	Kharif Rainfed	7	100	4	100	33	100	20	100
Wheat	Irrigated	-	-	4	100	33	100	3	100
Kulthi	Rainfed	3	100	5	100	1	-	8	100
Arhar *	Rainfed	4	100	5	100	4	100	3	100
Marua (Ragi)	Rainfed	1.0	100	0.5	100	-	-	10	100
Mustered	Rabi Irrigated	-	-	-	-	3	100	-	-
Bitter guard	Rainfed	-	-	-	-	-	-	7	100

* *Mixed cropping with maize and direct sown paddy*

Table - 5.16 Spread of Farm Families in Different AES Under Various Livestock Poultry and Fisheries Farming Situation

Animal Birds	Farming Situations	Spread of farm families in selected villages of different AES							
		AES I		AES II		AES III		AES IV	
		A	%	A	%	A	%	A	%
Cow	Local	15	100	45	100	70	100	60	100
Buffalo	Local	-	-	4	100	20	100	5	100
Goat	Local	25	100	55	92	50	100	10	100
Sheep	Local	3	100	10	100	30	100	3	100
Poultry	Local	25	100	65	-	34	-	40	-
Duckery	Local	1	100	7	-	20	-	10	-
Fisheries	Bangal and Ganga Finger lings	-	-	9	-	9	-	-	-

5.9 Gap in adoption of technology

During the participatory data collection by multidisciplinary team in all four representative villages of Jamtara district the gaps in adoption of technologies for different commodities have been recorded. The reason of non-adoption of technologies by the farmers comes out on the surface during PRA. The following tables indicate a detail picture of the gap in adoption of recommended practices under different farming situation in respect to various commodities. The gap in adoption has been recorded as N,P & F where 'N' stand for nil gap, 'P' stand for partial gap and 'F' stand for full gap.

A. AGRICULTURE

CROP : PADDY

F S_1 : Direct Sown - Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Sowing**				
	- Time	P	P	-	P
	- Method	F	F	-	F
2	Varieties	F	P	-	P
3	Seed Rate (per ha.)	P	P	-	P
4	Seed Treatment	F	F	-	F
5	Organic manure (tons / ha.)	P	P	-	P
6	**Fertilizer / Nutrient (kg /ha)**			-	
	- Basal (N+P+K)	P	P	-	P
	- Top dress (M+)	P	P	-	P
7	**Method of fertilizer use**			-	
	- Basal	P	P		P
	- Top dressing	P	P	-	P
8	**Micro nutrient (specify)**			-	
	- Basal	-			
	- Top dress	-		-	
9	**Pest Management**				
	- Stem borer	-		-	
	- Gandhibug	P	P	-	P
10	**Disease Management**				
	Blast	F	F	-	F
11	**Weed Management**				
	- Mechanical	F	F	-	F
	- Herbicide	F	F	-	F
12	**Water Management**				
	- Number of irrigations	P	P	-	P
	- Method of irrigation	-			
13	**Land Management**				
	- Salinity / Acidity	F	F	-	F
	- Water logging	-			
14	Method of Harvesting	N	N	-	N
15	Any other				
	Average Yield (Q. / ha.)				
	- Grain	P	P	-	P
	- Fodder	P	P	-	P

N.B. "--------" Less than 10% area comes under particular farming situation in the AES

CROP : PADDY

F S $_2$: Transplanted – Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Sowing**				
	Time	P	P	P	P
	Method	F	F	F	F
2	Varieties	P	P	P	P
3	Seed Rate (per ha.)	P^+	P^+	P^+	P^+
4	Seed Treatment	F	F	F	F
5	Organic Manure (tons / ha.)	F	F	F	F
6	**Fertilizer / nutrient (kg /ha)**				
	- Basal (N+P+K)	P	P	P	P
	- Top dress (M+)	P	P	P	P
7	**Method of Fertilizer use**				
	- Basal	N	N	N	N
	- Top dressing	P	P	P	P
8	**Micro Nutrient (specify)**				
	- Basal				
	- Top dress				
9	**Pest Management**				
	- Stem borer				
	- Gandhibug	F	F	P	P
10	**Disease Management**				
	- Blast	F	F	F	F
11	**Weed Management**				
	- Mechanical	P	P	P	P
	- Herbicide	F	F	F	F
12	**Water Management**				
	- Number of Irrigations	F	F	F	F
	- Method of Irrigation	F	F	F	F
13	**Land Management**				
	- Salinity / Acidity	F	F	F	F
	- Water logging				
14	Method of Harvesting	P	P	P	P
15	Any other				
	Average Yield (Q / ha.)				
	- Grain	P	P	P	P
	- Fodder	P	P	P	P

CROP : PADDY

F S $_3$: Transplanted – Irrigated

Sl. No.	Items of Package	Gap in Adoption in Different AES			
1	**Sowing**	**AES I**	**AES II**	**AES III**	**AES IV**
	- Time	-	-	P	-
	- Method	-	-	F	-
2	Varieties	-	-	P	-
3	Seed Rate (per ha.)	-	-	P+	-
4	Seed Treatment	-	-	F	-
5	Organic Manure (tons / ha.)	-	-	F	-
6	**Fertilizer / Nutrient (kg / ha.)**				
	- Basal (N + P + K)	-	-	P	-
	- Top dress (M+)	-	-	P	-
7	**Method of fertilizer use**				
	- Basal	-	-	N	-
	- Top dressing	-	-	P	-
8	**Micronutrient (specify)**				
	- Basal	-	-		-
	- Top dressing	-	-		-
9	**Pest Management**				
	- Stem borer	-	-		-
	- Gandhibug	-	-	P	-
10	**Disease Management**				
	Blast	-	-	F	-
	-				
11	**Weed Management**				
	- Mechanical	-	-	P	-
	- Herbicide	-	-	F	-
12	**Water Management**				
	- Number of Irrigations	-	-	P	-
	- Method of Irrigation	-	-	P	-
13	**Land Management**				
	- Salinity / Acidity	-	-	-	-
	- Water Logging	-	-	N	-
14	**Method of Harvesting**	-			
15	Any other	-	-		-
	Average Yield (Q / ha.)				
	- Grain	-	-	P	-
	- Fodder	-	-	P	-

N.B. "-" Less than 10% area comes under particular farming situation in the AES

CROP : PADDY

F S $_4$: Transplanted – Rainfed – Waterlogged

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Sowing**				
	- Time	-	P	P	P
	- Method	-	F	F	F
2	Varieties	-	P	N	P
3	Seed Rate (per ha.)	-	P+	P+	P+
4	Seed Treatment	-	F	F	F
5	Organic Manure (tons / ha.)	-	F	P	P
6	**Fertilizer / Nutrient (kg / ha.)**				
	- Basal (N+P+K)	-	P	P	P
	- Top dress (M+)	-	P	P	P
7	**Method of fertilizer use**				
	- Basal	-	N	N	N
	- Top dressing	-	P	P	P
8	**Micro Nutrient (specify)**				
	- Basal	-			
	- Top dress	-			
9	**Pest Management**				
	- Stem borer	-			
	- Gandhibug	-	F	P	P
10	**Disease Management**				
	- Blast	-	F	F	F
11	**Weed Management**				
	- Mechanical	-	P	P	P
	- Herbicide	-	F	F	F
12	**Water Management**				
	- Number of Irrigations	-	P	P	P
	- Method of Irrigation	-	N	N	N
13	**Land Management**				
	- Salinity / Acidity	-			
	- Water logging	-	F	F	F
14	Method of Harvesting	-	N	N	N
15	Any other				
	Average Yield (Q / ha.)				
	- Grain	-	P	P	P
	- Fodder	-	P	P	P

N.B. "---˙----" Less than 10% area comes under particular farming situation in the AES

CROP : MAIZE

F S : Kharif – Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	Sowing:				
	- Time	P	P	P	P
	- Method	F	F	F	F
2	Varieties	N	N	N	N
3	Seed Rate (per ha.)	P	P	P	P
4	Seed Treatment	F	F	F	F
5	Organic manure (tons / ha.)	P	P	P	P
6	**Fertilizer / Nutrient (kg / ha)**				
	- Basal (N+P+K)	P	P	P	P
	- Top dress (M+)	P	P	P	P
7	**Method of fertilizer use**				
	- Basal	P	P	P	P
	- Top dressing	P	P	P	P
8	**Micro nutrient (specify)**				
	- Basal	-			
	- Top dress	-			
9	**Pest Management**				
	Termite	F	F	F	F
	Stem borer	F	F	F	F
10	**Disease Management**				
	- Heliminthosporium	F	F	F	F
	- Blight	F	F	F	F
11	**Weed Management**	P	P	P	P
	- Mechanical				
	- Herbicide	F	F	F	F
12	**Water Management**				
	- Number of Irrigations	F	F	P	F
	- Method of Irrigation	P	P	P	P
13	- **Land Management**				
	- Salinity / Acidity	F	F	F	F
	- Water logging	N	N	N	N
14	Method of Harvesting	N	N	N	N
15	Any other				
	Average Yield (Q / ha.)				
	- Grain	P	P	P	P

CROP : ARHAR

F S : Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	Sowing				
	- Time	P	P	P	P
	- Method	P	P	P	P
2	Varieties	F	P	P	P
3	Seed Rate (per ha.)	P	P	P	P
4	Seed Treatment	F			
5	Organic Manure (tons / ha.)	F	P	P	F
6	**Fertilizer / Nutrient (kg /ha)**				
	- Basal (N+P+K)	F	P	P	P
	- Top dress (M+)	-	P	P	P
7	**Method of fertilizer use**				
	- Basal	P	P	P	P
	- Top dressing	-	P	P	P
8	**Micro Nutrient (specify)**				
	- Basal	-			
	- Top dress	-			
9	**Pest Management** Termite				
		F	F	F	F
	Fruit borer	F	F	P	P
10	**Disease Management** Wilt				
		F	F	F	F
11	**Weed Management**				
	- Mechanical	P	P	P	P
	- Herbicide	F	F	F	F
12	**Water Management**				
	- Number of Irrigations	N	N	N	N
	- Method of Irrigation	-			
13	**Land Management**				
	- Salinity / Acidity	F	F	F	F
	- Water logging	N	N	N	N
14	Method of Harvesting	N	N	N	N
15	Any other				
	Average Yield (Q / ha.)				
	- Grain	P	P	P	P
	- Fodder	-			

N.B. Arhar grown in all AES as mixed crop with Maize and direct sown Paddy

CROP : KULTHI

F S : Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Sowing**				
	Time	N	N	N	N
	Method	P	P	P	P
2	Varieties	F	F	F	F
3	Seed Rate (per ha.)	F	F	F	F
4	Seed Treatment				
5	Organic Manure (tons / ha.)				
6	Fertilizer / Nutrient (kg /ha)				
	Basal (N+P+K)	F	F	F	F
7	**Method of fertilizer use**				
	- Basal	-	-	-	-
8	**Micro nutrient (specify)**				
	- Basal				
9	Pest Management	F	F	F	F
10	Disease Management	F	F	F	F
11	**Weed Management**				
	- Mechanical	F	F	F	F
	- Herbicide	-			
12	**Water Management**				
	Number of Irrigations	-			
	Method of Irrigation	-			
13	**Land Management**				
	- Salinity / Acidity				
	- Water logging				
14	Method of Harvesting	N	N	N	N
15	Any other				
	Average Yield (Q / ha.)				
	- Grain	P	P	P	P
	- Fodder	P	P	P	P

CROP : MARUA (RAGI)

F S : Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	**AES II**	**AES III**	**AES IV**
1	Sowing				
	- Time	P	P	-	P
	- Method	P	P	-	P
2	Varieties	F	F	-	F
3	Seed Rate (per ha.)	P^+	P^+	-	P^+
4	Seed Treatment				
5	Organic Manure (tons / ha.)				
6	Fertilizer / Nutrient (kg / ha)				
	- Basal (N+P+K)	F	F	-	F
7	**Method of Fertilizer use**				
	- Basal	-	-	-	-
8	**Micro Nutrient (specify)**			-	
	- Basal	-	-	-	-
9	**Pest Management**			-	
	-	-	-	-	-
	-			-	
10	Disease Management				
	-	-	-	-	-
	-	-	-	-	-
11	**Weed Management**				
	- Mechanical	-	-	-	-
	- Herbicide				
12	**Water Management**				
	- Number of Irrigations	-	-	-	-
	- Method of Irrigations	-	-	-	-
13	**Land Management**				
	- Salinity / Acidity	-			
	- Water logging	-		-	
14	**Method of Harvesting**	N	N	-	N
15	Any other	-		-	
	Average Yield (Q / ha.)				
	- Grain - Fodder	P	P	-	P

CROP : WHEAT

F S : Irrigated

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	Sowing				
	- Time	-	P	P	P
	- Method	-	F	F	F
2	Varieties	-	N	N	N
3	Seed Rate (per ha.)	-	N	N	N
4	Seed Treatment	-	F	F	F
5	Organic Manure (tons / ha.)	-	F	P	F
6	**Fertilizer / Nutrient (kg /ha)**				
	- Basal (N+P+K)	-	P	P	P
	Top dress (M+) in two split dose	-	N	N	N
7	**Method of Fertilizer use**				
	- Basal	-	N	N	N
	- Top dressing	-	N	N	N
8	**Micro Nutrient (specify)**				
	- Basal				
	- Top dress				
9	**Pest Management**	-	F	F	F
	- Termite				
10	**Disease Management**				
	- Rust	-	F	F	F
	- Smut				
11	**Weed Management**				
	- Mechanical	-	F	F	F
	- Herbicide	-	F	F	F
12	**Water Management**				
	- Number of Irrigations	-	P	P	P
	- Method of Irrigation	-	P	P	P
13	**Land Management**				
	- Salinity / Acidity	-			
	- Water logging	-			
14	Method of Harvesting	-	N	N	N
	Average Yield (Q / ha.)				
	- Grain	-	P	P	P

B. HORTICULTURE

CROP : BITTER GUARD

F S : Kharif – Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	Sowing				
	- Time	-	-	-	P
	- Method	-	-	-	N
2	Varieties	-	-	-	N
3	Organic Manure (kg / plant)	-	-	-	P
4	**Fertilizer / Nutrient (kg /ha)**				
	- Basal (N+P+K)	-	-	-	P
5	**Pest Management**				
	- Red pumpkin Beetle	-	-	-	P
	- Fruit fly				
6	**Disease Management**				
	- Powdery Mildew wilt virus diseases	-	-	-	F
7	Weed Management	-	-	-	N
8	**Water Management**				
	- Number of Irrigations	-	-	-	N
	- Method of Irrigation	-	-	-	N
9	**Special Practices**				
	- Training	-	-	-	P
	- Pruning	-	-	-	P
	Harvesting				
	- Method (Through Blade)	-	-	-	N
	- Time (One day gap)	-	-	-	N
10	**Farm Level Processing**				
	- Grading	-	-	-	P
	- Packing	-	-	-	F
	- Processing	-	-	-	F
	- Storage	-	-	-	F
11	**Marketing**	-	-	-	F
	- Average Yield	-	-	-	P

CROP : TOMATO

F S : Rainfed

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	Sowing				
	- Time	P	P	P	P
	- Method	N	N	N	N
2	Varieties	P	P	P	P
3	Spacing (cm.)	P	P	P	P
4	Organic Manure (Ton / ha.)	F	F	F	F
5	**Fertilizer / Nutrient (kg /ha)**				
	- Basal (N+P+K)	P	P	P	P
	- Top dressing	P	P	P	P
6	**Pest Management** Fruit Borer				
		F	F	P	P
7	**Disease Management** - Dumping off				
		F	F	F	F
	- Mosaic	F	F	F	F
8	Weed Management	N	N	N	N
9	**Water Management**				
	- Number of irrigations	F	F	F	F
	- Method of irrigation	P	P	P	P
10	**Special Practices**				
	- Training	F	F	F	F
	- Pruning	F	F	F	F
	Harvesting				
	- Time (One day gap)	N	N	N	N
	- Before Ripening	P	P	P	P
11	**Farm Level Processing**				
	- Grading	P	P	P	P
	- Packing	F	F	F	F
	- Processing	F	F	F	F
	- Storage	F	F	F	F
12	Marketing	F	F	F	F
	Average Yield	P	P	P	P

C. ANIMAL HUSBANDARY

ANIMAL : COW

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Breed Up gradation**				
	* Artificial Insemination				
	- Breed	F	F	F	F
	Location	F	F	F	F
	* Natural Insemination				
	Breed	F	F	F	F
	Location	F	F	F	F
2	**Feed Management (per animal)**				
	Green fodder (kg /day)	F	F	F	F
	Dry fodder (kg / day)	P	P	P	P
	Concentrates (gm / day)	P	P	P	P
	Minerals (gm / day)	F	F	F	F
	Vitamins (ml / day)	F	F	F	F
3	Inter Calving Period (months)	P	P	P	P
4	**Health Care (per year) (+)**				
	HSBQ (no. vaccinations)	P	P	P	P
	FMD	F	F	F	F
	Rinder pest	F	F	F	F
	Mastitis	F	F	F	F
	Thilariasis	F	F	F	F
	Deworming	F	F	F	F
5	**General Management**				
	Washing (times / day)	F	F	F	F
	Cleaning (times / day)	F	F	F	F
	Housing (Pacca / Kutcha)	P	P	P	P
	Drinking Water (lit. / day)	P	P	P	P
6	Average Milk yield (lit. / day)	P	P	P	

ANIMAL : BUFFALO

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Breed Up gradation**				
	* Artificial Insemination				
	- Breed	-	F	P	F
	Location	-	F	F	F
	* Natural Insemination				
	Breed	-	F	F	F
	Location	-	P	P	P
2	**Feed Management (per animal)**	-			
	Green fodder (kg /day)	-	P	P	P
	Dry fodder (kg / day)	-	P	P	P
	Concentrates (kg / day)	-	P	P	P
	Minerals (gm / day)	-	F	F	F
	Vitamins (ml / day)	-	F	F	F
3	Inter Calving Period (months)	-	P	P	P
4	**Health Care (per year) (+)**				
	HSBQ (no. vaccinations)	-	P	P	P
	FMD	-	F	F	F
	Rinder pest	-	F	F	F
	Mastitis	-	F	F	F
	Thilariasis	-	F	F	F
	Deworming	-	F	F	F
5	**General Management**				
	Washing (times / day)	-	P	P	P
	Cleaning (times / day)	-	P	P	P
	Housing (Pacca / Kutcha)	-	P	P	P
	Drinking Water (lit. / day)	-	P	P	P
6	Average Milk yield (lit. / day)	-	P	P	P

ANIMAL : GOAT

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Breed Up gradation**				
	* Artificial Insemination				
	- Breed	F	P	P	F
	- Location	F	F	F	F
	* Natural Insemination				
	- Breed	F	P	P	F
	- Location	F	P	P	F
2	**Feed Management (per animal)**				
	- Green fodder (kg /day)	N	N	N	N
	- Dry fodder (kg / day)	P	P	P	P
	- Concentrates (kg / day)	F	F	F	F
	- Minerals (gm / day)	F	F	F	F
	- Vitamins (ml / day)	F	F	F	F
3	**Inter Calving Period (months)**	N	N	N	N
4	**Health Care (per year) (+)**				
	- HSBQ (no. vaccinations)	F	F	F	F
	- FMD	F	F	F	F
	- Rinder pest	F	F	F	F
	- Mastitis	F	F	F	F
	- ENT	F	F	F	F
	- Deworming	F	F	F	F
5	**General Management**				
	- Washing (times / day)				
	- Cleaning (times / day)	F	F	F	F
	- Housing (Pacca / Kutcha)	P	P	P	P
	- Drinking Water (lit. / day)	P	P	P	P
6	**Average Milk yield (lit. / day)**				
	Average Meat yield / year	P	P	P	P

ANIMAL : SHEEP

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Breed Up gradation**				
	* Artificial Insemination				
	- Breed	F	F	F	F
	- Location	F	F	F	F
	* Natural Insemination				
	- Breed	F	F	F	F
	- Location	F	F	F	F
2	**Feed Management (per animal)**				
	- Green fodder (kg /day)	P	P	P	P
	- Dry fodder (kg / day)	F	F	F	F
	- Concentrates (kg / day)	F	F	F	F
	- Minerals (gm / day)	F	F	F	F
	- Vitamins (ml / day)	F	F	F	F
3	Inter Calving Period (months)	P	P	P	P
4	**Health Care (per year) (+)**				
	- HSBQ (no. vaccinations)	F	F	F	F
	- FMD	F	F	F	F
	- ENT	F	F	F	F
	- Deworming	F	F	F	F
5	**General Management**				
	- Washing (times / day)				
	- Cleaning (times / day)	F	F	F	F
	- Housing (Pacca / Kutcha)	P	P	P	P
	- Drinking Water (lit. / day)	P	P	P	P
6	Average Meat yield / year	P	P	P	P

D. BIRD

BIRD : POULTRY

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Breed Up gradation**				
	- Breed	F	P	P	F
2	**Feed Management (per Bird)**				
	- Concentrates	F	F	F	F
	- Minerals (mix)	F	F	F	F
	- Vitamins (mix)	F	F	F	F
3	**Health Care (per annum)**				
	- R.D. (no. vaccinations)	F	F	F	F
	- Fowl box	F	F	F	F
	- Mareks disease	F	F	F	F
	- Deworming	F	F	F	F
4	**General Management**				
	- Cleaning (times / day)	F	F	F	F
	- Housing (Pucca / Kuccha)	P	P	P	P
	- Drinking Water (lit./ day)	P	P	P	P
5	**Average yield**				
	- Egg	P	P	P	P
	- Chicken meat	P	P	P	P
	- Broiler	P	P	P	P

E. FISH

FISH

Sl. No.	Items of Package	Gap in Adoption in Different AES			
		AES I	AES II	AES III	AES IV
1	**Culture Component**				
	Indian Carp	-	P	P	-
	Exotic Carp	-	F	F	-
	Prawn	-	F	F	-
2	**Pond Preparation**	-	F	F	-
	Organic Manure	-	F	F	-
	Inorganic Manure	-	F	F	-
	Bio-fertilizer	-	F	F	-
	Lime	-	F	F	-
	Water Depth (in meter)	-	P	P	-
3	**Weed Control**	-	P	P	-
4	**Stoking Size**				
	Spawn	-	F	F	-
	Fry	-	F	F	-
	Finger lings	-	F	F	-
5	**Feeding Schedule**				
	Rice bran and oil cake	-	F	F	-
	CIFACA	-	F	F	-
	Green leaf	-	F	F	-
6	Disease	-	F	F	-
7	Sample Netting	-	F	F	-
8	Aeration	-	F	F	-
9	Harvesting Method	-	P	P	-
10	Culture Method	-	F	F	-
11	Average Yield	-	P	P	-

5.10 Reason of Gap in Adoption of Technology

In the present scenario technologies are being generated by the research scientist in research stations and disseminated to the farmers through existing extension setup of the department. But usually there exists a gap between the recommended technology and existing practice, resulting in low productivity in different in different commodities. Such gaps are mainly of three types i.e, extension gap, adoption gap and research gap and all these gaps have been recorded by the multidisciplinary AES team during participatory data collection with respect to different commodities under various farming system in fours AESs. The commodities, which are grown in more than 10% of the cultivated area of that particular commodity in the representative villages, are taken in to consideration for detailed study of the gaps, reasons of gaps and strategies to bridge the gaps. Similarly in case of live stock and fish production system, the important farming situations for different commodities adopted by the majority of the house holds of the representative villages have been taken in to consideration for the study of gap analysis. The reasons for each type of gap are indicated below.

Table 5.17 Type of gap and reason of gap

Sl. No	Types of Gap	Reason of Gap	Code No
1.	Extension gap	a. Lack of awareness b. Lack of knowledge c. Lack of skill d. Lack of motivation e. Lack of conviction	1 2 3 4 5
2.	Adoption gap	a. Fear of Risk b. Lack if resources c. Lack of input availability d. Lack of market & infrastructure	6 7 8 9
3.	Research gap	a. Lack of specific recommendation for the AES b. Recommendation is cumbersome, not profitable & incompatible with market and infrastructure c. Recommendation is inappropriate	10 11 12

The gap analysis of different commodities under various farming situations was conducted at representative villages by the AES team and farmers. The size of gap and reasons in respect of various recommended practices for different commodities under different enterprises have been spelt out in the following tables. The size of the gap has been recorded as F,P and N, where F = Full gap, P = Partial gap & N = Nil gap.

Agriculture

Paddy

Paddy is the major crop in this region, it grown under four farming situation i.e, direct sown rainfed, transplanted-rainfed, transplanted-irrigated and transplanted-rainfed-water logged condition. Farmers are mostly growing local varieties of paddy and its yield per hectare varies from 18 to 30q. The yield of paddy in this region is much lower to the national average, there are considerable yield gap, which could be narrowed down by adopting appropriate strategy. The reason for such gap in different AESs is indicated below.

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Sowing / Transplanting method.	P, F	Lack of awareness, skill and resource.
2	HYV / Hybrids	P, F	Lack of resources & input availability.
3	Seed rate	P	Lack of conviction.
4	Seed treatment	F	Lack of knowledge and conviction
5	Application of required quantity of OM and Fertilizers.	P	Lack of resource.
6	Method of fertilizer use	P	Lack of skill
7	Pest and disease management	P, F	Lack of knowledge, resources and input.
8	Weed management	P, F	Lack of knowledge and resource
9	Water management	P	Lack of awareness, motivation and conviction
10	Land management	F	Lack of knowledge, resource and input

Maize

After paddy most of the upland area of this district cover through maize crop. Farmers sown kharif maize as sole crop of mostly with intercropped to Arhar and Kudrum. Local verities of maize are more popular in the district. The yield of maize is not satisfactory due to the wider gaps to recommended technologies. So, there is a great opportunities to explore the technology through appropriate strategy.

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Sowing	P, F	Lack of awareness, skill and resource
2	Varity	P	Lack of resources and input availability
3	Seed Rate	P	Lack of skill and knowledge
4	Application of required quantity of OM and fertilizers	P	Lack of knowledge and conviction
5	Method of fertilizer use		Lack of skill and knowledge
6	Pest and disease management	P, F	Lack of knowledge and resource
7	Weed management	P, F	Lack of conviction resource and input
8	Water management	P, F	Lack of awareness, resource and conviction
9	Land management	F	Lack of knowledge, resource and input

Arhar (Red Gram)

Arhar is important pulse crop which grown in large scale in Jamtara district. Arhar mostly grown as mixed crop with maize, recently its mixed cropping with direct sown paddy being popular among the farmers. Gaps in scientific package and practices are mention below through narrowing these gaps we can achieve high production of Arhar in Jamtara district.

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Sowing	P	Lack of awareness, skill and resource
2	Variety	F	Lack of resources and input availability
3	Seed Treatment	F	Lack of input availability conviction
4	Seed Rate	P	Lack of conviction
5	Application of required quantity of OM and fertilizers	P, F	Lack of resource
6	Method of fertilizer use	P	Lack of skill and knowledge
7	Pest and disease management	F	Lack of knowledge, resource and input
8	Weed management	P, F	Lack of knowledge, resource ----- for risk
9	Land management	F	Lack of knowledge, resource and input

Kulthi

Kulthi is a main crop of rainfed farming but now a day its cultivated area is drastically reduced in all AES of the district. Kulthi fastly replaced by maize and direct sown paddy with intercropping of Arhar due to low yield less market value of Kulthi. Cultivation of Kulthi is very safe in rainfed situation of the district through minimize the fallowing gaps farmers can get a good return from Kulthi crop.

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Varity	F	Lack of awareness and input availability
2	Seed Rate	F	Lack of motivation and conviction
3	Use of fertilizers	F	Lack of awareness and resource
4	Pest and disease management	F	Lack of resource
5	Weed management	F	Lack of knowledge and resource

Marua (Ragi)

As like Kulthi, Marua is also a special feature to grown in dry land situation. Its area of cultivation also fastly reducing and replace by Maize and direct sown paddy with Arhar and Kudrum intercropping. Local variety and neglected management without adopting recommended package and practice, cultivation of Ragi does not give more return to farmers. Narrowing existing farming situation to recommended farming situation could minimize it.

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Sowing	P	Lack of awareness conviction and resource
2	Variety	F	Lack of input availability and resource
3	Seed Rate	P	Lack of conviction and motivation
4	Use of fertilizers	F	Lack of knowledge and resource
5	Weed management	P	Lack of knowledge and resource

Wheat

Farmers are much interested to grown Wheat in all AES of the district. They grow Wheat in very limited area where assured irrigation facility is available. Some important gaps have been arises which act as barrier to increase cultivated area of this most important rabi crop in Jamtara district. To minimize these gaps through adoption of new technology and appropriate strategy coverage of Wheat crop can be increase in this district.

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Sowing	P	Lack of awareness skill and resource
2	Variety	F	Lack of knowledge and conviction
3	Seed Treatment	F	Lack of knowledge and conviction
4	Application of required quantity of manure and fertilizers	P, F	Lack of resource
5	Pest and disease management	F	Lack of knowledge, resource and input
6	Weed management	F	Lack of knowledge and resource
7	Water management	P	Lack of resource

II. Horticulture

Bitter Guard

Some farmers of AES IV have been adopted cultivation of Bitter Guard in rainfed condition on upland soil. There is considerable yield gap due to non – adoption of appropriate technology. The reason for gap in adoption of technology are indicated below :

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Sowing	P	Lack of awareness and knowledge
2	Application of required quantity of O M and fertilizers	P	Lack of knowledge and resource
3	Pest and disease management	P, F	Lack of knowledge, resources and input
4	Special practice	P	Lack of knowledge
5	Farm level processing	P, F	Lack of motivation, skill and conviction
6	Marketing	F	Lack of market and infrastructure

Tomato

Gap analysis of tomato was made in all AES. The regions for technological gap are indicated below :

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Sowing	P	Lack of awareness and knowledge
2	Varities	P	Lack of resource and input availability
3	Spacing	P	Lack of knowledge and conviction
4	Application of O M and fertilizers	F, P	Lack of resource
5	Pest and disease management	P, F	Lack of knowledge and resource
6	Water management	F, P	Lack of resources
7	Special practices	F	Lack of knowledge
8	Harvesting	P	Lack of skill
9	Farm level processing	P, F	Lack of knowledge, motivation and awareness
10	Marketing	F	Lack of market and infrastructure

III. Animal Husbandry

Cow

Cow rearing is a common practice among the farmers of all four AES of Jamtara district. Main purpose of Cow rearing is collection of dung for fuil and to sell the calf for urning money. Average production of milk per cow per day (1 lit.) is very low. It is the matter of concern because average milk yield is very low to expected yield 8 to 10 lit. / Cow / day. The reason for gap as ascertained from the farmers is indicated below :

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Breed up gradation	F	Lack of input resource and awareness
2	Feed management	P, F	Lack of knowledge and resource
3	Inter calving period	P	Lack of skill and knowledge
4	Health care	F, P	Lack of input, resource, knowledge and conviction
5	General management	P, F	Lack of resource, awareness and knowledge
6	Milk yield	P	Combined effect of all above reasons.

Buffalo

Gap analysis in adoption of technology was made in three representative villages of AES – II, III and IV. The reasons for gap are indicated below :

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Breed up gradation	P, F	Lack of input resource and awareness
2	Feed management	P, F	Lack of knowledge and resource
3	Inter calving period	P	Lack of skill and knowledge
4	Health care	P, F	Lack of input, resource, and knowledge
5	General management	P	Lack of knowledge, resource and skill
6	Milk yield	P	Combined effect of all above reasons

Goat

Goat rearing is a one of the most profitable source of poor people of Jamtara district. All most all families of four-selected village are associated with goat rearing. Due to non-adoption of appropriate technology the meat yield rate is labour than the potential yield. The reasons for gap in adoption of technology are as follows:

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Breed up gradation	P, F	Lack of input resource and awareness
2	Feed management	P, F	Lack of resource, awareness and knowledge
3	Health care	P	Lack of input, resource and knowledge
4	General management	P, F	Lack of awareness and resource

Sheep

A few families in all representative villages of each AES associated with sheep rearing. There is significant yield gap due to non- adoption of appropriate technology and recommended practices. The reasons for gap as ascertained from the villages are indicated below :

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Breed up gradation	F	Lack of input resource and awareness
2	Feed management	P, F	Lack of resource, awareness and knowledge
3	Inter calving period	P	Lack of skill and knowledge
4	Health Care	P, F	Lack of input, resource and knowledge
5	General management	P, F	Lack of knowledge, resource and skill

Poultry

Poultry is practical as in back yard system in the district. Gap analysis was made in representative villages of all AES. The reason for gap are indicated below :

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Breed up gradation	P, F	Lack of knowledge
2	Feed management	F	Lack of resource and conviction
3	Health Care	F	Lack of input and awareness
4	General management	P, F	Lack of motivation resource

Fish

Captured fishing and fresh water aquaculture are taken in most of the village, where WHT are available. Gap analysis was made in representative village of AES – II and III. It was observed that there is significant productivity gap in pisciculturr due to non-adoption of technology, which indicates that there is lot of scope for increasing productivity level. The reasons for gap as ascertained in representative villages are indicated below :

S.No.	Recommended practices where gap exists	Size of gap	Reasons for gap
1	Culture compound	P, F	Lack of input, awareness and knowledge
2	Pond preparation	P, F	Lack of resource and knowledge
3	Weed control	P	Lack of knowledge and skill
4	Stoking size	F	Lack of resource, knowledge and fear of risk
5	Feeding schedule	F	Lack of resource and knowledge
6	Disease management	F	Lack of knowledge and resource
7	Sample netting	F	Lack of skill
8	Aeration	F	Lack of knowledge and skill
9	Harvesting method	P	Lack of skill and resources

5.11 Natural Resource Management

Land, water, vegetation, minerals and bio-inhabitant are the natural resource of the district. During participatory date collection it was observed that gradually the natural resources are being degraded causing threat for survival. Therefore, it was felt essential to study the problems relating to natural resources, its severity in representative villages of four AES are presented below :

Table 5.8

Sr.No.	Problem	Of problems in representative villages			
		AES I	AES II	AES III	AES IV
1	Degradation of private				
	Land				
	Erosion	H	M	M	L
	Acidity	M	M	M	-
	Water logging	-	-	-	M
2	Degradation of common land				
	Erosion	H	M	M	-
	Destruction of trees / others (over grazing, construction work)	L	-	-	-
		H	M	M	M
3	Loss of surplus run-off from the village	H	H	M	-

N.B. H = High, M = Medium, L= Low

Cause of degradation of natural resource are indicated below :

Sr. No.	Problem	Relevance to AES	Causes
1	Soil erosion	I, II, III, IV	- High rainfall - Light texture soil - Lack of vegetative covers - Deforestation - Defective tillage practice - Poor rain water management
2	Acidity	I, II, III	- Heavy rainfall - Leaching of bases in lowers horizons - Loss of organic matter due to surface run-off
3	Water logging	IV	- Poor drainage facility
4	Destruction of trees in common land	I, II, III, IV	- Lack of awareness - Lack of rigidity in legislation - Indescriminate deforestation for personal interest
5	Loss of surplus run-off from the village	I, II, IV	- Lack of WHT - Sloppy land - Lack of awareness to collect the water

II. Water Scarcity

Water scarcity is a serious problem in whole plateau region of Chotanagpur. In Jamtara district people also suffers from this natural hazards. Problems and causes of water scarcity will more clear from following table.

Table 5.19

Sr. No.	Problem	Relevance to AES	Causes
1	Excess run-off rain water	I, II, III	- Undulating land surface - Loss of vegetative cover - Lack of WHT with suitable catchments areas - Development of hand pan - Sewer erosion
2	Reduced ground water	I, II, III	- Lack of perennial rivers - Lack of WHT - Lack of awareness to collect run-off water - Our exploitation of ground water - Decreased rainfall - Fully cropping system

5.12 Integrated Nutrient Management

Introduction of HYV, increase area under double cropping, less use of organic matter will affect the sustainability of agriculture in future. Development of an integrated plant nutrient management system involving an approximate mix of organic manure, including pulses crop in crop rotation for biological nitrogen fixation, use of green manure, BGA, phosphate solublising microbes and use of soil test bashed chemical fertilizer essential for the sustainable production and soil health. All package and practices of INM are laking in all representative villages of four AES of Jamtara district and reason of gap are lack of resource, knowledge and motivation.

5.13 Integrated Pest Management

Integrated Pest management (IPM) aims at promoting favorable ecological, economic and sociological out comes which is accomplished by the best mix of pest control tactics in an integrated manner.

Table : 5.20 Major Crop Pest and disease in selected villages

Sr.No.	Crops	Name of Pest / Diseases	AES I	AES II	AES III	AES IV
1	Paddy	Steam barer	M	M	M	M
		Gundhibug	H	M	M	M
		Blast	H	M	M	M
		Termite	H	-	-	-
2	Maize	Termite	H	M	M	M
		Leaf blight	M	M	M	M
3	Arhar	Wilting	H	M	M	M
		Fruit borer	M	M	M	M
4	Marua (Ragi)	Pink borer	L	L	L	L
		Blast	L	L	L	L

VI. IDENTIFICATION OF CRITICAL ISSUES, PROBLEMS AND OPPORTUNITIES

The critical issues, problems and opportunities relating to various production systems in the district have been identified on the basis of primary and secondary data for preparation of need based strategy on extension and research activities. For the sake of convenience in strategic planning, the relevant information have been grouped under seven categories ie. Agricultural Production System, Horticulture Production System, Live Stock Production System, Fish Production System, National Resource Management, Sericulture and Lac Cultivation. A summary statement about the Issues, Problems and Opportunities under each group and this relevance to specific Agro – Ecological Situation is given in table 7

Table 7.1 SUMMARY STATEMENT OF CRITICAL ISSUES, PROBLEMS AND OPPORTUNITIES UNDER EACH AES

S.No.	Issues and Problems	Category	A E S			
			I	II	III	IV
1.	**Agricultural Production System**					
	Considerable yield gap in crops like Paddy, Arhar, Urad, Kulthi, Wheat.	**E**	Y	Y	Y	Y
	➢ Low fertility status of soil					
	➢ Lack of irrigation and rain water management					
	➢ Non-availability of desired variety of seeds					
	➢ Low seed placement					
	➢ Decreasing trend in use of organic manure					
	➢ Farmers refer local variety due to food habit and climatic condition					
	➢ Knowledge and skill gap in I N M & I P M					
	➢ Non-availability of Bio-fertilizer					
	➢ Negligible area covers with High Yielding Varieties					
	➢ Major Technology gap and poor adoption rate of new technology in crop management practice					
	➢ Non availability of timely credit for purchase of inputs					
2.	**Low Profit from agricultural crops due to :-**	**E/R**	Y	Y	Y	Y
	➢ Low Productivity					
	➢ High Production cost					
	➢ Non-availability of organized market					
	➢ Exploitation of middle man					
	➢ Non-adoption of risk involving new technology					
	➢ Lack of storage facilities and post harvest technology					
3.	**Resources of population and environmental degradation**	**E**	Y	Y	Y	Y
	➢ Traditional cultivation without adopting crop rotation					
	➢ Non-adoption of I P M practice					
	➢ Imbalance use of chemical fertilizer					
	Opportunities		**I**	**II**	**III**	**IV**
	➢ Adoption of appropriate Agro forestry System in degraded soil	**E**	Y	Y	Y	-
	➢ Adoption of new technology to increase forest produce	**E**	Y	Y	-	-
	➢ Diversification of paddy to others crops in rain fed situation	**E**	Y	Y	Y	Y
	➢ Expansion of area under high yielding short duration rice varieties and hybrid rice varieties.					

S.No.	Issues and Problems	Category	A E S			
			I	II	III	IV
(II)	**Horticulture Production System**					
1.	**Significant yield gap in fruit crops and vegetables due to:-**	**E/R**	Y	Y	Y	Y
	➢ Lack of irrigation potential					
	➢ Non-availability of quality seed and planting material					
	➢ Imbalance use of fertilizer					
	➢ Timely non availability of input					
	➢ Low fertility status of soil					
	➢ Inadequate research recommendation based on existing farming situation					
	➢ Knowledge and skill gap in improved technology					
	➢ Non-adoption of IPM & INM practices					
	➢ Excess post harvest loss					
	➢ Poor acceptance of hybrid seed in vegetables					
	➢ Grazing by stray cattle					
	➢ Poor scientific management due to lack of organized orchard					
2.	**Low profit in fruits and vegetables due to:-**	**E/R**	Y	Y	Y	Y
	➢ Intervention of middle man					
	➢ Lack of organized market facility					
	➢ Lack of storage facility and non-adoption of preservation Technology					
	➢ Lack of organization among the farmers					
	➢ Lack of Agro processing and post harvest technology					
3	**Poor Productivity in Fruit Crops:-**	**E/P**	Y	Y	Y	Y
	➢ Pronounce natural hazards					
	➢ Inadequate care and Maintenance of plants					
	➢ Lack of new Technology					
	Opportunities					
	➢ Establishment of planned orchard	**R**	Y	-	-	-
	➢ Commercial production of Flowers	**E**	-	Y	Y	Y
	➢ Expansion of area under Mango, Lime, Jackfruit, Papaya & Banana	**E**	Y	-	-	Y
	➢ Scope for plantation of medicinal plants for development of industries	**E**	Y	-	-	-
	➢ Establishment of nurseries for production of quality planting material for fruits, flowers and vegetables	**E/R**	-	Y	Y	-
III	**Live Stock Production System**		**I**	**II**	**III**	**IV**
1	**Low productivity in dairy animals due to:-**	**E**	Y	Y	Y	Y
	➢ Availability of local breed in dairy animal					
	➢ Inadequate green fodder					
	➢ Significant gap in food management and health care					
	➢ Lack of artificial insemination at block level.					
	➢ Natural crossing by stray bulls.					
	➢ Non-availability of medicine in rural areas.					
	➢ Poor sanitation and housing.					
	➢ Limited Insurance facility.					
2	**Low profit in dairy produce due to:-**	**E/R**	Y	Y	Y	
	➢ Lack of farmers organization					
	➢ Involvement of middle man					
	➢ Lack of chilling plant and collection centers for milk					
	➢ Inadequate market and road facility for dairy product					

	Issues and Problems		I	II	III	IV
3	**Low productivity of Poultry Birds due to:-**	**E**	Y	Y	Y	Y
	➢ Local breeds of poultry birds					
	➢ Lack of vaccination facility in rural areas					
	➢ Technology gap in nutrition management and housing					
	➢ Non-availability or poultry feed in rural areas					
	➢ Low adoption of improved breeds					
	➢ Limited finance and insurance facility					
	Opportunities					
	➢ Artificial insemination facility at block levels for cattle	**E/P**	Y	Y	Y	Y
	➢ Insure timely vaccination programme for cattle and poultry birds in rural areas		Y	Y	Y	Y
	➢ Introduce improved breed of poultry in rural area		Y	Y	Y	Y
	➢ Introduce improved breeds of goat and pig among the landless farmers		Y	Y	Y	Y
	➢ Scope of bater rearing		Y	Y	Y	Y
	➢ Scope of grain fodder cultivation suitable for this region		Y	Y	Y	Y
	➢ Establishment of processing plant for milk		Y	Y	Y	Y
IV	**Fish Production System**		**I**	**II**	**III**	**IV**
1	**Low productivity of fish is due to:-**	**E**	Y	Y	Y	Y
	➢ Non-availability of quality fish seed, fingerlings.					
	➢ Technology gap in adoption of scientific production practices					
	➢ Proper management and maintenance of Tank / Pond					
	➢ Less capacity to hold the water due to siltation and mostly dry up in summer season					
	➢ Short term leasing policy of G.P tanks					
	➢ Long term leasing policy of G.P. tanks					
	➢ Lack of ownership of community water bodies					
	➢ Non-availability of low cost feed					
	➢ Generally followed traditional cultural practices					
	➢ Lack of adequate credit flow in to fishery sector.					
2	**Limited composite pisciculture due to:-**	**E**	Y	Y	Y	Y
	➢ Knowledge and Skill gap among the fish growers					
	➢ Non-availability of desired species of fingerlings in time					
	➢ Lack of proper pond water treatment					
	➢ Want of facility for exchange of water					

Sl. No.		Category	A E S			
	Issues and Problems		**I**	**II**	**III**	**IV**
3	**Low profit due to:-**	**E**	Y	Y	Y	Y
	➢ Lack of marketing facility					
	➢ Lack of farmers organization					
	➢ Lack of storage and processing facility					
	Opportunities					
	➢ Scope of intensive pisciculture in Ponds/Tank/Water harvesting structure with organizational support	**E**	Y	Y	Y	Y
	➢ Opportunities for production of quality fish seed by induced breeding in fish hatchery project.	**E**	Y	Y	Y	Y
	➢ Use of water logged area for integrated pisciculture	**E**	-	-	-	Y
IV	**National Resource Management**					
	Degradation of land due to:-	**E**	Y	Y	-	-
	➢ Excess run off and rain drop impact					
	➢ High gradient of land					
	➢ Large fallow land after kharif season					
	➢ Low organic matter in soil					
	➢ Coarse texture soil					
	➢ Low WHC of soil					
	➢ Soil erosion					
	➢ Faulty method of tillage					
	➢ Non-adoption of crop rotation					
	➢ Small and scattered land holding.					
2	**Depletion of soil nutrients due to:-**	**E**	Y	Y	Y	Y
	➢ Excess run off of water and soil erosion					
	➢ Leaching of nutrients					
	➢ Soil Acidity					
	➢ Inadequate application of organic matter / green manure					
	➢ Faulty cropping system					
	➢ In balanced use of chemical fertilizers					
3	**Poor water management leading to low productivity due to:-**	**E**	Y	Y	Y	Y
	➢ Lack of skill in rainwater harvesting.					
	➢ Lack of WHT.					
	➢ Unbunding land					
	➢ Lack of scientific approach to built the WHT					
4	**Loss of vegetative cover due to:-**	**E**	Y	Y	Y	Y
	➢ Indiscriminate deforestation					
	➢ Cultivation of pastureland and overgrazing.					
	➢ High temperature in summer season					
	➢ Low moisture holding capacity of soil					
	➢ Lack of awareness of aforestation among the villagers					

Sl. No.	Issues and Problems	Category	A E S			
			I	II	III	IV
5	**Reduction of storage capacity in reservior and indigenous water harvesting structure due to:-**	E/P	Y	Y	Y	Y
	➢ Loss of vegetation in the catchments causing siltation					
	➢ Lack of desiltation and renovation measures.					
6	**Soil acidity due to :-**	E	Y	Y	-	-
	➢ Heavy rain fall					
	➢ Leaching of bases					
	➢ Non-use of liming materials					
	Opportunities					
1	**Soil conservation measures by**	E/P	Y	Y	Y	Y
	➢ Agronomic practices		Y	Y	Y	Y
	➢ Integrated watershed management		Y	Y	Y	Y
	➢ Formulation of WHT with sufficient catchments area		-	Y	Y	Y
	➢ Mechanical measures		Y	Y	Y	Y
2	**Adoption of appropriate agro forestry system in degraded soil by**	E	Y	Y	Y	-
	➢ Plantation of forest and fruit plant		Y	Y	Y	-
	➢ Inter cropping with cover crops		Y	Y	Y	-
	➢ Awareness among the farmers organization		Y	Y	Y	Y
3	**Development of water resources for irrigation**	E/P	Y	Y	Y	Y
	➢ Water users association and awareness		Y	Y	Y	Y
	➢ Include short duration low water requirement crop in crop rotation		Y	Y	Y	Y
	➢ Reduce application losses of water by using canal system and delivery pipe		Y	Y	Y	Y
	➢ Desilting of water harvesting structure and reservoirs		Y	Y	Y	Y
	➢ Conversion of water logged area into Pisciculture		-	-	-	Y

Sl. No.		Category	A E S			
VI	**Sericulture**					
	Issues and Problems		**I**	**II**	**III**	**IV**
	➢ Lack of awareness to adopt sericulture as commercial farming.	**E**	Y	Y	-	-
	➢ Lack of natural vegetation of mulberry plant.	**E/R**	Y	Y	-	-
	➢ Non-availability of good quality plant cutting of mulberry	**E/R**	Y	Y	-	-
	➢ Major technology gap in sericulture	**E**	Y	Y	-	-
	➢ Knowledge and skill gap about sericulture among the farmers	**E**	Y	Y	-	-
	➢ Lack of organizational setup of Government in sericulture department at the district and block level	**P**	Y	Y	-	-
	➢ Non-availability of silk industries in this area	**P**	Y	Y	-	-
	➢ Lack of Government planning to popularize sericulture in the district	**P**	Y	Y	-	-
	➢ Scanty infrastructure of sericulture in the district	**E/P**	Y	Y	-	-
	Opportunities					
	➢ Awareness programme to adopt sericulture as commercial farming		Y	Y	Y	Y
	➢ Plantation of good quality leaf mulberry		-	-	Y	Y
	➢ Provision of training on scientific mulberry production and rearing of silk worm		-	-	Y	Y
	➢ Establishment of organizational setup of Government in sericulture department at the district and block level		-	-	Y	Y
	➢ Arrangement of market facility for cocoon		-	-	Y	Y
	Issues and Problems	**Category**	**I**	**II**	**III**	**IV**
VII	**Lac cultivation**					
	➢ Scope of Lac cultivation in the district	**E**	Y	Y	Y	Y
	➢ Lack of awareness about this important aspect		-	Y	Y	Y
	➢ Knowledge and skill gap among the farmers		-	Y	Y	Y
	➢ Unavailability of seed and others facility to initiate Lac cultivation		-	Y	Y	Y
	➢ Lack of government approach to commercial production of Lac in the district		-	Y	Y	Y
	➢ Unavailability of government organization set up to extend Lac cultivation		-	Y	Y	Y
	➢ Awareness programme on lac cultivation to adopt as new enterprises		-	Y	Y	Y
	➢ Training programme for farmers in reputed Institution or through expert		-	Y	Y	Y
	➢ Insure availability of brood lac seed to farmers		-	Y	Y	Y
	➢ Establishment of organizational setup of Government for lac cultivation in district / Appointment of expert for this purpose		-	Y	Y	Y
	➢ New plantation programme for Ber and Palash tree		-	Y	Y	Y

VII. SWOT ANALYSIS OF EXISISTING FARMING SYSTEMS IN DIFFERENT AES OF THE DISTRICT

The SWOT analysis of existing farming system in different AESs was carried out by the district technical team and scientist of Birsa Agricultural University under direction of Director SAMETI, NATP consultant Jharkhand State and Project Director ATMA and presented below :

Sl. No.	Particulars	Relevance to Different AES			
A.	**Strength**	**I**	**II**	**III**	**IV**
I.	**Ecological**				
1	Hot and humid climate for favouring rice crop	Y	Y	Y	Y
2	Adequate rain fall favouring various types of crops	Y	Y	Y	Y
3	Rich bio-diversity.	Y	Y	Y	Y
4	Red laterite soil conducive for plantation	Y	Y	-	-
5	Conducive climate for Jack fruit, Papaya floriculture and olericulture	Y	Y	Y	Y
6	Vast strech of up land for dry land crops	Y	-	-	-
7	Natural dense plantation of plash tree for lac cultivation	Y	Y	Y	-
8	Low land deep soil for paira crop and Banana cultivation	-	-	-	Y
9	Adequate pasture land for dairy	Y	Y	-	-
II.	**Socio – Economic**				
1	Easy availability of work force	Y	Y	Y	Y
2	Social cohesion among the farm families	Y	Y	Y	Y
3	Traditional fisher man community	-	Y	Y	-
4	Skilled farmers in Vegetable cultivation	-	-	-	Y
5	High woman participation in agricultural work	Y	Y	Y	Y
6	Committed net work of NGOs	Y	-	-	Y
III.	**Infrastructure**				
1	SHG existence	Y	Y	Y	Y
2	Large number of NGOs net working in district	Y	Y	Y	Y
3	Jamtara situated near Industrial town Dhanbad and Chittaranjan	Y	Y	Y	Y
4	Well connected by rail and road to Kolkata	Y	Y	Y	Y
5	Govt. seed multiplication farm	Y	Y	Y	Y
6	Govt. supported WHT	-	Y	Y	-
7	Fish rearing tank at Jamtara	Y	Y	Y	Y
8	Local weekly market	Y	Y	Y	Y
9	Two religious place Deoghar and Basukinath near Jamtara	Y	Y	Y	Y
10	Net working of Nationalized Bank and Gramin Bank	Y	Y	Y	Y

Sl. No.	Particulars	Relevance to Different AES			
		I	II	III	IV
IV.	**Production System**				
1	Large scale cultivation of Paddy	Y	Y	Y	Y
2	Farming system dominated by rainfed farming	Y	Y	-	Y
3	Increasing trend in use of input	-	Y	Y	Y
4	Agriculture and dairy is the predominated farming system	Y	Y	-	-
5	Cultivation of kharif vegetable	-	-	-	Y
6	Rearing of back yard Poultry, Goat and Pig	Y	Y	Y	-
7	Extensive maize + Arhar mixed cropping	Y	Y	-	Y
B.	**Weakness**	**I**	**II**	**III**	**IV**
I.	**Ecological**				
1	Totally rainfed farming	Y	Y	Y	Y
2	Fluctuating rainfed fall with long dry spell in monsoon season	Y	Y	Y	Y
3	Early or late monsoon	Y	Y	Y	Y
4	Soils are acidic in nature with low moisture holding capacity	Y	Y	Y	-
5	Soil erosion and degradation	Y	Y	-	-
6	Loss of organic matter and soil nutrients due to erosion	Y	Y	Y	-
7	Undulating land surface	Y	Y	Y	-
8	Water logged in low lying area.	-	-	-	Y
9	Siltation of WHT	-	-	-	-
10	Indescriminate deforestation	Y	Y	-	-
11	Lack of perennial rivers	Y	Y	Y	Y
12	Poor quality of ground water	Y	Y	Y	Y
13	High humidity and high temperature leading to occurrence of crop pest and diseases it also negatively affect the capacity of work force	Y	Y	Y	Y
14	Prone to cyclone	-	-	-	Y

Sl. No.	Particulars	Relevance to Different AES			
		I	II	III	IV
II.	Socio-economic				
1	Low literacy rate	Y	Y	-	Y
2	Majority of population come under below poverty line	Y	Y	-	Y
3	High percentage of tribal population	Y	Y	Y	-
4	Most of the farmers are small and marginal	Y	Y	-	Y
5	Castism and superstitions	Y	Y	Y	Y
6	Alcoholism in male and women.	Y	Y	Y	-
7	Migration of labour force	Y	Y	Y	Y
8	Exploitation of rural money lenders and middle man	Y	Y	Y	Y
9	Engagement of child labours in agriculture	Y	Y	Y	Y
III.	Infrastructure	I	II	III	IV
1	Disorganized market	Y	Y	Y	Y
2	Limited facilities for agro processing	Y	Y	Y	Y
3	Inadequate no. of training institute	Y	Y	Y	Y
4	Inadequate storage facility	Y	Y	Y	Y
5	Poor communication facility in rural areas	Y	Y	Y	Y
6	Lack of management of traditional water harvesting structure	Y	Y	Y	Y
7	Lack of interdepartmental co-ordination	Y	Y	Y	-
8	Inadequate irrigation facility	Y	Y	Y	Y
IV.	Production System	I	II	III	IV
1	Considerable yield gap in agriculture	Y	Y	Y	Y
2	Excess use of nitrogen and imbalance use of chemical fertilizers	-	-	Y	-
3	Mono cropping	Y	Y	-	-
4	Poor soil and water management	Y	Y	Y	Y
5	Loss of organic matter and plant nutrients from soil	Y	Y	Y	Y
6	Non adoption of seed treatment, green manure	Y	Y	Y	Y
7	Management problems in pisciculture	-	Y	Y	-

Sl. No.	Particulars	Relevance to Different AES			
		I	II	III	IV
8	Dry up of WHT due to high percolation	-	Y	Y	-
9	Lack of awareness and knowledge in identification of crop pests and diseases	Y	Y	Y	Y
10	Poor post harvest technology	Y	Y	Y	Y
11	Technological gap in management of live stock	Y	Y	Y	Y
12	High mortality of goat due to PPR	Y	Y	Y	Y
13	Lack of crop diversification in upland	Y	Y	-	-
14	Lack of hatchery for fish breeding	-	Y	Y	-
15	Non – availability of AI facility	Y	Y	Y	Y
16	Poor health and feed management in live stock and poultry	Y	Y	Y	Y
17	Zinc deficiency in low land areas	-	-	-	Y
18	Negligible cultivation of green fodder	Y	Y	Y	Y
19	Low market price of Agricultural and dairy product	Y	Y	Y	Y
C.	**Opportunities**				
1	**Ecological**	**I**	**II**	**III**	**IV**
1	Adoption of appropriate agro forestry system in degraded soil	Y	Y	-	-
2	Scope for medicinal plantation for conservation of forest and development of industries	Y	Y	-	-
3	Integrated water shed development	Y	Y	Y	Y
4	Scope for pasture development	Y	Y	-	-
5	Scope of mulberry plantation for sericulture	Y	Y	-	-
6	Scope of lac cultivation on plash tree	Y	Y	Y	Y
7	Harnessing ground water potential	Y	Y	Y	Y
8	Streched river bank cultivation by promotion of check dam	-	-	Y	Y
9	Pisciculture in tanks	-	Y	Y	-
II	**Socio – Economic**	**I**	**II**	**III**	**IV**
1	Labour intensive work	Y	Y	Y	Y
2	Scope of SHG formation and federation district level	Y	Y	Y	Y
3	Availability of family labour	Y	Y	Y	Y

Sl. No.	Particulars	Relevance to Different AES			
III	**Infrastructure**	**I**	**II**	**III**	**IV**
1	Installation of cold storage	Y	Y	Y	Y
2	Formation of hatchery	-	Y	Y	-
3	Installation of fruit preservation and processing unit	Y	Y	Y	Y
4	Agro – service center and seed processing unit	Y	Y	Y	Y
5	Installation of lac processing unit	Y	Y	-	-
6	Need of soil testing laboratory	Y	Y	Y	Y
7	Krishi Vigyan Kendra (KVK) in the district	Y	Y	-	-
8	Formation Krishak Bazar	Y	Y	Y	Y
9	AI center in each block	Y	Y	Y	Y
10	Construction of water holding structure and cross bandh on small canal (Joria)	Y	Y	Y	Y
IV	**Production System**	**I**	**II**	**III**	**IV**
1	Commercial floriculture	Y	Y	Y	Y
2	Expansion of area under Jack fruit				
3	Vast scope of farming system research	Y	Y	Y	-
4	Breed improvement of Cow, Buffalo and Goat	Y	Y	Y	Y
5	Fresh water pesciculture	-	Y	Y	-
6	Integrated fish farming	-	Y	Y	-
7	Scope of sericulture and lac cultivation	Y	Y	Y	-
8	Micro irrigation for fruit cultivation	Y	Y	-	-
9	Expansion of area under mixed cropping	Y	Y	-	-
10	Renovation of fish tanks and composite pisciculture	-	Y	Y	Y
11	Cultivation of medicinal plants	Y	Y	-	-
12	Potential for mushroom cultivation	-	-	Y	Y
13	Vast scope of vegetable production and its marketing	Y	Y	Y	Y

Sl. No.	Particulars	Relevance to Different AES			
		I	**II**	**III**	**IV**
14	Vast cope of intensification and diversification of existing farming system	Y	Y	Y	Y
15	Expansion of health care and feed management programme for cattle, poultry at village level	Y	Y	Y	Y
A	**THREAT**	**I**	**II**	**III**	**IV**
I	**Ecological**				
1	Weather aberration like drought and cyclone	Y	Y	Y	Y
2	Long dry spell in monsoon season	Y	Y	Y	-
3	Gradual decline of ground water	Y	Y	Y	Y
4	Un even distribution of rain fall	Y	Y	Y	-
5	Light soil and deforestation	Y	Y	Y	-
6	Degradation of natural resources	Y	Y	Y	-
7	Siltation and high percolation in WHS	-	Y	Y	-
8	Undulating land surface	Y	Y	Y	Y
	Socio Economic	**I**	**II**	**III**	**IV**
1	Migration of labour	Y	Y	Y	Y
2	Large scale exploitation of money lenders and middle man	Y	Y	Y	Y
3	Menace of stray cattle	Y	Y	Y	Y
4	Unhygienic way of living	Y	Y	-	Y
5	Lack of farmers thrust on Govt. officials	Y	Y	Y	Y
6	Diversion of agricultural land to non agricultural use	Y	Y	Y	Y
7	Lack of conviction in farmers	Y	Y	Y	Y
	Infrastructure	**I**	**II**	**III**	**IV**
1	Lack of confidence of Proper management and better utilization of available infrastructure	Y	Y	Y	Y
	Production System	**I**	**II**	**III**	**IV**
1	Threat of life saving irrigation facility of crops	Y	Y	Y	Y
2	Natural hazards	Y	Y	Y	Y
3	Decreasing trend of organic matter use	Y	Y	Y	Y

Sl. No.	Particulars	Relevance to Different AES			
		I	II	III	IV
4	Losses of biodiversity	Y	Y	Y	Y
5	Imbalance use of fertilizers	-	Y	Y	Y
6	Uncertainty of good return from crop	Y	Y	Y	Y
7	Out break of serious animal diseases	Y	Y	Y	-

VIII. PROPOSED EXTENSION STRATEGIES

Based upon the analysis of critical issues, problems, opportunities and SWOT analysis of the farming systems of different Agro-Ecological Situations, need based and feasible strategies have been worked out for carrying out extension activities in the district. The strategies have been categorized under five major groups as indicated below.

- Diversification and intensification of existing farming systems.

- Improvement in productivity and income of existing enterprises and commodities within existing farming system.

- Natural resource management for ensuring sustainability in production and productivity.

- Human resource development.

- Community organization.

- Sustainability of the project.

8.1 Diversification and intensification of existing farming system

The major production systems under farming systems of the district are agricultural production system, horticultural production system livestock production system and fish production system. As regards agricultural and horticultural production system, the suitability of the crops for the district have been assessed using Relative Spread Index (RSI) and Relative Yield Index (RYI).

$$RSI = \frac{\text{Crop area expressed as percentage of total cultivated area in the district}}{\text{Crop area expressed as percentage of total cultivated area in the state}} \times 100$$

$$RYI = \frac{\text{Mean yield of the crop in the district}}{\text{Mean yield of the crop in the State}} \times 100$$

High spread - 90-200%

Low spread - 30-90%

High yield - 60-200%

Low yield -30-60%

Using the two indices, the crops can be grouped as follows:

RYI \ RSI	High	Low
High	HH	HL
Low	LH	LL

Low spread and low yield crops are undesirable which need diversification. High spread and low yield crops are either to be substituted or their yield level can be increased by technological and input interventions. Low spread and high yield crops should be encouraged. The high spread and high yield crops are most ideal crops and value addition, agro-processing and marketing intervention need to be improved for more profit and sustainability.

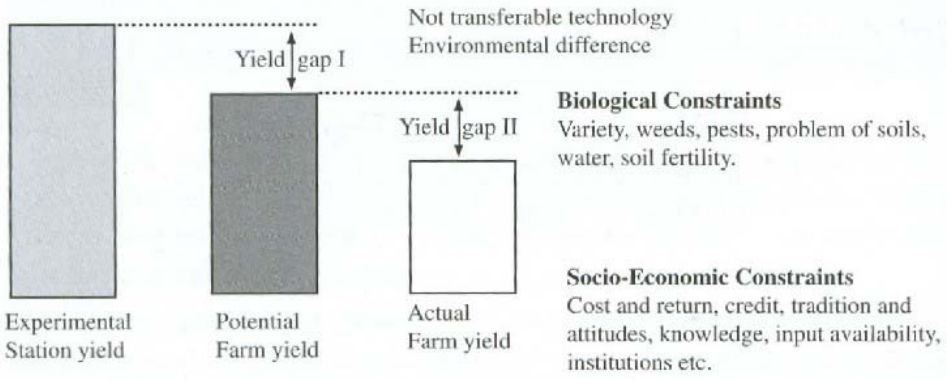
The less remunerative enterprises need diversification and existing farming system require further intensification to increase the production level.

The thrust crops identified in the district are as follows.
High spread and High yield -
Low spread and High yield - Vegetables, Mustard, Fruit plants
High spread and Low yield - Paddy, Maize, Arhar, Kulthi, Mung, Urad
Low spread and low yield – Ragi, Gundali, Nizer, Sugar cane

8.2 Improvement in productivity and income of existing enterprises and commodities.

Most of the commodities under different enterprises of the district have low yield. There are major technological gap between existing farming practices and recommended practices.

Strategies are suggested to reduce the yield gap II for improvement in productivity and income of existing enterprise. In general, the farmers are inclined to have more production and profit with minimum risk. Therefore, various extension strategies to overcome the technological gaps and reduce anticipated risks are suggested.



For land less farmers non-land based enterprises are suggested to increase the income and employment.

8.3 Natural Resource Management for ensuring sustainability in production and productivity

During field study it is observed that unabated soil erosion and degradation of natural resource base may pose serious threats for sustainable crop production. Various problems relating to soil and water management, Integrated Pest Management and Integrated Nutrient Management have been identified and strategies suggested to conserve the natural resources and their regeneration.

8.4 Community Organization

The concept of unpaid contact farmers and individual extension has virtually failed in most of the areas of the district. In contrast, extension service to work with functional groups of farmers has become highly effective. Various groups such as Self Help Groups (SHG) or Farmer Interest Group (FIG) could be formed in villages for protection of common interests, empowerment and availing access to information, technology and market. For ensuring equity in distribution of benefits in watershed areas, maintenance of ecological assets and management of water resource, community organization is considered vital.

Farm women contribute significantly to agricultural production, livestock production and household food security in the district. Their skills could be improved to reduce drudgery and to improve the quality of work through need based training. Women farmers could be involved in the decision making process and natural resource managements. Entrepreneurship development can also be made among the women. The existing women's groups can be strengthening and their participation in post-harvest handling, seed and fruit preservation can be ensured for which strategy is suggested.

8.5 Human Resource Development

Human resource development is a vital component for the success of any project. For effective implementation of the project as well as for its sustainability all the stakeholders including extension functionaries of agriculture and allied departments, NGOs, private extension workers, para-professionals, input handling agencies are required to be trained on various aspects relating to their roles and responsibilities.

8.6 Sustainability of the Project

In general, most of the projects do not sustain after the project period is over. Cost sharing by the farmers and building up a revolving fund by ATMA will be desirable for sustainability of the project after the fund flow is withdrawn. Such cost sharing for consultancy service, soil testing, artificial insemination and supply of critical inputs etc., can be made for project sustainability.

A summery statement of extension strategies for different AESs in Jamtara district

Sl. No.	Strategies	Relevance under A E S			
I	**Agricultural Production System**	**I**	**II**	**III**	**IV**
	➢ Adoption of mixed cropping / intercropping system	Y	Y	Y	-
	➢ Substitution of upland rice & Marua, with medicinal plants / Horticulture / Pamology.	Y	Y	-	-
	➢ Increase cropping intensity in the areas having assured irrigation	-	-	Y	-
	➢ Increase cropping intensity by inducing short duration varieties in rain fed situation.	Y	Y	-	-
	➢ Increase cropping intensity utilizing residual moisture after Kharif crop through paira crop	-	-	-	Y
	➢ Adoption of scientific crop rotation	Y	Y	Y	Y
	➢ Improvement in rain fed farming adopting suitable dry land technology	Y	Y	Y	Y
	➢ Expansion of area under Safflower, Niger and Red Gram	Y	Y	-	-
	➢ Balance use of fertilizer	Y	Y	Y	Y
	➢ Use of Bio fertilizer and organic manure	Y	Y	Y	Y
	➢ Awareness in farmers to adopt suitable technology and managerial practice.	Y	Y	Y	Y
	➢ Over coming technological gap in major agricultural crops like – Paddy, Maize, Arhar, Urad, Mung, and other crops	Y	Y	Y	Y
	➢ Decentralized seed production programme of preferred varieties under the concept of seed village programme	Y	Y	Y	Y
	➢ Value addition and agro processing in pulses and oil seed	Y	Y	Y	Y
	➢ Farm mechanization for timely and effective and agriculture operations	Y	Y	Y	Y
	➢ Over coming technology gap in post harvest technology	Y	Y	Y	Y
	➢ Adoption of INM and IPM practices in field crop	Y	Y	Y	Y
II	**Horticulture Production System**				
		I	**II**	**III**	**IV**
	➢ Establishment of organized orchards of fruits	Y	Y	-	-
	➢ Renovation of old orchards	Y	Y	Y	Y
	➢ Extension and intensive cropping of different vegetables	-	-	Y	-
	➢ Intensive cultivation of flowers	-	Y	Y	
	➢ Dry land horticulture as alternate land use	Y	Y	Y	Y
	➢ Area expansion under Papaya plantation	Y	Y	Y	-
	➢ Introduction of Banana in the area of assured irrigation and water logged	-	-	Y	Y
	➢ Introduction of Poly bag, Drip, Sprinkler, and pitcher irrigation system in organized orchard and nursery for flowers	Y	Y	Y	-
	➢ Introduction of Mushroom cultivation among the farmers organization	Y	Y	Y	Y
	➢ Awareness among the farmers organization to check the stray cattle grazing	Y	Y	Y	Y
	➢ Introduction of Bee keeping in garden, orchard and commercial floriculture field	Y	Y	Y	Y
	➢ Post harvest technology, value addition, Processing, Preservation of fruits and vegetables.	Y	Y	Y	Y
	➢ Over coming technology gap in vegetables like – Tomato, Bitter guard Brinjal, Okra, Onion, Cole crops and fruit crops	Y	Y	Y	Y
	➢ Rejuvenation of old orchard	Y	Y	Y	Y
	➢ Agro processing and value addition in spices like Ginger and Turmeric.	-	Y	Y	Y

Sl. No.	Strategies	A E S			
III	**Live Stock Production System**	**I**	**II**	**III**	**IV**
	➢ Breed up-gradation in dairy and goatry through Artificial insemination.	Y	Y	Y	Y
	➢ Encourage rearing of improved goat, pig, and poultry breeds.	Y	Y	Y	Y
	➢ Introduction of quails.	Y	Y	Y	Y
	➢ Introduction of improved duckery under pisciculture farming system	-	Y	Y	Y
	➢ Introduction of green fodder and forage crops.	-	Y	Y	Y
	➢ Renovation of village pasture with seasonal and drought resistance fodder in Rabi Season	Y	Y	-	-
	➢ Schedule programme for health care at village level for livestock and poultry	Y	Y	Y	Y
	➢ Processing and preservation of milk and milk products	Y	Y	Y	Y
	➢ Encourage establishing hatchery for broiler and layer chicks.	Y	Y	Y	Y
IV	**Fish Production System**	**I**	**II**	**III**	**IV**
	➢ Expansion of composite pisciculture in the available water bodies.	-	Y	Y	Y
	➢ Introduction of multiple stocking and repeated harvesting.	-	Y	Y	Y
	➢ Introduction of integrated pisciculture and duckery	-	Y	Y	Y
	➢ Renovation of village tanks	Y	Y	Y	Y
	➢ Establishment of hatchery at block level / district level for fish seed production	-	Y	Y	Y
	➢ Adoption of pre stocking and post stoking technology and management in fishery.	Y	Y	Y	Y
	➢ Encouragement for raising fingerlings from fry stage through rural youth.	-	Y	Y	Y
V	**Natural Resource Management**	**I**	**II**	**III**	**IV**
	➢ Adoption of conservation measures through bunding, across ploughing, growing cover crop, mulching construction of check dam	Y	Y	Y	Y
	➢ Formation of W H S (Water Harvesting Structure) / tank	-	Y	Y	Y
	➢ Encourage use of F Y M and compost	Y	Y	Y	Y
	➢ Soil amendment with liming material	Y	Y	Y	-
	➢ Trench fencing with a well for partial irrigation	Y	Y	-	-
	➢ Use of fertilizer on soil test basis	Y	Y	Y	Y
	➢ Inter cropping for companion crops	Y	Y	Y	Y
	➢ Awareness to use bio-fertilizer	Y	Y	Y	Y
	➢ Utilization of natural perennial stream / tanks by lifting the water manually / small pumping set for irrigation	-	-	Y	Y
	➢ Balance and proper placement for fertilizer in soil	Y	Y	Y	Y
	➢ Awareness of farmers of rain water harvesting technique	Y	Y	Y	Y
	➢ Introduction of green Manuring	-	-	Y	Y
	➢ Waste land a forestation	Y	Y	-	-
	➢ Promotion of Agro forestry system	Y	Y	Y	-

Sl. No.	Strategies	AES			
VI	**Sericulture**	**I**	**II**	**III**	**IV**
	➢ Plantation of good quality leaf producing species of mulberry	Y	Y	-	-
	➢ Trench fencing of mulberry garden with a well to provide life saving irrigation facility in summer and dry spell	Y	Y	-	-
	➢ Provision of infrastructure to popularize sericulture as commercial farming	Y	Y	-	-
	➢ Establishment of silk industries in this area	Y	Y	-	-
	➢ To provided market facility for good return from sericulture occupation.	Y	Y	-	-
	➢ To provide scientific facility to store the cocoon at block level.	Y	Y	-	-
	➢ Arrangement of training for farmers	Y	Y	-	-
	➢ Scientific sericulture demonstration at village level.	Y	Y	-	-
VII	**Lac Cultivation**	**I**	**II**	**III**	**IV**
	➢ Initiate scientific Lac cultivation on abundant available plash tree	Y	Y	Y	Y
	➢ Insure good quality Lac seed	Y	Y	Y	Y
	➢ Provide training of farmers in reputed Institution for scientific cultivation of Lac	Y	Y	Y	Y
	➢ Provision of time to time technical support and close monitoring of Lac cultivated area by technical expert	Y	Y	Y	Y
	➢ Plantation of good quality Ber and Plash tree	Y	Y	-	-
	➢ To established a government organizational set up for technical support and extension of Lac cultivation	Y	Y	Y	Y
	➢ Provision of scientific Lac cultivation demonstration at village level	Y	Y	Y	Y
	➢ Marketing facility for good return from Lac cultivation	Y	Y	Y	Y
	➢ Establishment of Lac processing unit at district level	Y	-	-	-
VIII	**Community Organization**				
		I	**II**	**III**	**IV**
	➢ Revitalizing the dormant groups available in Agriculture, Animal Husbandry, Horticulture, Floriculture, Fisheries, Natural Resource Management, Sericulture and Lac cultivation	Y	Y	Y	Y
	➢ Encouraging formation of community oriented groups in all activities for better access to Information Technology, input and market	Y	Y	Y	Y
	➢ Village level organization for rain water harvesting and their proper utilization	Y	Y	Y	Y
	➢ Organization of villagers to monitoring a forestation and deforestation and also cultivation and marketing of forest produces.	Y	Y	Y	Y
	➢ Special encouragement to form woman SHGs	Y	Y	Y	Y
	➢ Organization of farmers federation at district level	Y	Y	Y	Y

Sl. No.	Strategies	AES			
IX	**Sustainability of the Project**	**I**	**II**	**III**	**IV**
	➢ Cost sharing by farmers for AI, Soil testing, Vaccination, Training programme and others facilities for building revolving fund of ATMA.	Y	Y	Y	Y
	➢ Publication of news letter and periodicals by ATMA and circulation on nominal prices.	Y	Y	Y	Y
	➢ Building up revolving funds at ATMA and FIAC level by collecting cost of service for various activities.	Y	Y	Y	Y
	➢ Creation of farmer's forum with membership fee at ATMA level for Participatory, Monitoring and Evaluation of ATMA activities.	Y	Y	Y	Y
	➢ Developing linkage between district level farmers federation and sectorial groups at block level with ATMA through affiliation	Y	Y	Y	Y
	➢ Gradual increase of farmers representative in GB of ATMA	Y	Y	Y	Y
X	**Human Resource Development**	**I**	**II**	**III**	**IV**
	➢ Training need assessment for extension functionaries, NGOs and Private Service Providers	Y	Y	Y	Y
	➢ Project orientation to G.B., AMC, BTT & FAC	Y	Y	Y	Y
	➢ Awareness campaign on the project at group level	Y	Y	Y	Y
	➢ Need based training to BTT & NGOs	Y	Y	Y	Y
	➢ Exposure visit of public and private extension workers including FIGs	Y	Y	Y	Y
	➢ Training on leadership development and group dynamics to different commodity orientated groups	Y	Y	Y	Y
	➢ Training on I T & Cyber extension to GB, AMC, BTT & FAC members	Y	Y	Y	Y
	➢ Developing technical literature and audio visual aids at ATMA level.	Y	Y	Y	Y
	➢ Documentation of success stories / ITKs (process and content) for replication.	Y	Y	Y	Y

IX. Proposed Research Strategies

Understanding farmers and farming system is the basic and most important step in the process of technology generation, assessment and refinement. But the agricultural research system under the institutional leadership of Indian Council of Agricultural Research is still stereotypical and yet to include the concept in its research agenda. There are growing doubts about the efficacy of the generalized technologies recommended by the Zonal Research Stations for a particular Agro-climatic Zone. A certain technology proved to be successful with one farmer may not yield the same result with the other in the same farming system since the same commodity is grown under different situations. Therefore refining the generalized technologies in to situation specific recommendations for each agro- ecological situation has become a demanding task..

Further it would not be redundant to mention that the technological development in the field of agriculture is gender blind. Therefore in the process of participatory research, along with men, women farmers must be involved to identify and prioritize their problems and facilitate to finalize the research agenda. The technology generated may need further testing and fine-tuning in terms of gender applicability.
The researchable issues identified during participatory data collection have been prioritized by the research scientists ZRS (Dumka), BAU, Ranchi and KVK (Deoghar) using various prioritizing techniques and accordingly strategies have been formulated.

9.1 Resynthesis of technological package for each commodity on farming situation basis.

Each commodity is grown under different situations even within same agro-ecological situation. Therefore the generalized package recommended for all the farming situations either fails in some situations or does not yield desired result in all the situations and hence needs resynthesis of the technological package for different farming situations of a single crop for its acceptance and adoptability by the farmers.

The resynthesized package again needs testing in farm situation to judge its suitability in the situation in collaboration with researchers, farmers, extensionists and private extension providers. All aspects of technological synthesization, farmers involvement is the pre requiste.

9.2 Farmer participatory on-farm research.

On-farm research is a set of procedures for adaptive research whose purpose is to develop recommendations for the representative group of farmers. In on-farm research, farmers participate in identifying problems and its priorities, managing experiment and evaluating results. On-farm research is therefore is an adaptive research with farmers perspective. While conducting the on-farm research, researcher should give top priority to the farmers rationality and follow the following steps.

i. Identification of problem
ii. Collection and analysis of information
iii. Planning for on-farm research
iv. Experimentation
v. Assessment/evaluation of results.
vi. Recommendations and diffusion

In any system of on-farm research extension, agents should participate in the entire process and so are able to transfer the recommendations to farmers with skill and confidence.

The summary statement of participatory research strategies for each AES, developed on the basis of information collected by the AES teams during participatory data collection is presented below.

Table 9.1 Summary statement of participatory Research Strategies

Sl. No.	Particulars	Relevance to Different AES			
		I	II	III	IV
1.	Amendment of acid soils using locally available liming material.	Y	Y	-	-
2.	Short duration varieties selection of Arhar.	Y	Y	-	-
3.	Drought and disease resistance varieties selection of Paddy, Maize, Arhar, Urad, Mung.	Y	Y	Y	Y
4.	INM and IPM in rice based cropping system.	Y	Y	Y	Y
5.	Technology intervention for increase coverage of rabi crops.	Y	Y	Y	Y
6.	Water harvest technology and rain water management and its proper utilization.	Y	Y	Y	Y
7.	Developing remuneration cropping system model for rainfed farming.	Y	Y	Y	Y
8.	Envolving suitable technology for preparation of high quality compost and vermicompost.	Y	Y	Y	Y
9.	Development of suitable technology of packing and transportation of fruits, vegetables and flowers for better market value.	Y	Y	Y	-
10.	Identification and characterization of Basmati Rice.	Y	Y	Y	Y
11.	Selection of hybrid vegetables	Y	Y	Y	-
12.	Biological control of pest and diseases for creals, pulses, vegetables & fruits.	Y	Y	Y	Y
13.	Variety selection of rice suitable for each AESs.	Y	Y	Y	Y
14.	Performance of Red Divyan poultry breed in Jamtara district.	Y	Y	Y	Y
15.	Technology development to eliminate nutritional imbalance in Cow and Buffalo.	Y	Y	Y	Y
16.	Technology for reducing kid mortality in goat.	Y	Y	Y	Y
17.	Low cost technology for checking runoff, soil loss, percolation rate in WHS and increasing ground water recharge.	Y	Y	Y	-
18.	Standardization of fish feed using locally available materials.	-	Y	Y	-
19.	Control of RD and Fowl pox in poultry birds.	Y	Y	Y	Y
20.	Identification and characterization of locally available medicinal plant.	Y	Y	-	-

Table 9.2 Summary statement of on-station research strategies

Sl. No.	Particulars	Relevance to Different AES			
		I	II	III	IV
1.	Identification, testing and refinement of ITKs	Y	Y	Y	Y
2.	Evolving suitable wilt resistant varieties of Tomato, Arhar, and Brinjal.	Y	Y	Y	-
3.	Use of Biofertilizer in pulses, creals and vegetables.	Y	Y	Y	Y
4.	Identification of major soil series and preparation of soil fertility map of district.	Y	Y	Y	Y
5.	Standardization of INM and IPM package for paddy based cropping sequence.	Y	Y	Y	Y
6.	Disease management in fresh water fish.	-	Y	Y	-
7.	Package development on Agro forestry farming system.	Y	Y	-	-
8.	Hi-tech floriculture, agriculture and famology possibility in Jamtara district.	Y	Y	Y	-

X. Activity Schedule of Extension and Research Strategies

For achieve the goal of extension strategy proposed for different AES in Chapter VIII the proposed activities along with the number of units and cost per unit have been suggested in the following tables :

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
A.	**Agriculture Production System**					
1	Adoption of mixed cropping / inter cropping system	(a) On farm & on station demonstration for area expansion.	4	3000	II	
		(b) Exposure visit to success sites.	4	5000	II	
		(c) Organizing farmers training.	4	5000	II	
		(d) Organization of farmers field day	4	5000	II	
2.	Substitution of upland rice & Marua, with medicinal plants / Horticulture / Pamology.	(a) On farm demonstration	4		II	
		(b) Awareness campaign	4	1000	I	
		(c) Exposure visit to success sites.	4	5000	II	
		(d) Identification and analysis of success story	-	-		
3.	Increasing cropping intensity in the areas having assured irrigation	(a) Identification and analysis of success story.	-	-		
		(b) Exposure visit of farmers to the successful sites.	4	5000	II	
		(c) On farm trials of Rabi Crop	4	3000	II	
		(d) Organization of farmers field day	4	2000	II	
		(e) Training to farmers on management practices by using successful farmers as resource person.	4	5000	III	
		(f) Facilitate supply of critical inputs in appropriate time.	-	-		
4.	Increasing cropping intensity by inducing short duration varieties in rain fed situation.	(a) On farm trial of short duration Kharif and Rabi crop.	4	3000	II	
		(b) Identification & Characterization of local varieties.	-	-		
		(c) Exposure visit of farmers on demonstration sites.	4	5000	II	
		(d) Ensure timely availability of specified short duration variety seed to farmers.	-	-		
		(e) Training and awareness campaign among the farmers	4	2000	I	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
5.	Increasing cropping intensity using residual moisture after Khaif crop through paira crop	(a) On farm demonstration of paira crop like gram, masoor, lentil etc.	16	3000	II	
		(b) Exposure visit of success site.	4	5000	II	
		(c) Training and awareness programme regarding paira crop	4	5000	II	
		(d) Farmers field day	4	3000	I	
					II	
6.	Adoption of scientific crop rotation	(a) On farm demonstration with suitable crop rotation and study economies in comparisons to existing practice.	4	3000	II	
		(b) Exposure visit on demonstration site.	4	5000	II	
		(c) Organize field day	4	3000	II	
		(d) Training on suitable crop planning and crop rotation.	4	5000	II	
					II	
7.	Improvement in rain fed farming adopting suitable dry land technology	(a) Field level training to farmers on various aspects of dry land technology such as crop planning, in situ moisture conservation, soil and water conservation runoff harvesting, alternate land use etc.	4	5000	II	
		(b) Identification and analysis of successful site	-	-		
		(c) Organizing awareness campaign for adoption of dry land technology.	4	2000	I	
		(d) Exposure visit of farmers to the successful sites.	4	5000	II	
		(e) Demonstration of bunding and water harvesting structure on suitable site with large catchment area.	4	100000	III	
8.	Expansion of area under safflower & Niger and Red gram	(a) Demonstration of safflowers, Niger and Red gram in upland rain fed condition.	12	3000	II	
		(b) Awareness campaign at Block and village level for adoption of these crops by the farmers.	4	2000	II	
		(c) Exposure visit of farmers to the successful sites and interaction with successful farmers.	4	5000	II	
		(d) Insure supply of good quality seed and other inputs in time.	-	-		
		(e) Training on management practices of these crops.	4	5000	III	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in Rs.)	Year	Remark
9.	Balance use of fertilizer.	(a) Demonstration on suitable crop sequence with Integrated Nutrients management.	8	6000	III	
		(b) Training and awareness campaign on INM in crop.	4	3000	I	
		(c) Exposure visit on successful site and interaction with farmers.	4	5000	III	
		(d) Facilitate supply of inputs in time.	-	-		
10.	Use of Bio fertilizer and Organic Manure	(a) Training to farmers on benefit, use and preparation of Rhizobium, B.G.A and organic manner.	4	5000	III	
		(b) Conduct demonstration of pulses with Rhizobium and Rice with B.G.A.	8	3000	II	
		(c) Exposure visits on successful site and interaction with farmers.	4	5000	II	
		(d) Facilitate critical input i.e., Rhizobium culture, B.G.A in time.	-	-		
11.	Awareness in farmers to adopt suitable technology and managerial practice.	(a) Organize farmers in to groups	-	-		
		(b) Training Programme for farmers on cultivation managerial practice.	4	5000	II	
12.	Over coming technological gap in major agricultural crops like Paddy, Maize Arhar, Urad, Mung and other crops.	(a) Identification and analysis of technological gap.	-	-		
		(b) Provide sufficient technology to fulfill that gap through IT Connectivity, training, Exposure visit, scientist expert visit at village level.	4	5000	III	
13.	Decentralized seed production programme of preferred varieties under the concept of seed village programme	(a) Identification of interested farmers for seed production programme.	-	-		
		(b) Identification and analysis of success stories.	-	-		
		(c) Organize training on seed production technology	4	5000	III	
		(d) Facilitate procurement of foundation seeds from reliable farmers and procurement of certified seeds produced.	-	-		

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
14.	Value addition and agro processing in pulses and oil seeds	(a) Formation of FIGs	-	-		
		(b) Organizing field level training and demonstration on value addition and agro processing.	4	5000	III	
		(c) Facilitate availability of machinery, credit and marketing for the produce.	-	-		
15.	Over coming technology gap in post harvest technology.	(a) Identification of FIGs	-	-		
		(b) Organize training on post harvest technology and how to minimize loss.	4	5000	III	
		(c) Facilitate availability of storage and linkage with ongoing schemes.	-	-		
16.	Adoption of INM and IPM practices in field crops.	(a) Prepare detailed action plan to manage the IPMs at farm level	-	-		
		(b) Organize awareness campaign on IPMs & INM practices.	4	3000	II	
		(c) Organize training for farmers on production and use of bio fertilizers, compost, vermin compost and use of balance nutrition.	4	5000	III	
		(d) Identity feasible waste lands for production of green manure seeds and bio-fertilizers like Azolla, BGA by SHG & FIG and other farmers organization	-	-		
		(e) Organize field day at demonstration site.	4	3000	II	
		(f) Identify key crop pest and problems in endemic villages in such AES.	-	-		
		(g) Analyze technological options emerging through different sources of innovations including bio-pesticides.	-	-		
		(h) Conduct demonstration on crop pest management	4	3000	II	
		(i) Organize field day with sound discussion with successful farmers.	4	3000	II	
		(j) Facilitate supply of input for IPM.	-	-		

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
B.	**Horticulture Production System**					
1.	Establishment of organized orchards of fruits.	(a) Identification & selection of suitable site.	-	-		
		(b) Facilitate timely supply of planting materials.	-	-		
		(c) Field level training to farmers on cultivation practices of fruit crops.	4	3000	II	
		(d) Introduction and demonstration of intercropping practices in newly established garden.	4	3000	II	
		(e) Exposure visit to success site.	4	5000	II	
		(f) Insure provision of life shaving irrigation facility for plant by digging well or tank.	4	50000	II	
2.	Renovation of old Orchards	(a) Organizing awareness camp on orchards site.	4	5000	II	
		(b) Facilitate new and good planting material and technology for renovation of old orchards	-	-		
		(c) Exposure visit of farmers on success site.	4	5000	II	
3.	Extension and intensive cropping of different vegetables.	(a) Training on production technology	4	5000	III	
		(b) Identification and analysis of successful site.	-	-		
		(c) Facilitate timely supply of critical inputs.	-	-		
		(d) Exposure visit to success site and interaction with vegetables grower farmers.	4	5000	III	
4.	Intensive cultivation of flowers.	(a) Formation of organized group for flower cultivation.	-	-		
		(b) Demonstration of high return value of floriculture.	4	5000	III	
		(c) Awareness camp among the farmers on cost benefit ratio of flower cultivation.	4	3000	III	
		(d) Training on managerial and cultivation practices.	4	5000	III	
		(e) Facilitate marketing facilities for flowers.	-	-		
		(f) Facilitate timely supply of inputs and planting materials.	-	-		
		(g) Training for motivates the farmers in the Hi-Tech cultivation.	4	5000	IV	
		(h) Exposure visits on success site and interaction with farmers.	4	5000	IV	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
5.	Dry land horticulture as alternate land use.	(a) Organizing awareness camps on dry land horticulture.	4	3000	II	
		(b) Exposure visits of farmers to successful site where dry land horticulture has been done.	4	5000	II	
		(c) Training to farmers on dry land horticulture.	4	5000	II	
		(d) Facilitate timely supply of plant materials for dry land horticulture.	-	-		
6.	Area expansion under papaya plantation.	(a) Formation of Net house for seedling germination and provide easily plant material for the farmers.	4	100000	I	
		(b) Identification & analysis of success site.	-	-		
		(c) Field level training to farmers on cultivation.	4	3000	II	
		(d) Intercultural practice in papaya field	4	3000	II	
		(e) Exposure visit to success site.	4	5000	II	
7.	Introduction of Banana in area of assured irrigation and water logging condition.	(a) Identification and selection of suitable site	-	-		
		(b) Facilitate supply of tissue cultured Banana planted.	4	5000	II	
		(c) On farm trial of Banana with inter cropping.	4	5000	II	
		(d) Exposure visit of farmers on successful site and tissue cultured lab where plant is to be produced.	4	5000	II	
		(e) Training of farmers on scientifically and managerial practices of Banana.	4	5000	III	
		(f) Insure market facility of product.	-	-		
8.	Introduction of poly bag, drip, sprinkler and pitcher irrigation system in organized orchard and nursery flowers.	(a) Training of farmers on proper utilization and benefit of these technologies.	4	5000	III	
		(b) Demonstration of these technologies in organized orchards and nursery of flowers.	4	100000	I	
		(c) Exposure visit of farmers on demonstration site.	4	5000	II	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
9.	Introduction of mushroom cultivation among the farmers organization.	(a) Awareness campaign in block or village level for organization of interested group.	12	3000	I	
		(b) Demonstration of mushroom cultivation in organized group.	4	10000	II	
		(c) Training of farmers on successful cultivation of mushroom and its benefit.	4	5000	I	
		(d) Exposure visit of farmers on success site and interaction with successful farmers.	4	5000	II	
10.	Awareness among the farmers organization to check the stray cattle grazing.	(a) Awareness campaign in village to check the stray cattle grazing.	32	3000	I	
		(b) Formation of organized farmers group.	-	-		
		(c) Formation of kanihoj at village and panchayat level and that controlled by the farmers group.	32	10000	I	
		(d) Exposure visit of farmers at successful site.	4	5000	II	
11.	Introduction of Beekeeping in Garden, Orchard and commercial floriculture field.	(a) Training of farmers on Beekeeping.	4	5000	II	
		(b) Identification of interested farmers and selection of sites.	-	-		
		(c) Providing essential tools and technology to initial and popularise beekeeping among the farmer groups.	32	1000	III	
		(d) Exposure visit to success site.	4	5000	II	
12.	Over coming technology gap in vegetables like Tomato, Bitter guard, Brinjal, Okra, Onion, Cole crops and fruit crops.	(a) Organized need based training on technology gaps.	4	5000	II	
		(b) Awareness among farmers through mass media about technological gap.	4	3000	II	
		(c) Demonstration on seed treatment, planting technique, INM & IPM etc.	8	5000	III	
		(d) Facilitate availability of critical input and marketing of produce.	-	-		

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
13.	Rejuvenation of old Orchard.	(a) Identification of old orchard organizes field level demonstration and training on rejuvenation of old orchard.	4	10000	II	
14.	Post harvest technology, value addition, Processing, Preservation of fruits and vegetables.	(a) Carry out diagnostic study on market problem.	-	-		
		(b) Assess marketable surplus of each commodity with different types of farm families.	-	-		
		(c) Identity alternate market opportunity for each commodity.	-	-		
		(d) Assess specifications regarding consumer preferences for each commodity.	-	-		
		(e) Assess new technological options regarding post harvest handling at farm level.	-	-		
		(f) Facilitate linkage with input and marketing	-	-		
		(g) Training on post harvest technology for fruit and vegetables.	4	5000	III	
		(h) Exposure visit of farmers at successful site.	4	5000	III	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
	Live Stock Production System					
1	Breed up gradation in dairy and goatry through Artificial insemination	(a) Facililitate supply of frozen semen on cost sharing bases	-	-	-	
		(b) Training of unemployed youth in each block	4	15000	II	
		(c) Organize awareness camps for breed up gradation	20	1000	II	
2	Encourage rearing of improved Goat, Pig and Poultry bird	(a) Identification of innovative farmers of these enterprises	-	-	-	
		(b) Exposure visit of farmers	4	5000	II	
		(c) Training of farmers groups on improved Pig, Goat and Poultry bird	12	5000	II	
3	Introduction of quails	(a) Identification of interested farmers	-	-	-	
		(b) Awareness programme for rearing quails	20	1000	II	
		(c) Training on quails rearing for interested farmers	4	5000	II	
		(d) Facilitate supply of key input for quails rearing	-	-	-	
4	Introduction of improved Duckery under Pisciculture farming system	(a) Identify and analyze success stories	-	-	-	
		(b) Exposure visit to successful sit	4	5000	II	
		(c) Training on Duckery to interested farmers	4	5000	II	
		(d) Facilitate timely availability of input	-	-	-	
5	Introduction of Green fodder and forage crops	(a) Identification of success stories where green fodder cultivation has been taken successfully	-	-	-	
		(b) Conduct field demonstration	8	3000	II	
		(c) Exposure visit of identified farmers group to success sites	4	5000	II	
		(d) Identification of sites and species (grasses) for green fodder cultivation	-	-	-	
		(e) Farmers training an improved fodder cultivation technical	4	5000	II	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
6	Renovation of village pastured with seasonal and drought resistance fodder in Rabi season	(a) Identification of success stories where green fodder cultivation has been done successfully	-	-	-	
		(b) Exposure visit of identified farmers groups to success sites	4	5000	II	
		(c) Identification of site and species for fodder cultivation in Rabi season	-	-	-	
		(d) Organizing farmers training on fodder cultivation	4	5000	II	
7	Schedule programme for health care at village level for livestock and poultry	(a) Identification of paravets and NGOs willing to take up work	-	-	-	
		(b) Organizing training for paravets, NGOs and FIGs on health care technique for live stock and poultry	4	15000	II	
8	Processing and preservation of milk products	(a) Assessment of marketed surplus of milk	-	-	-	
		(b) Identification formulation of FIGs for milk processing	-	-	-	
		(c) Organizing training programme on processing and preservation of milk products	4	5000	II	
		(d) Linkage with input, credit and marketing	-	-	-	
9	Encourage establishing hatchery for broiler and layer chicks	(a) Organize interested farmers in to group	-	-	-	
		(b) Organize training to FIG on establishment hatchery for broiler and layer chicks	4	5000	III	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
Fish Production System						
1	Expansion of composite Pisciculture in the available water bodies	(a) Identification of success site	-	-	-	
		(b) Exposure visit on success site	4	5000	II	
		(c) Awareness campaign for composit fish cultivation	16	1000	-	
		(b) Organizing farmers training for composite fish culture (field level)	8	1000	-	
		(e) Facilitate supply of critical inputs like finger lings and prawn	-	-	-	
2	Introduction of multiple stocking and reputed harvesting	(a) Awareness programme on multiple stocking and repeated harvesting	16	1000	II	
		(b) Identification of success site	-	-	-	
		(c) Exposure visit and interaction with successful farmers	4	5000	III	
		(d) Training technique of multiple stocking and repeated harvesting	4	5000	II	
3	Introduction of integrated pisciculture and duckery	(a) Identify and analysis success stories	-	-	-	
		(b) Organize training of interested farmer on integrated fish farming	4	5000	III	
		(c) Facilitate linkage with input and service provider	-	-	-	
4	Renovation of village tanks	(a) Policy decision for medium term lease of village tanks by GPs	-	-	-	
		(b) Awareness campaign for pond preparation	-	-	-	
		(c) Demonstration of critical practice for renovation	-	-	-	
5	Establishment of hatchery at block level / district level for fish seed production	-	-	-	-	
6	Adoption of pre stocking and post stoking technology and management in fishery	(a) Organize training programme for the interested farming / FIG	4	5000	III	
		(b) Exposure visit to CIFA, SRI	4	5000	II	
		(c) Facilitate availability of inputs, credit and market	-	-	-	
7	Encouragement for raising finger lings fry stage through rural youth	(a) Identify interested rural youth and organize them into groups	-	-	-	
		(b) Organize training to rural youth on production technology	4	5000	III	
		(c) Facilitate linkage with input credit and market	-	-	II	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
National Resource Management						
1	Adoption of conservation measures through bunding, across ploughing, growing cover crops mulching construction of check dam	Awareness campaign for motivation of the farmers	16	1000	III	
		Demonstration on bunding, cover crops and mulching	24	5000	II	
		Organize field day on demonstration site	4	1000	II	
		Construction of small check dam	16	50000	II	
2	Formation of WHS (Water Harvesting Structure) Tank	a. Construction of WHS	4	50000	II	
		b. Exposure visit of constructed site and training for proper utilization collected water	4	50000	II	
3	Encourage use of FYM and compost	a. Awareness programme	8	1000	II	
		b. Training on scientific preparation of FYM and compost and its benefit on crop production and soil binding	4	5000	II	
4	Soil amendment with liming material	Awareness programme to use liming material in acidic soil	4	1000	II	
		Facilitative availability of liming material in local market	-	-	-	
		Demonstration on lime loving crop with liming material on soil test basic	24	5000	II	
5	Trench fencing with a well for partial irrigation	Construction of trench fencing to check the soil erosion and run off with a well to collect run off water	4	100000	I	
		Exposure visit of farmers to success site	4	5000	II	
6	Use of fertilizer on soil test basis	Awareness programme on this important aspect	8	1000	II	
		Training for the basic concept of soil test and fertilizer use and its benefit	4	5000	I	
7	Inter cropping for companion crops	Demonstration of Inter Cropping	8	5000	II	
		Exposure visit of demonstration site and interaction with the farmers on its benefit	4	5000	II	
8	Awareness to use bio-fertilizer	Awareness and training campaign on its benefit and method of use	4	5000	II	
		Facilitate availability of bio-fertilizer	-	-	-	
9	Utilization of natural perennial stream/tank by lifting the water manually/small pumping set for irrigation	Selection of suitable site	-	-	-	
		Awareness of programme to utilize available resources among the organized group	8	1000	II	
		Facilitate the credit and revolving fund				

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
National Resource Management						
10	Balance and proper placement for fertilizer in soil	Field level practical training on placement of fertilizer	16	1000	III	
		Awareness programme on its benefit	8	1000	III	
		Demonstration on suitable crop with proper placement of fertilizer	8	5000	II	
		Exposure visit on success site	4	5000	II	
11	Awareness of farmers of rain water harvesting technique	Awareness porgramme	24	1000	III	
12	Introduction of green manuring	Training of farmers on its full package and practices	4	5000	II	
		Demonstration of green manuring	8	5000	II	
		Exposure visit to success site	4	5000	II	
13	Waste land aforestation	Awareness programme on aforestation	24	1000	III	
		Identification of waste land for aforestation	-	-	-	
		Organize field day on aforestation site	8	1000	II	
14	Promotion of agro forestry system	Awareness programme on agro-forestry system	24	1000	III	
		Demonstration on agro forestry	8	5000	II	
		Exposure visit on demonstration site	4	5000	II	
		Facilitate availability of forestry plant at block level	-	-	-	
Sericulture						
1	Plantation of good quality leaf producing species of mulberry	Procured mulberry cutting for plantation	8	5000	II	
		Training of farmers on mulberry cultivation	4	15000	II	
2	Trench fencing of mulberry garden with a well to provide life saving irrigation facility in summer and dry spell	Demonstration of mulberry plantation with trench fencing and a well	4	10000	I	
		Exposure visit on demonstration site	4	5000	II	
3	Provision of infrastructure to popularize sericulture as commercial farming	Awareness campaign at village level	24	1000	I	
		Provision of infrastructure to introduce new enterprises as sericulture	-	200000	I	
4	Establishment of silk industries in this area	-	-	-	-	Policy issues
5	To provided market facility for good return from sericulture occupation	Search possibility of marketing to consult different organization	-	-	-	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
6	To provide scientific facility to store the cocoon at block level	-	-	200000	I	
7	Arrangement of training for farmers	-	4	50000	II	
8	Scientific sericulture demonstration at village level	-	8	25000	II	
Lac Cultivation						
1	Initiate scientific Lac cultivation on abundant available plash tree	Awareness programme among the farmers	16	1000	II	
2	Insure good quality Lac seed	-	-	-	-	
3	Provide training of farmers in reputed Institution for scientific cultivation of Lac	-	4	50000	II	
4	Provision of time to time technical support and close monitoring of Lac cultivated area by technical expert	Visit of technical expert and close monitoring of lac cultivation in rural areas	-	100000	II	
5	Plantation of good quality Ber and Plash tree	-	8	10000	II	
6	To established a government organizational set up for technical support and extension of Lac cultivation	-	-	-	-	
7	Provision of scientific Lac cultivation demonstration at village level	-	-	200000	II	
8	Marketing facility for good return from Lac cultivation	Orientation with different industries and institutions	-	-	-	
9	Establishment of Lac processing unit at district level	-	-	-	-	Policy issues

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
Community Organization						
1	Revitalizing the dormant groups available in Agriculture, Animal Husbandry, Horticulture, Floriculture, Fisheries, Natural Resource Management, Sericulture and Lac cultivation	Identification of dormant groups	-	-	I	
		Assess the reason of dormancy	-	-	I	
		Organize training on skill up gradation and important	32	5000	II	
		Facilitate forward and backward linkage	-	-	-	
2	Encouraging formation of community oriented groups in all activities for better access to Information Technology, input and market	Identify the success studies where CIGs have successful	-	-	I	
		Exposure visit of farmers to success sites	4	5000	II	
		Organize groups with the help of NGOs	-	-	II	
		Organize training on skill up-gradation, group dynamics and empowerment	4	10000	I	
3	Village level organization for rain water harvesting and their proper utilization	Formation of farmers groups with help of NGOs	-	-	II	
		Training of farmers on rain water harvesting and its proper utilization	8	5000	II	
4	Organization of villagers to monitoring a forestation and deforestation and also cultivation and marketing of forest produces	Formation of user groups	-	-	I	
		Training of farmers on Joint forest management and protection of plantation	4	5000	II	
		Facilitate marketing of forest produces	-	-	-	
5	Special encouragement to form woman SHGs	Identification of successful women groups	-	-	I	
		Intraction of well organized group to other women through exposure visit	4	3000	II	
		Involvement of NGOs which have more female members for women group organization	-	-	II	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
6	Organization of farmers federation at district level	Organize the farmers in to different FIG with the help of NGOs	-	-	II	
		Facilitate to continue at block level	-	-	II	
		Facilitate for formation of district level federation for better access to information, input, credit and market.				
Sustainability of the project						
1	Cost sharing by farmers for AI, Soil testing, Vaccination, Training programme and others facilities for building revolving fund of ATMA	Organize awareness campaigns	16	1000	I	
		On necessity of creating revolving fund	-	-	-	
		Motivation of FOs for payment of the cost of AI, soil testing, vaccination, training programme and others facilities	-	-	-	
		Collection of service charges for field visit and advisory services	-	-	-	
2	Publication of news letter and periodicals by ATMA and circulation on nominal prices	Identify success status of various enterprises, important commodities of different AES need of the farmer etc	-	-	III	
		Publish monthly new letters and periodicals on technical and managerial aspects	-	-	III	
		Circulate among the farmers and extension functionaries on payment of cost for creating the revolving fund of ATMA	-	-	III	
3	Building up revolving funds at ATMA and FIAC level by collecting cost of service for various activities	Organize awareness campaigns for farmers to diffuse the concept of revolving funds and basis of cost sharing	4	1000	II	
		Motivate the farmers to share the cost for various services like supply of bio fertilizer, planting material, transportation cost of chicks etc.	-	-	II	
4	Creation of farmer's forum with membership fee at ATMA level for Participatory, Monitoring and Evaluation of ATMA activities	Awareness campaign at pachayat level about the farmers forum at ATMA	-	-	-	
		Collect annual or life membership the from farmers who are interested to be member fee of the farmers forum				
		Training of members an participatory monitoring and evaluation	-	-	II	
		Constitute a monitoring evaluation unit at ATMA and a committee involving NGOs/ farmers representatives for monitoring and evaluation of ATMA activities on participatory basis	-	-	-	

Sl. No.	Extension Strategy	Proposed activities	No. of Units	Unit cost in (Rs.)	Year	Remark
5	Developing linkage between district level farmers federation and sectorial groups at block level with ATMA through affiliation	Formation of block level scetarial association and district level federation with the help of NGOs	-	-	-	
		Affliate the bodies with ATMA under specific terms and conditions	-	-	-	
		Organize training for farmers federation for their empowerment	-	-	-	
		Distribute technical literatures prepared by ATMA to the FA / FF at a very nominal price to build up their capacity or knowledge base	-	-	-	
6	Gradual increase of farmers representative in GB of ATMA	-	-	-	-	
Human Resource Development						
1	Training need assessment for extension functionaries, NGOs and Private Service Providers	Organize workshop to asses the training need of extension functionaries of the line deptts. of different level, NGOs. Pvt. Service providers, GB, AMC and FIAC	-	-	II	
2	Project orientation to G.B., AMC, BTT & FAC	Conducting orientation course for GB, AMC, FAC, BTT and grassroot level workers about the project for effective implementation	-	-	I	
3	Awareness campaign on the project at group level	Prepare leaflets about the aims, objective and outcome of the project in local language	-	-	I	
4	Need based training to B T T & NGOs	Organize awareness campaigns at GP level to create mass about the project to sensitive and activate the farming communities	-	-	I	
5	Exposure visit of public and private extension workers including F I Gs	Find out the training need assess of the BTT and NGOs	-	-	I	
6	Training on leadership development and group dynamics to different commodity orientated groups	Organize training course for BTT and NGOs from time to time discharge their roles and responsibilities effectively	-	-	I	
7	Training on IT & Cyber extension to GB, AMC, BTT & FAC members	-	-	-	II	
8	Developing technical literature and audio visual aids at ATMA level	-	-	-	II	
9	Documentation of success stories / ITKs (process and content) for replication	-	-	-	II	

Type of activities to be carried out for research strategies.

Sl. No.	Research strategies	Proposed Activities	No. of units	Unit cost in (Rs.)	Year	Remarks
1.	Amendment of acid soils using locally available liming material.	Conducting field trials on acid soil management with locally available liming material	4	1500	III	
2.	Short duration varieties selection of Arhar.	Search of suitable seed	-	-	-	
		On farm trial	4	1000	II	
		Trial on farmers field	4	1000	II	
3.	Drought and disease resistance varieties selection of Paddy, Maize, Arhar, Urad, Mung.	Information of collection and analysis of crop information of productivity the crops in different AES	-	-	II	
		Identification of interested farmers and selection of sites	-	-	-	
		Conducting field trials	24	2500	II	
		Organizing field days	4	1000	II	
4.	INM and IPM in rice based cropping system.	Identification of existing practice of INM and IPM in rice based cropping system	-	-	-	-
		Conducting field trial on INM and IPM	8	2500	II	
		Finding out the recommendation for INM and IPM for this situation	-	-	-	
5.	Technology intervention for increase coverage of rabi crops.	Identification of site and interested farmers group	-	-	II	
6.	Water harvest technology and rain water management and its proper utilization.	Identification of sites and farmers for on farm test	-	-	4	
7.	Developing remuneration cropping system model for rainfed farming.	Identification of existing cropping system in different AES	-	-	-	
		Identification of interested farmers	-	-	-	
		On farm trials for remunerative crop for judge their suitability	20	1000	II	
8.	Envolving suitable technology for preparation of high quality compost and vermicompost.	Identification of interested farmers and sites for conducting the trial	-	-	II	
		Field trial with different ratio of constituents	8	1000	II	
		Selection of best technology that will be adopt by the farmers	-	-	III	
9.	Development of suitable technology of packing and transportation of fruits, vegetables and flowers for better market value.	Identification of areas in respect of marketable surplus of vegetables, fruits and flowers	-			

		Testing with different kinds of packaging materials	4	1000	II	
		Selection of suitable technology	-	-	II	
10.	Identification and characterization of Basmati Rice.	Research of suitable seed material	-	-	II	
		Selection of preferred varieties by the farmers	-	-	-	
11.	Selection if hybrid vegetables	Collection of promising hybrid vegetable seed	-	-	I	
		Selection of sites and farmers for field testing	-	-	II	
		Conducting field trials with new hybrid	4	1000	II	
		Organizing field day of farmers on success full site	4	1000	II	
12.	Biological control of pest and diseases for ureas, pulses, vegetables & fruits.	Identification of farmers and analysis of this problems	8	1000	II	
		Collection of bio agents	-	-	II	
		Release of bio agents in farmers field	-	-	II	
		Assessing the affect	-	-	-	
13.	Variety selection of rice suitable for each AESs.	Collection and analysis of information on productivity of rice in different AES	-	-	I	
		Identification of interested farmers and selection of sites	-	-	II	
		Conducting field trials	4	1000	II	
14.	Performance of Red Divyan poultry breed in Jamtara district.	Selection of interested farmers	-	-	I	
		Conduct performance trial of Red divyan poultry breed	4	1000	II	
		Visit to performance site regularly to take observation	-	-	II	
15.	Technology development to eliminate nutritional imbalance in cow and Buffalo.	Selection of interested farmers	-	-	I	
		Field trials with different feed mix containing green fodder and concentration	10	1000	III	
16.	Technology for reducing kid mortality in goal.	Identification of village and farmers having goatery	-	-	I	
		On farm testing of new recommendation to reduce kid mortality	-	-	II	
17.	How cast technology for checking runoff, soil less, percolation rate in WHS and increasing ground water recharge.	Visit to problematic site and analysis of problem	4	1000	II	
		Identification of village and site for conducting trials	-	-	I	
		Conducting trials with different methods to find out the most cheapest and suitable	24	1000	III	

18.	Standardization of fish feed using locally available materials.	Identification and collection of locally available materials for fish feed	8	1000	I	
		Preparation of mixture of different proportion	-	-	II	
		On farm trial with different feed mixture	12	1000	III	
		Study of efficacy	-	-	III	
19.	Control of RD and fowl pox in poultry birds.	Selection of farmers and village	-	-	I	
		On farm testing of new recommendation along with ITKs	4	1000	II	
20.	Identification and characterization of locally available medicinal plant.	Identification of locally available medicinal plants	-	-	I	
		Characterization of germ plasm of selected medicinal plants	-	-	I	

ACTIVITY SCHEDULE FOR CONDUCTING ON-STATION RESEARCH

Sl. No.	Proposed Research Activities	No. of units	Unit cost in (Rs.)	Year	Remarks
1.	Prioritization of researchable issues using tools like congruency, economic surplus method, checklist and scoring techniques	5	1000	I	
	Organizing issue based workshop for finalizing research agenda	1	1000	I	
	Selection of research methods and conducting research for at least two seasons	5	1000	II	
	Replication research results under adaptive trials	5	1000	II	
	On farm trial in farmers field	10	1000	II	
	Analysis of data of the on farm trials	-	1000	II	
	Releasing proven technology for general recommendation for the concerned AES	-	-	II,III	

XI. Operational Modalities

Organization involved

Agricultural Technology Management Agency (ATMA) Jamtara an autonomous registered society. For integrated development programme of the district through ATMA a three stage organizational setup has been suggested in order to implement the programmes of the Strategic Research and Extension Plan (SREP) under the National Agricultural Technology Project. The planning and implementation of the activities of the development process will be operated at the village, block and district level by the different organization involved in it with their functions as under:

1. Village Level Organizations:

Active Farmer's participation in district level programme planning is one of the main theam of the NATP. At village level more emphasis would be given to fromed farmers organization like Farmer Interest Groups (FIGs), Women Interest Groups (WIGs), Commodity Interest Groups (CIGs) and others similar types of farmer's Groups. This job may be assigned to some identified and competent NGOs of each block with collaboration to BTT and FAC. These organization will co-ordinate in organizing all type of agricultural activities at village level and also give feedback to the extension and research. Their representative would be directly involved in the block level FAC and also at AMC and GB at district level.

2. Block Level Organization

A.) Farm Information and Advisory Center (FIAC)
This will function at block level. It would managed key extension programmes within the block, leaving service and development activities to be managed by other units or personal within the line department. In effect, the FIAC would act as the extension planning and operational arm of ATMA. It would be common meeting point for the line departments. It prepares detail extension programmes and coordinate their implementation. It would also be the level, where farmers input could be more effectively mobilized through a Farm Information and Advisory Center (FIAC) and Farmers Advisory Committee (FAC).

This will be constituted for providing a formal feed back mechanism. It would be constituted representing all major stake holders and farmers representative of FOs within the block. The FAC would help to set block extension priorities and recommend research allocation across programme area. This committee would review and provide advice to each implementation unit at block level. The chairman of the FAC would be selected from the farmer's representative on rotation. FAC shall meet once in every month on fixed schedule date.

B.) Block Technology Team

Block Technology Team comprising of the block level hards of the participating line departments with Block Agriculture Officer as the officer in charge 1st Convenor will come in force. This Block Technology Team (BTT) operating at block level would prepare the seasonal work plan, including the extension activities to be undertaken during the coming season and would operationalize the Strategic Research and Extension Plan in the block. BTT would meet once in a month and would operationalize the Programme within the block with their technical supervison and support.

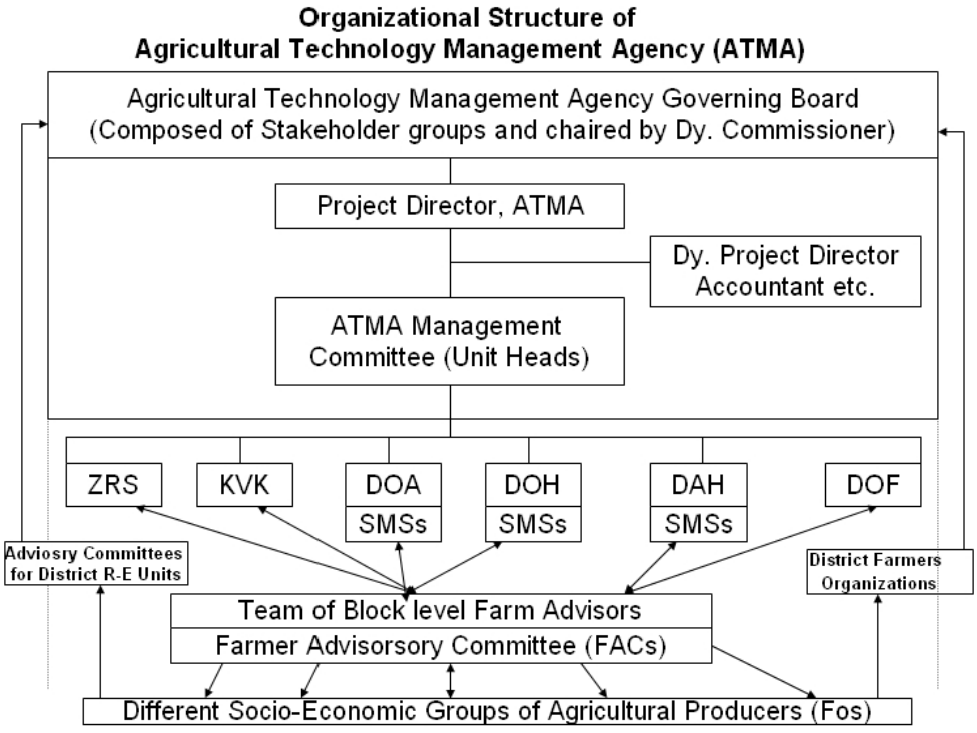
3. District Level Organization

A.) Management Committee

It constitutes line department heads, ZRS, KVK, NGO and four representative from the farmers organization under the chairmanship of the Project Director of ATMA. It will be responsible for planning and reviewing of the day to day activities of ATMA. It would carry out periodic participatory rural appraisal to identify the problems and constraints faced by the different socio-economic groups of the farmers. It will prepare on integrated Strategic and Research Plan for the district that would specify extension priorities reflecting the important farmers constraints identified and also short and medium adoptive research, its validation and refinement. The district level line department's and research units would organize in service training and support activities for the block and field level extension staff. This committee will also approve Block Action Plan (BAPs) that would submitted to ATMA Governing Board for approval and coordinate the extension through the department, ZRS, KVK, NGOs and FOs and private sector firms. This committee will meet every month.

B.) Governing Board (GB)

Governing Board (GB) represented by the official and non-official members (Farmers representative) under the chairmanship of Deputy Commissioner. It is a powerful policy making body and will provide guidance as well as review the progress of functioning of ATMA. It will review and appraise the Strategic Annual Action Plan that are prepared and submitted by the participating units. It will provide feedback and direction to the participating units as needed about the various research and extension activities, being carried out in the district. It will facilitate the greater involvement of private sector, NGOs and farmers organization in providing input, technical support, agro-processing and marketing services to the farmers. The Governing Board will meet once in three months.



Agricultural Technology Management Agency (ATMA), Jamtara, an autonomous registered society created at district level shall function under the overall guidance of the Governing Board (GB) represented by the

official and non-official members under tIie Chairmanship of District Collector. The day to day activities of ATMA will be managed by the ATMA Management Committee (AMC) comprising of the district heads of agriculture and line departments, representative of ZRS/KVK and NGO sector under the Chairmanship of Project Director, Deputy Project Director. The detailed operational modalities and fund flow mechanism are described below.

11.1. Preparation of annual / seasonal Block Action Plan (BAP).

Based on the strategies developed for each AES, a detailed Block Action Plan (BAP) or seasonal plan for each block is to be prepared as block is the implementing unit. Each FIAC team comprising of BTT and FAC members would prepare the Block Action Plan that would spell out the extension activities to be carried out in the block.

11.2. Technical approval of BAP

The Block Action Plan prepared by the FIAC team is to be approved by the FAC at Block Level and then sent to ATMA for necessary review by the Management Committee and final approval by Governing Board, ATMA.

11.3. Administrative Approval of BAP

On receipt of BAP by ATMA, the management committee would review the plans of each block and ensure that the plans are technically sound, administratively feasible and in consistence with the SREP. After review by the AMC, plans are placed before the Governing Board for administrative approval.

The Research Institutions would also prepare the seasonal or annual action plan to carry out different research activities and place before the GB for approval.

Similarly, the line departments would also work out seasonal or annual work plan with respect to type of trainings required for various levels of extension functionaries, technical support required to implement different activities by BIT and FAC etc. for approval of GB.

11.4 Fund Flow Mechanism

ATMA will have operational flexibility in use of project funds. The plans prepared for field activities by FIAC team, plans for infrastructure development, human resource development and for carrying out research activities are to be submitted by ATMA to TDMC after due approval of Governing Board. After formal approval of the plans by Technology Dissemination Management Committee (TDMC) at national levels, required funds for different activities will be released directly to ATMA by Technology Dissemination Unit (TDU).

On receipt of funds by ATMA, it will be released to district heads of the participating units against their action plan. But funds required to implement the programme component at block level, will be directly released to convenor BTT who in turn would release required amount to members of BTT for carrying out different field activities in consultation with the FAC members. Detailed information about the release of funds to BTT to carry out different activities under different programme component should be informed to the heads of concerned departments to enable them for effective monitoring and supervision of field activities. Every month the BTT and DTT would submit physical and financial progress report to ATMA and ATMA in turn would submit a quarterly statement of expenditure in prescribed format to Govt. of India for re-imbursement claim. The BTT at block level has to maintain registers like cash book, advance register, guard file, stock book & T.A. register for smooth management of the accounting procedure.

11.5 Modalities for implementation of various activities:

(i) Infrastructure development

This includes construction/renovation of the existing structure and procurement of equipments and vehicles by following the guidelines issued by World Bank/Govt. of India. The renovation work would be carried out separately by the participating organizations on receipt of funds from ATMA and after formal approval of plans and estimates by Chairman, ATMA. The allocated budget for the purpose must be spent as per the prescribed World Bank norms.
Construction of FIAC building at block level would be carried out by ATMA in accordance with the World Bank terms and condition and also after formal approval of the plans and estimates by Chairman, ATMA.

While purchasing the vehicle of ATMA, budgetary provision, Govt. of India guideline and clearance must be taken into consideration. However due attention should be given to purchase field vehicle rather than car and that too after posting of regular Project Director.

The equipments are broadly divided into two categories i.e. IT & non-IT equipment. Both IT and non IT equipments like furniture etc. for participating organizations and FIAC would be procured centrally by ATMA by following codal procedure and World Bank norms. All actions as indicated above need approval of GB.

State Agricultural Management Training Institute (SAMETI), Ranchi, Jharkhand has become autonomous under the requirement of NATP and cater the management training needs of extension functionaries of line departments, pvt. Input Dealers and NGOs. Various types of training courses under the requirement of NATP for different levels of officials and non-officials have been suggested in SREP, the details of which are as follows:

A) Exposure visit of farmers
Exposure visit of 30 farmers at a time may be conducted to the success site either within the district or outside the district. A sum of Rs.5,000/- & Rs.15,000/- may be spent for inside and outside district exposure visit. The financial limit as indicated is the maximum upper limit.

B) Awareness Campaign
Awareness campaign for activities like soil testing, use for bio-fertilizer, organic farming, and artificial insemination may be conducted for a duration of 4 hrs only and preferably in the afternoon. In each campaign 50 farmers would participate and estimated cost for each campaign is Rs 1000.00

C) Farmers training
Two types of farmers training have been suggested in SREP ie. Institutional training and field level training. The duration of institutional training is 3- 6 days whereas field level training is for one day. The expenditure for institutional and field level training is Rs 200.00 and Rs 100.00 per head per day respectively.

D) Training for GB / MC / Extension functionaries / Scientists / NGOs / Input dealers
In each training / workshop maximum 30 members would participate. The cost structure for such type of institutional training is Rs 400.00 per day per participant. Basing on the training needs, on request of ATMA, SAMETI would organize various types of training courses for the aforesaid category of personnel. All institutional training programmes on management aspects will be conducted by SAMETI on request of ATMA, Jamtara.

11.7 Extension Activities

The field activities are to be managed by FIAC team and supervised by the DTT. The DTT members may be divided into different sub groups for effective monitoring and supervision of different activities conducted by FIAC and ATMA. The mode of expenditure for different field activities are indicated below :

a) Demonstration

Demonstration for cereal, pulses, oil-seed crops and spices have been suggested in SREP. The area of demonstration is 0.1 ha. in case of vegetables and spices whereas it is 0.2 ha. in case of cereal, pulses and oil-seeds. The demonstration must be conducted on participatory approach and share of farmers for the demonstration must be ensured. The cost of critical input may be borne out of the programme component subject to a maximum limit of Rs 500.00 only. While conducting the demonstration the steps required in pre planning, planning and follow-up stage should be meticulously followed. The result of demonstration should be documented and presented to FAC / AMC

b) Field Day

Field day is one of the most important activity to be organized on completion of demonstration. Fifty participants would participate and a maximum of Rs. 1000.00 may be spent in each field day.

c) The participatory research

Component of this project would be implemented concerned ZRS / KVK. It may be mentioned here that planning and execution of participatory research shall be done in an integrated manner on farming system basis.

d) Community Organization

The job may be assigned to some identified and component NGOs of each block. Farmer Interest Group (FIG), Commodity Interest group (CIG) and Women Interest Group (WIG) are expected to be formed by the NGOs in collaboration with BTT and FAC. The NGOs may also be assigned to revitalize the existing dormant groups, if available in the block. There should be close co-ordination between FAIC and NGO at grassroots level. This assignment be co-ordinate by Project Director as well as AMC members.

e) Preparation of A.V. aids

Simple visual aids like posters, charts on some thrust crops, important practices and group activities are required to be prepared by FIAC and grassroots level extension officers. Necessary skill and funds are to be provided by ATMA. Printing of leaflets, technical manuals and documentation of success stories through videocassettes are to be done centrally at ATMA level. Expenditure for all such activities is to be incurred from ATMA budget.

f) Documentation

The result of demonstration, success stories, case studies, new innovations are to be documented by ATMA either by print media or videocassettes as required. The documented activities should take proper place in the ATMA newsletter and annual report for wide circulation and replication.

XII. SUCCESS STORIES AND ITKs

1. Lac Cultivation is Introduced:-

ATMA Jamtara first time introduced Lac cultivation in Santal Pargana region at Jamtara. Brood lac inoculated on plash tree (*Buetea Monosparing*) successfully has been completed in Ambabank, Murgabani, Lakrakunda and Mohanpur villages of Nala block, Sahajpur village of Jamatara block and Jagarnathpur, Kadrudih, Piprasole of Narayanpur blocks of Jamtara districts the brood lac is inoculated on Palash plant.

After joining as Project Director of ATMA Jamtara Mr. R.B.Singh planned to introduce this important enterprise among the farmers of the district on abundence naturally available Palash tree in the whole districts. He contacted the Scientists of Indian Lac Research Institute, Namkum and approached them to include the group of farmers of Jamtara for training from 26th to 31st May 2003.

Group for lac cultivation was formed in different blocks with the help of one local NGO. A group of 30 farmers were selected from farmers groups for training. After completion of training, pruning of Palash tree were completed by beneficiaries themselves as per guidance and supervision of Mr. Shaktidhar Koiri an associate of I.L.R.I, Namkum, Bhian lac (ie. Cariya lacca.insect) was brought from associated farmers group of I.L.R.I, Namkum and inoculated on Palash plants.

The farmers will get about 40 to 45 quintals of lac in October and will be able to sell the lac @ 50.00 to Rs. 80.00 per kg, depending upon the quality of lac without any problem and on a least investment and labour. There is no fear of theft, rain and any other calamity hazards, accept a small expenditure of Rs. 7.00 (seed 100 gram + plastic net) per plant including the seed cost.

It is also proposed that in October when the main season of lac cultivation will start, the farmers of the district will not sale it outside that will be used for further propagation within the district on uncovered plants of Palash.

2. Horticultural Activities: Plantation of Papaya and Banana:-

ATMA Jamtara introduced first time cultivation of Tissue Cultured Banana and Papaya cultivation in organized groups of Santhal Pargana at Jamtara district. ATMA Jamtara first erected Agro net house for the hardening of Tissue cultured Banana plants of "Srimanti" brought from Godrej, Hyderabad on 29th May 2003 and after hardening, planted in farmers field under the supervision of Horticultural expert and Project Director.

In the supervision of Project Director, two Papaya varieties are introduced one is hybrid "Red lady" of Taiwan and another is C.O. – III improved from Ranchi selection at Coimbotor (T.N.) 6000 plants are ready for the plantation in farmers field.

Farmers can increase Banana coverage by transferring, tubers emerging from main plats by themselves too.

3. Mulberry Cultivation and Cocoon Rearing:-

First time in the district of Jamtara the project of cocoon rearing of Mulberry silk was taken up by the ATMA Jamtara.

Lot of barren upland fields and interest of laborious farm lady compelled P.D ATMA, Jamtara to take up this project, without the help of persons of Line Department ie. of Industry Department of Govt. of Jharkhand.

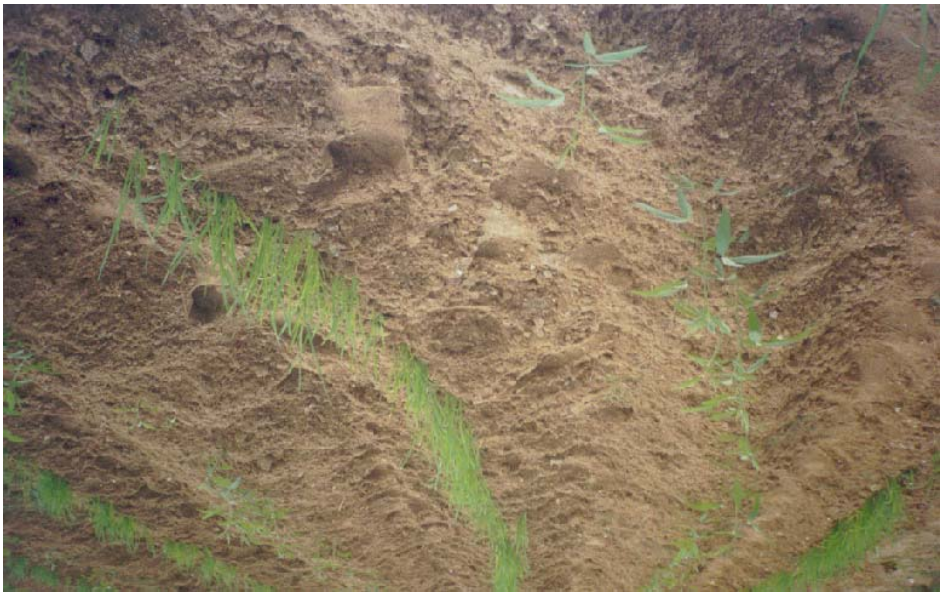
Under this project cutting of Mulberry plant have been planted in farmers fields of Karmoie, Bada Manjhaladih, Chalna, Govindpur, Kenbora, Khizuria villages. F.I.G. and S.H.G. groups of these villages have already dug pits for planning mulberry cuttings in the selected field.

After this with the graceful guidance and help of Sri Rajesh Agrawal, Director Industries Govt. of Jharkhand, Ranchi the mulberry farm Hehal, Ranchi has accepted to organized farmers groups of impart training to women farmers participants in 2 batches of 15 each that is total to 30 participants in September 2003. By January cocoon rearing will be started in these villages by trained women farmers.

4. Cluster Farming:-

For the first time in the district of Jamtara by the unwearied effort of Project Director ATMA Jamtara and the team consisting Dr. Arvind Kumar, Dy. Project Director and Mr. S. Thakur, a new S.H.G. groups farming is introduced.

The different S.H.G. groups have adopted mixed cropping of Paddy + Arhar and Maize + Arhar with border of Kudrum in different villages of Jamtara districts. Group farming of mixed cropping has been adopted by 22 farmers of Jaganathpur, 20 farmers of Bada Manjhaladih, 20 farmers of Karmoi and 20 farmers of Mojra village, respectively in 15, 10, 5 and 2 acres of land.



By the effort of Project Director ATMA Jamtara farmers have started cultivation of upland rice i.e., Khandgiri variety of rice behind the plough as direct sowing in Jamtara district for the first time as it is not in their cultural practices ago.

Farmers of this locality do not do direct sowing even in upland situation. They usually transplant in upland situation, due to delay and uneven distribution of monsoon large area of upland remain fallow and due to late sowing yield of paddy drastically reduced.

5. Cumulative Farming of Vegetables:-

Particularly Karaila (Bitter guard) cultivation has been started by a well organized farmers group (President Md. Abdul Miya, Secretary Shri Gangadhar Pandit) in Khajuria village of Kundhit block in Jamtara district. Md. Abdul Miya and Shri Gangadhar Pandit has been visited Krishi Expo 2003 and they inspired to do vegetable cultivation more scientifically. At present 20 acres of Kharif Bitter Guard (Karaila) has been cultivated on upland situation with out any facility of supplement irrigation. They built more scientific net web at 2.5 feet high from ground level to avoid rotting of veins and fruits in rainy season.

Simultaneously 74 female and 26 male vines of Parwal (Tricosanthis dioca) is also brought from HARF (previously CHESS) Palandu, Ranchi to introduce in Jamtara district. Parval is a most promising and widely accepted vegetable and will be proved very much remunerative for the poor farmers of this locality.

6. Backyard Poultry

In Bada Manjhaladih, Shahablal Marandi rearing successfully Backyard poultry (Red Divyayan). Whole family are very happy. They are getting much eggs and profit from this species of hen (250-280 eggs per year). They do not sell eggs, give more emphasis to produce Chicks and distribute among the members of group and local people on cost basis who are interested in backyard poulty rearing.