

LIVELIHOOD PROMOTION THROUGH INTEGRATED FARMING SYSTEM IN ASSAM

NAIP (COMPONENT-3), ICAR, NEW DELHI



BASELINE SURVEY REPORT



SUBMITTED BY

CONSORTIUM OFFICE, NAIP, COMPONENT-3

ASSAM AGRICULTURAL UNIVERSITY

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Date:

(P.K. Gogoi)
CPI, NAIP
Component -3 AAU, Jorhat

THE BASELINE STUDY TEAM

Name	Designation & Address
Faculty Members:	
<i>Dr. Prabin Kr. Gogoi</i>	<i>Professor & CPI, NAIP, Deptt. of Agronomy, AAU</i>
<i>Dr. Rajendra Kr. Talukdar</i>	<i>Professor & Co-PI, NAIP, Deptt. of Extension Education, AAU</i>
<i>Dr. Jayanta Deka</i>	<i>Principal Scientist & Co-PI, NAIP, Deptt. of Agronomy, AAU</i>
<i>Dr. Nikunja Chandra Deka</i>	<i>Principal Scientist & Co-PI, NAIP, Deptt. of Agronomy, AAU</i>
<i>Dr. Nilay Bora</i>	<i>Sr. Scientist & Assoc. Scientist, NAIP, Deptt. of Agronomy, AAU</i>
<i>Dr. Abhijit Sarmah</i>	<i>Sr. Scientist & Assoc. Scientist, NAIP, Deptt. of Agronomy, AAU</i>
Senior Research Fellows:	
<i>Mr. Himangshu Lekhak</i>	<i>SRF(Agri), NAIP, AAU</i>
<i>Mr Bipul Phukan</i>	<i>SRF(Fishery), NAIP, Lakhimpur</i>
<i>Mr. Pranjal Pratim Gautam</i>	<i>SRF(Fishery), NAIP, Karbi Anglong</i>
<i>Dr. Haricharan Nath</i>	<i>SRF(Vety.), NAIP, Kokrajhar</i>
<i>Dr. Pratap Bora</i>	<i>SRF(Vety.), NAIP, Lakhimpur</i>
<i>Dr.(Mrs.) Jubee Phukan</i>	<i>SRF(Vety.), NAIP, Karbi Anglong</i>
<i>Mrs. Pranalika Gogoi</i>	<i>SRF(Agri), NAIP, SIRD</i>
<i>Md. Abu Shamim Ahmed</i>	<i>SRF(Fishery), NAIP, Kokrajhar</i>
NGOs Activists:	
<i>Mr. Bishnu Nurzery</i>	<i>President, Discovery Club, Kokrajhar</i>
<i>Mr. Amal Goswami</i>	<i>Executive Director, Impact NE, Lakhimpur</i>
<i>Fr. Thomas Manglassery</i>	<i>Executive Director, Jirsong Asong, Karbi Anglong</i>
<i>Mr. Ramen Bora</i>	<i>Activist, Impact NE, Lakhimpur</i>
<i>Mr. Sansuma Basumatary</i>	<i>Activist, Discovery Club, Kokrajhar</i>
<i>Mr. Hareswar Brahma</i>	<i>Activist, Discovery Club, Kokrajhar</i>

EXECUTIVE SUMMARY

A sample survey was conducted in the target districts namely, *Lakhimpur*, *Kokrajhar* and *Karbi Anglong* covered under the NAIP projects (Component 3) entitled “Livelihood Promotion through Integrated Farming System in Assam” by using ‘Livelihood Baseline Questionnaire’ on a group of 750 selected farmers. The results are summarized below:

The baseline information of the sample villages shows that in both the clusters of *Kokrajhar* and *Karbi Anglong* districts, and in the *Dhakuakhana* cluster of *Lakhimpur* district majority of population is Schedule Tribe. However, in *Lakhimpur* cluster of *Lakhimpur* district, relative proportion of OBC and others communities (1677 no’s out of 2722 no’s of total population) are more than SC/ST. Major sources of irrigation of the target villages are stream, pond and STW. Rice is the major crop. Farm mechanization is very less. Infrastructure facilities are very poor. Awareness levels of farmers regarding scientific crop cultivation are poor. The transport facilities are inadequate. There exists a number of social and environmental issues out of which a few notable are soil erosion, loss of soil nutrients, greater competition for natural resources (land, water, forests, fodder), loss of land to non-agricultural use, fodder/grazing area shortage-loss of community land, increase drudgery for women, poor health of children, unemployment, social conflicts etc.

Regarding the status of the socio-economic profile of the villages, Agriculture is the main occupation and 79.2 to 92.0 percent population primarily depends on Agriculture for their livelihood. Family size varies from 6 to 8 in the target villages. In all the clusters, the highest expenditure was incurred in day to day consumption (31 to 45 %), primarily on food requirements, followed by social functions (9 to 15 %). Expenditure on health (6 to 8 %) and education (2 to 5 %) was poor in all the clusters.

On the subject of land and water uses, medium land constituted about half of the total land holding (45 % to 57.9 %) followed by low land (26 % to 41 %), homestead and other land in all the clusters.

Regarding water uses, irrigation facilities are highly inadequate and shallow tube well (18 no's), stream (39 no's) and pond irrigation (46 no's) are the only sources of irrigation.

Regarding cropping pattern and net agricultural income, mono-cropping of cereals like rice in all districts, maize/sugarcane in Karbi Anglong, vegetables cultivation in small scale primarily in homestead garden are common practices. The cropping intensities varied from 110.0 to 128.1 percent. Annual gross revenue from Agriculture and Horticulture varied from Rs. 9,888.00 to Rs. 34,342.00 per family depending on the size of the land holding.

The post harvest activities like, mechanical cleaning and grading are not done. Cold storage is not available. Marketing facilities are underdeveloped and marketing practices are unorganized. Storage was only traditional.

Among various livestock and fisheries activities, cow is the main source of milk and bullock is the primary source of draught power. Very less expenditure is made on animal rearing and maintenance. The poultry breeds were only indigenous in all the surveyed villages (2684 no's in all the clusters). Pig (1076 no's) is reared in large numbers of households. Inbreeding depression in pig was common in all villages. Despite having household pond (617 no's), scientific fish rearing is not done and fisheries contribute little to the family income.

Some of the output and outcome variables are quantified and presented in the following tables (Table I & II) with their base values:-

Table I. Output variables in different clusters with base values

Outputs	Baseline values cluster-wise						
	Lakhimpur	Dhakuakhana	Kokrajhar	Gossaigaon	Diphu	Hamren	All clusters
Number of SHGs	5	4	6	7	5	7	34
Availability of mini carp hatcheries	0	0	0	0	0	0	0
Availability of mini poultry hatcheries	0	0	0	0	0	0	0
Availability of vegetable nurseries	0	0	0	0	0	0	0

Area coverage of Rice-fish-vegetable farming system	0	0	0	0	0	0	0
Area coverage of Integrated-pig-fish-vegetable	0	0	0	0	0	0	0
Rearing of improved pigs (no's/cluster)	0	0	0	0	0	0	0
Area coverage of Integrated-poultry-fish-vegetable	0	0	0	0	0	0	0
Area under Community fish-vegetable farming	0	0	0	0	0	0	0

Table II. Outcome variables in different clusters with base values

Outcomes	Clusters						
	Lakhimpur	Dhakuakhana	Kokrajhar	Gossaigaon	Diphu	Hamren	All clusters
Rice: Area (ha)	159.5	146.7	147.30	145.4	134.7	148.2	881.8
Yield (q/ha)	31.85	28.88	30.95	29.55	27.84	29.20	29.7
Maize: Area (ha)	0	0	2.0	2.8	6.70	8.30	19.8
Yield (q/ha)	0	0	31.43	34.72	36.31	38.75	35.3
Sugarcane: Area (ha)	0	0	5.0	6.7	3.35	4.75	19.8
Yield (q/ha)	0	0	216.32	231.45	183.24	275.00	226.5
Vegetable: Area (ha)	6.10	9.60	9.60	11.25	3.7	4.65	44.9
Yield (q/ha)	210.6	221.5	280.7	273.6	225.3	244.8	242.8
Cow / Bullocks (nos.)	315	304	298	291	256	275	1739
Milk yield (l./day/cow)	1.21	1.09	1.73	1.36	1.00	0.75	1.19
Pig (nos.)	148	164	205	217	169	173	1076
Productivity of local breeds of pigs (meat kg/head)	58	62	60	67	60	68	62.5
Poultry (nos.):	382	415	486	505	460	436	2684
Productivity of poultry (meat in kg/bird)	1.25	1	1.5	1.5	1.2	1.4	1.3

Laying capacity of birds (no. of eggs/ bird)	82	85	90	95	75	88	86
Pond with fish culture (nos.)	103	105	104	106	96	103	617
Productivity of pond (t/ha)	3.25	3.6	3.3	3.5	2.9	3.2	3.3
Area under fish culture (ha)	9.9	8.1	9.5	9.7	8.2	7.9	53.3
Present demand for use of certified seeds of rice (ton/cluster)	7.17	6.6	6.62	6.54	6.06	6.66	39.65
Demand for vegetable saplings (approx. number of sapling in lakh)	4.27	6.72	6.72	7.87	2.59	3.25	31.42

Regarding income from other subsidiary occupations and wage employment, farmers are engaged to some extent in weaving (Rs. 1000 to Rs. 3500/year), handicraft (Rs. 700 to Rs. 1550/year) and sericulture (Rs. 1500 to Rs. 5000) but incomes were meager.

On the aspect of sources of knowledge, the status is not encouraging. The farmers get information basically from their friends (56.8 % to 70 %) and state extension agencies (48 % to 62.4 %).

Regarding the perception of farmers on low yield, natural calamities like flood and drought (> 60% farmers in Lakhimpur & Karbi Anglong district), low yielding varieties (about 40% farmers in Lakhimpur & Kokrajhar district) and incidence of disease and pest (about 25% farmers in Lakhimpur & Kokrajhar district) were perceived as major factors.

People used to migrate in search of works (out migration) during the month of September – October, i.e. after rice transplanting and during February – May i.e. after harvest of rice when there is little scope for employment in agricultural activities. About 4% people from all the clusters except in Hamren (9.7%) migrated to different nearby places in search of works, mostly unskilled.

Regarding farmers' perception towards extension services, about half of the respondents in Lakhimpur (52% in Lakhimpur 45% in Dhakuakhana cluster) and Kokrajhar districts (45.5% in Kokrajhar and 50.0% in Gossaingaon cluster), were satisfied

with the services of agricultural extension personnel. However, most of the respondents were dissatisfied with extension services rendered by other sectors like veterinary, fishery etc.

The access of the farmers to the micro credit facilities was not available in the target villages.

The farmers are not at all aware about the contract farming and hence it does not exist in the target villages.

CHAPTER I

BACKGROUND

1.0 Introduction

The Indian Council of Agricultural Research (ICAR) has initiated the National Agricultural Innovation Project (NAIP) to fulfill the national objectives of transfer of agricultural technologies as mentioned in the National Policy on Agriculture (NPA). It also suggests generation of innovations in technology system or actualization of the vast untapped growth potential of Indian Agriculture to generate income and employment opportunities for rural communities.

1.1 Project Objectives and Components

The overall objective of the NAIP is to facilitate an accelerated and sustainable transformation of the Indian Agriculture so that it can support poverty alleviation and income generation through collaborative development and application of agricultural innovation by the public organization in partnership with farmers group, the private sectors and other stakeholders. There are four components under the NAIP.

1.2 Rationale and Objectives of the Sub-project

Amongst 27 districts of Assam, the Planning Commission, Govt. of India identified five districts as disadvantaged districts. On the basis of several deliberations with NAIP, it was decided to select three disadvantaged districts *viz.*, *Lakhimpur*, *Kokrajhar*, and *Karbi Anglong* as project area under component 3 of NAIP. These districts, basically remote, are deprived of proper road communications and other developmental initiatives. All the three districts are predominantly populated by scheduled tribes, scheduled castes, other backward classes and *adibasis*.

Agriculture is still the means of sustenance in these districts and mostly characterized by low productivity and low income as compared to other districts of the state due to poor adoption of technologies, low access to credit and extension, vulnerability to risks, poor soil and water management, limited input supply and poor infrastructure etc. Each of these three districts has unique ethnic structure, socio-cultural setup, agricultural tradition, agro-ecological situations and constraints. Extensive efforts made for development so far have not accrued benefits towards the sustainability of livelihood of the people at grass root due to poor rural assets of the districts; lower access to knowledge, technology, credit and inputs; poor saving habit and vulnerability to risks.

Introduction of integrated farming system approach at cluster level is the only way to secure rural livelihood in these three disadvantaged districts.

The long-term objective of the project is to improve rural livelihood security in three disadvantaged districts of Assam introducing integrated farming system approach.

The specific objectives of the project are –

1. To improve productivity through introduction of agro-ecologically appropriate technological intervention.
2. To protect natural resource base and environment through introduction of IFS.
3. To establish entrepreneurship, credit & market linkage for profitability and sustainability.

1.3 Activities under Component 3

Project activities were identified to meet the objectives, to achieve the project goal, objective-wise activities were identified which are as given below.

Objective-1: To improve productivity through introduction of agro-ecologically appropriate technological intervention

Activities

- Rice-fish-vegetable
- Livestock-fish-vegetable
 - Pig-fish-vegetable
 - Poultry-fish-vegetable
- Community fish farming and vegetable cultivation

Objective-2: To protect natural resource base and environment through introduction of IFS

- Bio-resource flow model for recycling of pig dung in fishpond and pond water for irrigating horticultural crops
- Bio-resource flow model for recycling of poultry litter in fishpond and pond water for irrigating horticultural crops
- Bio-resource flow model for recycling fish metabolites in rice-field.
- Integration of fish in rice-field to reduce methane emission, maintain agricultural biodiversity and harness the productivity of water.
- Utilization of community water body for fish farming and to irrigate horticultural crops at the catchments.

Objective-3: To establish entrepreneurship, credit & market linkage for profitability and sustainability.

- Mini carp hatchery
- Establishment of marketing groups
- Poultry hatchery
- Vegetable nursery
- Certified rice seed production
- Processing of chilli
- Credit linkage
- Market linkage

Intervention to development pathways

- Formation 350 numbers of farmers group (SHGs, FIGs and Farmers' Societies etc.).
- Preparation of location specific (AES-specific) plan of work in participation with farmers.
- Technological, operational/ management and market interventions for implementation of livelihood programme.
- Result demonstration on stabilized yield for livelihood sustainability.

1.4 Outcomes and Outputs

Expected outputs

1. Trained farmers: About 5000 nos.
2. Formation of SHGs: About 200 nos.
3. Establishment of 3 Community Resource Centres
4. Establishment of 6 mini carp hatcheries: Each hatchery shall produce 150 lakhs carp spawn per year.
5. Establishment of 6 mini poultry hatcheries: Each hatchery shall produce 1lakh DOC per year
6. Establishment of 6 vegetable nurseries: Each nursery shall produce 25 lakhs vegetable saplings per year
7. Rice-fish-vegetable area coverage: 500 ha: Production shall be 4 ton rice, 1.5 ton fish and 5 ton vegetables per ha per year.
8. Integrate pig-fish-vegetable coverage: 100 ha: Production shall be 550 piglets, 4 ton fish and 12 ton vegetables per ha per year.

9. Integrate poultry-fish-vegetable coverage: 100 ha: Production shall be 144000 eggs, 4 ton fish and 12 ton vegetables per ha per year
10. Community fish-vegetable farming: About 12 ha: Production shall be 4.5 ton fish and 12 ton vegetables per ha per year.

Expected outcomes:

1. Increased production and income of 3500 farm families in selected clusters.
2. Increased availability of critical inputs by 30%
3. Reduction in post harvest losses of farm produce by 30%.
4. Increase in livestock production by 20%.
5. Increase in per capita availability food and nutritional status in the adopted families by 30%
6. Integration of additional farm enterprise into existing farm system shall require at least 50 additional man days per family per year. Thus, the project shall generate about 5 lakhs additional man days during the project period.
7. The present rate of repayment of agricultural loan is less than 30%. Hence, banks are not willing to extend loan in the agricultural sector. Thus credit take off rate is very low. Through intervention of the project it is expected to establish credit linkage and increase in credit off take and repayment by 50%.
8. 20% increase in better price realization through market linkages.
9. Risk reduction by 30%

1.5 Objectives and Use of Baseline Survey

- Data on rural assets, prevailing farming system, Bioresource flow, socio-economic status, technology adoption gaps, reasons of technology gap and potential.
- Data on status of women, their role in prevailing livelihood system and potential.
- Development of adaptive capacity of farmer and farm women, improvement in attitudes towards their occupation, identification of critical factors and prioritization for livelihood security.
- Impact of knowledge and management on livelihood activities.

1.6 Methodology of data collection for baseline report

A survey was conducted in *Lakhimpur, Kokrajhar* and *Karbi Anglong* districts by using livelihood baseline questionnaire. Major farming systems were identified

and commodities were prioritized. Critical gaps in income and technology adoption were identified. Farm systems having similar resource base, enterprise patterns, household livelihoods, constraints requiring similar development strategies and interventions were identified. Six clusters were made consisting of five revenue villages each. Three IFS modules blending tested technologies generated by the AAU were developed.

Data were collected cluster wise. Cluster wise farmers were identified by NGOs, consortium partner from their jurisdiction. These farmers were listed and from these cluster wise list, 125 farmers were randomly selected as sample. Total sample size thus selected for all six clusters was 750. Total number of direct beneficiaries under all the six clusters is 3500 for the entire project duration. About 20% of the population forms the total sample size.

1.7 Documentation of baseline report

The data obtained from the systematic baseline survey are tabulated; categorized, analyzed and essential information are comprehended in different chapters in this report.

CHAPTER II**BASELINE DATA OF SAMPLE VILLAGES****2.1 Introduction**

The baseline data of the target villages collected by random sampling on various demographic information, agricultural activities, knowledge level, communication, environmental and social issues etc. are presented herewith.

2.2 Population statistics

Population categories (eg. male, female & children) are shown in Table 1. Out of six clusters, Gossaigaon cluster has highest total literacy rate of 60.0% whereas lowest literacy rate was found in Dhakuakhana cluster (46.0%). Highest and lowest male literacy rate was witnessed in Gossaigaon cluster (69.0%) and Dhakuakhana cluster (49.2%), respectively. In case of female literacy rate also, highest was found in Gossaigaon cluster (47.8%) and lowest in Diphu cluster (37.7%). In all the surveyed areas, total populations was found to be 17351 and out of these 7499 numbers were male and 6946 numbers were female. Total literacy rate in the surveyed areas were 51.1 per cent.

Table 1. Population statistics of different clusters of selected districts

Clusters	Male	Female	Children	Total	Literacy (%) **			ST	OBC & Other	SC
					Male	Female	Total			
Lakhimpur										
(a)Lakhimpur (6)*	1102	999	621	2722	51.9	46.1	49.2	980	1677	-
(b)Dhakuakhana (5)	1489	1409	816	3713	49.2	42.6	46.0	2007	1675	-
Kokrajhar										
(a) Kokrajhar (6)	608	540	399	1547	65.2	43.0	55.0	1065	452	30
(b) Gossaingaon (8)	1649	1490	1081	4210	69.0	47.8	60.0	2900	1265	45
Karbi Anglong										
(a) Diphu (7)	545	535	-	1080	56.6	37.7	47.3	635	445	-
(b) Hamren (10)	2106	1973	-	4079	54.4	44.3	49.5	2705	1239	135
All clusters										
Total	7499	6946	2917	17351	57.7	43.58	51.1	10292	6753	210

* Figures in parentheses are number of villages in each cluster under survey

** Figures in the column are the average values

In Lakhimpur cluster of Lakhimpur district, majority of population falls under OBC & other (*Ahom, Koch Rajbongshi, Chutia & Kalita*) categories. All other remaining clusters were dominated by ST population (eg. *Missing, Boro, Kachari, Karbi, Garo etc.*). Out of the total population, 59.32 percent (10292) were Schedule Tribe. In all the surveyed clusters, SC population was found to be very negligible except in case of Hamren cluster.

2.3 Source of Irrigation

Pond and stream were the main sources of irrigation in all the clusters [Table 2]. However, in both the clusters of Kokrajhar district, STW facilities were available for irrigation along with pond and stream. Sources like river, well, canal, & drip/sprinkler were not used for irrigation in any of the surveyed clusters.

Pond irrigation was found to be highest in Lakhimpur Cluster [15 numbers (12.0%)] and lowest in Gossaingaon cluster [3 numbers (2.4%)]. STW facilities used by the farmers of Kokrajhar and Gossaingaon cluster were 11 numbers (11.2%) and 7 numbers (5.6%), respectively. Summarizing the sources of irrigation for the total study area, there were 39 (5.2%), 18 (2.4%) and 46 (6.1%) streams, STW and pond users respectively.

Table 2. Sources of irrigation (numbers) for farmers in surveyed clusters

Cluster	River	Stream	STW	Pond	Well	Canal	Drip/ Sprinkler
Lakhimpur							
(a) Lakhimpur	0	6 (4.8)	0	15 (12.0)	0	0	0
(b) Dhakuakhana	0	4 (3.2)	0	9 (7.2)	0	0	0
Kokrajhar							
(a) Kokrajhar	0	8 (6.4)	11 (11.2)	6 (4.8)	0	0	0
(b) Gossaingaon	0	3 (2.4)	7 (5.6)	4 (3.2)	0	0	0
Karbi Anglong							
(a) Diphu	0	4 (3.2)	0	5 (4.0)	0	0	0
(b) Hamren	0	14 (11.2)	0	7 (5.6)	0	0	0
All clusters							
Total	0	39 (5.2)	18 (2.4)	46 (6.1)	0	0	0

* Figures in the parentheses are the per cent of sample farmers using a particular source in each cluster

2.4 Agricultural activities

It is revealed from the Table 3 that major area in all the clusters were occupied by rice cultivation. Highest area and yield (159.5 ha & 31.85 q/ha respectively) were seen at Lakhimpur cluster while lowest area and yield were seen at Diphu cluster (134.7 ha & 27.84 q/ha respectively). Mostly, local varieties of rice like *Doom Sali*, *Panja Sali*, *Doria*, *Gaya*, *Motonga*, *Balom* etc. are grown across the clusters. Apart from rice, other crops like maize, sugarcane, oil seeds & pulses are also grown in small areas. Oil seeds like, rapeseed and mustard, *niger*, sesame etc. are grown in small scale under each cluster. Major pulses grown in the surveyed clusters were green gram, black gram, pea etc.

In addition to these cereals, oil seeds & pulses crops vegetables (Tomato, chilli, brinjal, okra, beans, pumpkin, cucurbits, cabbage, cauliflower, knolkhol, gourds etc. of local and F₁ hybrids in some places) are also widely grown in sample farmers of the clusters, primarily in homestead garden and in some cases on commercial scale. Total rice growing area were 881.8 ha in the study area with a productivity of 29.7 q/ha. In case of vegetables, 44.9 ha areas were covered by vegetable cultivation (both *kharif* and *rabi*) with a productivity of 242.8 q/ha.

Table 3. Area under different crops and average yield in selected clusters

Cluster	Rice		Maize		Oil seeds		Pulses		Sugarcane		Vegetables		Fruits	
	Area (ha)	Av. yield (q/ha) *	Area (ha)	Av. yield (q/ha) *	Area (ha)	Av. yield (q/ha) *	Area (ha)	Av. yield (q/ha) *	Area (ha)	Av. yield (q/ha) +*	Area (ha)	Av. yield (q/ha) *	Area (ha)	Av. yield (q/ha) *
Lakhimpur														
(a) Lakhimpur	159.5	31.85	0	0	8.00	5.50	6.40	4.8	0	0	6.10	210.6	14.13	126.00
(b) Dhakuakhana	146.7	28.88	0	0	14.90	5.34	12.00	4.59	0	0	9.60	221.5	15.95	129.85
Kokrajhar														
(a) Kokrajhar	147.3	30.95	2.0	31.43	12.9	5.93	5.5	5.84	5.0	216.32	9.60	280.7	13.76	131.66
(b) Gossaingaon	145.4	29.55	2.8	34.72	14.5	6.18	6.0	5.65	6.7	231.45	11.25	273.6	14.12	136.00
Karbi Anglong														
(a) Diphu	134.7	27.84	6.70	36.31	7.75	5.06	3.75	4.05	3.35	183.24	3.70	225.3	10.84	125.82
(b) Hamren	148.2	29.20	8.30	38.75	8.00	5.58	5.75	4.43	4.75	275.00	4.65	244.8	12.92	132.06
All clusters														
Total	881.8	29.7	19.8	35.3	51.55	5.6	39.4	4.9	19.8	226.5	44.9	242.8	81.72	130.2

+ Jaggery yield

* Figures indicates average values

In Karbi Anglong and Kokrajhar, pig and poultry are key component in the farming system and these play a major role in the rural livelihood [Table 4]. In all the clusters, sample farmers use local pigs and poultry breeds.

Table 4: Livestock stakes (numbers) in different clusters

Cluster	Cow/Bullock	Buffalo	Pigs	Poultry
Lakhimpur				
(a) Lakhimpur	315	16	148	382
(b) Dhakuakhana	304	28	164	415
Kokrajhar				
(a) Kokrajhar	298	12	205	486
(b) Gossaingaon	291	18	217	505
Karbi Anglong				
(a) Diphu	256	4	169	460
(b) Hamren	275	13	173	436
All clusters				
Total	1739	91	1076	2684

Poultry farming was found to be highest followed by piggery and cattle farming in all the clusters. Numbers of poultry was observed highest in Kokrajhar cluster (486 nos.) and lowest was found Lakhimpur cluster (382 nos). The highest number of pigs and cow/buffalo were found in Gossaingaon (217 nos.) and Lakhimpur (315 nos.) clusters respectively. In all the surveyed clusters nos. of buffalos was highest at Dhakuakhana (28 nos.) and the lowest at Diphu (4 nos.) respectively. Including the three districts, total numbers of cow/ bullock, buffalo, pig and poultry were 1739, 91, 1076 and 2684 respectively.

Table 5. Number(s) of pond in different clusters

Clusters	Lakhimpur		Kokrajhar		Karbi Anglong		Total All clusters
	Lakhimpur	Dhakua khana	Kokra-jhar	Gossain gaon	Diphu	Hamren	
Pond with fish culture	103	105	104	106	96	103	617
Pond without fish culture	13	09	14	06	12	10	64
No pond	09	11	07	13	17	12	69

Number of ponds per household in different clusters is showed in Table 5. This table revealed that number of ponds with fish culture ranged from 96 to 106 in the clusters. In all the clusters, number of farmers without pond is very less (ranged from 7 to 17). However, there are a small number of farmers having pond but not rearing fish. There were total of 617 number of ponds found with fish culture in the study area.

In all the villages, farmers are practicing traditional methods of fish culture like rearing fish in homestead pond and large community fisheries. *Beels* are used for capture fisheries only.

It was also observed from the clusters that there was no integration of rice-fish culture in any of the villages. However, indigenous fish species naturally occur in the rice fields and farmers harvest these fish for consumption.

2.5 Farm machinery

The farm mechanization is very poor. In Lakhimpur district, in the target villages not a single tractor is available. Eight power tillers are available in the villages. Farmers mostly use bullock drawn plough for primary and secondary tillage during land preparation; only 30.0 % farmers use MB plough. MB plough is not used in the Karbi Anglong. [Table 6].

Table 6. Number (s) of Farm machinery in surveyed village

Cluster	Tractor	Power tillers	MB plough	Water pump	Paddy Weeder	Sprayer	Duster/Seed drill	Spade	Sickle	Khurpi
Lakhimpur										
(a) Lakhimpur	0	6	51	5	25	50	0	315	350	10
(b) Dhakuakhana	0	2	24	3	15	11	0	260	326	12
Kokrajhar										
(a) Kokrajhar	5	12	45	10	12	75	0	301	324	150
(b) Gossaingaon	5	11	33	12	11	70	0	305	314	156
Karbi Anglong										
(a) Diphu	0	1	0	2	0	15	0	325	335	201
(b) Hamren	1	3	0	2	0	14	0	331	340	215
All clusters										
Total	11	34	153	34	63	235	0	1837	1989	744

In Karbi Anglong district, 4 power tillers and 1 tractor were found in the target villages (total of 34 numbers in the entire study area). Farmers mostly use bullock drawn plough for primary and secondary land preparation. All farmers use traditional plough.

Dusters and seed drill are not at all used in the villages. Paddy weeders were also not used in Karbi Anglong district though it was used to some extent in Lakhimpur and Kokrajhar districts. Sickle and spade were the two tools which were found in large numbers among surveyed farmers.

2.6 Infrastructure

There were no financial institutions/ banks in Dhakuakhana & Gossaigaon clusters. However, in other clusters like Lakhimpur and Diphu, there was at least one financial institution [Table 7]. There were 2 and 3 numbers of financial institution/ banks in Kokrajhar and Hamren cluster, respectively.

Table 7. Infrastructures in surveyed clusters (numbers)

Cluster	Financial Inst./ Banks	Post office	PCO	Health care centre	Vet. Services	Primary Agril. Cooperatives	Storage Structure	
							Local	Cold storage
Lakhimpur								
(a) Lakhimpur	1	1	3	1	1	1	135	0
(b) Dhakuakhana	0	1	0	1	0	0	131	0
Kokrajhar								
(a) Kokrajhar	2	2	3	2	1	1	129	0
(b) Gossaingaon	0	1	2	1	0	1	136	0
Karbi Anglong								
(a) Diphu	1	1	5	1	1	1	141	0
(b) Hamren	3	2	2	2	1	1	147	0
All clusters								
Total	7	8	15	8	4	5	818	0

Village Post Offices and primary Health Care Services are available in all the clusters (total of 8 numbers for each category). Primary agricultural cooperatives exist in all clusters except Dhakuakhana but functioning is not much effective except in Lakhimpur.

In Lakhimpur and Kokrajhar districts, farmers by and large store their produce (rice) in traditional semi-concrete store (*bhoral*) [Table 7]. In Karbi Anglong, grains are stored in *duli* (bamboo bins) and bamboo made store (*bhoral*) [141 and 147 numbers of *duli/bhoral* in Diphu and Hamren clusters respectively]. All these traditional storage structure were made out of bamboo, wood & cane available in all the clusters. Mud plastering is done on the inner side of the *bhoral*. No concrete threshing floors are available in the villages. No cold storage facilities are available in the clusters.

2.7 Awareness level

Awareness level of farm technologies viz., Integrated Pest Management (IPM), Integrated Nutrient Management (INM) and waste management was measured from sample respondents and the result indicated that except waste management, it was poor in the study area. In Dhakuakhana cluster, 22 farmers were aware about IPM, while only 9 farmers in Kokrajhar Cluster were aware about IPM [Table 8]. In Kokrajhar cluster, only 20 farmers were found to be aware about INM, whereas it was only 10 farmers in Diphu Cluster who were aware about INM.

Waste management is partially done in all the selected clusters: however the methods adopted are not scientific. Farmers in all the clusters used household wastes like vegetable waste and kitchen waste as feed for livestock (pig, cow/bullock). Cow dung and other disposals were used in rice and vegetable production. In Hamren Cluster, 51 farmers were aware of waste management, which is highest amongst all the clusters. The lowest level of awareness for waste management was observed in Lakhimpur Cluster. In the entire study area, only 13.5, 11.1 and 42.4 percent farmers were concerned about IPM, INM and Waste Management.

Table 8. Awareness levels of elements like IPM, INM etc. in surveyed clusters

Clusters	IPM	INM	Waste Management
Lakhimpur			
(a) Lakhimpur	19 (15.2)	14 (11.2)	45 (36.)
(b) Dhakuakhana	22 (17.6)	11 (8.8)	51 (40.6)
Kokrajhar			
(a) Kokrajhar	09 (7.2)	20 (16.0)	49 (39.2)
(b) Gossaingaon	13 (10.4)	15 (12.0)	54 (43.2)
Karbi Anglong			
(a) Diphu	17 (13.6)	10 (8.0)	59 (47.2)

(b) Hamren	21 (16.8)	13 (10.4)	60 (12.8)
All clusters			
Total	101 (13.5)	83 (11.1)	318 (42.4)

* Figures in individual cell indicates family heads and figures in parentheses indicates per cent family heads in each cluster

2.8 Extension services

In the entire clusters, formal extension functionaries like the personnel of the Department of Agriculture and Department of Veterinary and Animal Husbandry, Govt. of Assam visited the farmers' at least once in a month [Table 9]. In Lakhimpur, Kokrajhar and Gossaingaon clusters, functionaries from Cooperatives played the major extension role. NGO functionaries from Kokrajhar, Gossaingaon and Diphu clusters visited the farmers once a month on an average.

Table 9. Approximate no. of visits/month of extension agencies in surveyed clusters

Cluster	Agril. Deptt	Animal Husbandry Deptt.	Watershed Deptt	Cooperatives	NGO
Lakhimpur					
(a) Lakhimpur	2	1	0	1	-
(b) Dhakuakhana	1	1	0	0	-
Kokrajhar					
(a) Kokrajhar	1	1	0	1	1
(b) Gossaingaon	1	1	0	1	1
Karbi Anglong					
(a) Diphu	1	1	0	0	1
(b) Hamren	1	1	0	0	-
All clusters					
Total	1.3	1	0	0.5	0.5

2.9 Transport system in selected villages

Bus and *gramya* taxi (three/four wheelers) facilities are available in Lakhimpur and Kokrajhar districts. Buses and *gramya* taxis run frequently to nearby town and district headquarter. However, in Karbi Anglong district transport facilities are very poor. Only 2 buses run to nearby town (Hamren, Diphu) per day. Other vehicular transport

services are also not available in the surveyed villages of Karbi Anglong district [Table 10].

Table 10. Transport system for different market locations in the cluster

Cluster	For mandi	For Local market	For Town	For District HQ
Lakhimpur				
(a) Lakhimpur	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i>	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i>	Bus, Pick up van, tempo, Gramya taxi, Winger	Bus, Pick up van, tempo, Gramya taxi, Winger
(b) Dhakuakhana	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i>	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i>	Bus, Pick up van, tempo, Gramya taxi, Winger	Bus, Pick up van, tempo, Gramya taxi, Winger
Kokrajhar				
(a) Kokrajhar	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i> , Buffalo/bullock cart	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i> , Buffalo/bullock cart	Bus, Pick up van, tempo, Gramya taxi, Winger	Bus, Pick up van, tempo, Gramya taxi, Winger
(b) Gossaingaon	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i> , Buffalo/bullock cart	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i> , Buffalo/bullock cart	Bus, Pick up van	Bus, Pick up van
Karbi Anglong				
(a) Diphu	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i>	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i>	Bus, Pick up van	Bus, Pick up van
(b) Hamren	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i> , Buffalo/bullock cart	Thella, Rickshaw, Bicycle, <i>Bhar pachi</i> , Buffalo/bullock cart	Bus, Pick up van	Bus, Pick up van

Major systems for transport of agricultural produce to the *mandis/haat* were *Thella*, Rickshaw, Bicycle, *Bhar pachi* (manual carrying) etc. in all the clusters. However, in Gossaingaon, Kokrajhar and Hamren clusters, bullock/buffalo drawn carts were also used for transportation of agricultural produce.

2.10 Environmental and Social Safeguard Issues

The major environmental concern in the vicinity of the village and farm field with their level of severity in scale is presented in Table 11. Soil erosion and loss of soil nutrients are the two problems in Lakhimpur district that occur with lower intensity in the project areas. But these two problems are severe issues on the river banks of some of the major river systems in Lakhimpur district. Other environmental issues like degradation of soil biological status, soil water logging, soil contamination by misuse of pesticides and fertilizers, effect of change in cropping pattern on soil, water & environment; effect on agro-biodiversity like livestock, fish and other aquatic resources, water quality for drinking & irrigation and human health etc have very lower effect on environment in across the clusters.

Table 11. Major environmental safeguard variables with their baseline values

Areas	Lakhimpur	Dhakuakhana	Kokrajhar	Gossaigaon	Diphu	Hamren	All clusters
	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)
Land							
14.1 Carrying capacity of land (Pressure on land Resources)							
14.2 Soil erosion	2	1	1	1	1	1	1
14.3 Salinity and alkalinity	0	0	0	0	0	0	0
14.4 Loss of soil nutrients	2	1	1	1	1	1	1
14.5 Degradation of soil biological status	1	1	1	1	1	1	1
14.6 Loss of water holding capacity	0	0	0	0	0	0	0
14.7 Soil water logging	1	1	1	1	1	1	1
14.8 Soil contamination/ pollution							
14.8.1 Heavy metals	0	0	0	0	0	0	0
14.8.2 Pesticides and others	1	1	1	1	1	1	1
14.8.3 Harmful chemicals	0	0	0	0	0	0	0
14.8.4 Misuse of chemical fertilizer	1	1	1	1	1	1	1
14.8.5 Bio-wastes and non-degradable products							
14.9 Effects of change in cropping pattern on							
14.9.1 Soil	1	1	1	1	1	1	1

14.9.2	Water	1	1	1	1	1	1	1
14.9.3	Environment	1	1	1	1	1	1	1
14.10	Increase in agricultural wastes	0	0	0	0	0	0	0
14.11	Effect on beneficial							
14.11.1	Flora	0	0	0	0	0	0	0
14.11.2	Fauna	0	0	0	0	0	0	0
14.12	Loss of forests/ vegetation cover	0	0	0	0	0	0	0
14.13	Development of resistance in pests (Insects, weeds, microbes)	0	0	0	0	0	0	0
14.14	Effect on agro-biodiversity							
14.14.1	Horticulture/Crop Plant	0	0	0	0	0	0	0
14.14.2	Livestock	1	1	1	1	1	1	1
14.14.3	Fish	1	1	1	1	1	1	1
14.14.4	Other aquatic resources	1	1	1	1	1	1	1
14.15	Effect on general-biodiversity							
14.15.1	Plants	0	0	0	0	0	0	0
14.15.2	Animal	0	0	0	0	0	0	0
14.15.3	Microbes	0	0	0	0	0	0	0
14.16	Water							
14.16.1	Availability of water resources	1	1	1	1	1	1	1
14.16.2	Water quality for irrigation	1	1	1	1	1	1	1
14.16.3	Water quality for drinking	1	1	1	1	1	1	1
14.17	Air Quality							
14.17.1	Pollutants	0	0	0	0	0	0	0
14.17.2	Green house gases	0	0	0	0	0	0	0
14.18	Human Health							
14.18.1	Through the food chain	1	1	1	1	1	1	1
14.18.2	Through soil / water/air/wastes	0	0	0	0	0	0	0

*Scale Rating

0	Nil	2	Low	4	High
1	Very Low	3	Moderate	5	Very High

The major Social issues, their effects on local livelihood systems are presented in Table 12. Out of these issues, some are found with moderate effect on changing farmers' livelihood system. These includes greater competition for natural resources, loss of land to non-agricultural use, fodder/ grazing area shortage- loss of community land, increased drudgery for women, effect on child care/ health, unemployment, social conflicts etc to mention a few. Some other issues in the study area are vulnerability to economic loss, change in cropping pattern, unequal access to inputs, more dependence on external resources and increased role of middleman/ contractor which have lower effect than those mentioned above. Other issues like marginalization and

increasing disparity, increased poverty and indebtedness, change in occupational pattern, increased incidence of disease etc. have very low effect in the study areas.

Table 12. Major social safeguard variables with their baseline values

Areas	Lakhimpur	Dhakuakhana	Kokrajhar	Gossaigaon	Diphu	Hamren	All clusters
	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)	Scale (0-5)
15.1 Agriculture							
15.1.1 Vulnerability to economic loss	2	2	1	1	2	2	2
15.1.2 Greater competition for natural resources (land, water, forests, fodder)	3	3	2	2	3	2	3
15.1.3 Change in Land use affecting long term profitability of land	1	1	1	1	1	1	1
15.1.4 Loss of land to non-agricultural use	3	3	3	3	3	3	3
15.1.5 Change in income patterns	2	2	2	2	2	2	2
15.1.6 Unbalanced displacement of food crops by cash crops affecting food & nutritional security	1	1	1	1	1	1	1
15.1.7 Fodder/grazing area shortage- loss of community land	3	3	3	2	2	2	3
15.2 Community							
15.2.1 Unequal access to inputs	2	2	2	2	2	2	2
15.2.2 Marginalization and increasing disparities	1	1	1	1	1	1	1
15.2.3 Increased poverty and indebtedness	1	1	1	1	1	1	1
15.2.2 More dependence on external resources	2	2	2	2	2	2	2
15.2.5 Increased drudgery for women	3	3	3	3	3	3	3
15.2.6 Effect on child care/health	3	3	3	3	3	3	3
15.2.7 Change in occupational patterns	1	1	1	1	1	1	1
15.2.8 Increased incidence of diseases	1	1	1	1	1	1	1
15.2.9 Health and safety hazards	1	1	1	1	1	1	1
15.2.10 Effect on community ownership of natural resources and intellectual property	1	1	1	1	1	1	1
15.2.11 In-migration	1	1	1	1	1	1	1
15.2.12 Out-migration	1	1	1	1	1	1	1
15.2.13 Unemployment	3	3	2	3	2	2	3
15.2.14 Increased role of middlemen/contractors	2	2	2	2	2	3	2
15.2.15 Increase pressure on local infrastructure	1	1	1	1	1	1	1
15.2.16 Cultural impacts	1	1	1	1	1	1	1

15.2.17 Gender discrimination	1	1	1	1	1	1	1
15.2.18 Social conflicts	1	1	3	3	3	3	2
15.2.19 Increased risk of encroachment	1	1	1	1	1	1	1
15.2.20 Risk of life	1	1	1	1	1	1	1
15.2.21 Effect on international relations/ agreements etc (if any)	1	1	1	1	1	1	1

*Scale Rating

0	Nil	2	Low	4	High
1	Very Low	3	Moderate	5	Very High

CHAPTER III

SOCIO ECONOMIC PROFILE

3.0 Introduction

The dynamics of the social and economic attributes of the target villages are important baseline information for initiating appropriate intervention to improve livelihood status of the target villages. The basic information on socio-economic profile is documented hereunder.

3.1 Family size and occupation

Family size varied from 6 numbers in Lakhimpur district to 8 in Karbi Anglong district. In Kokrajhar district, average family size is 7 members. Agriculture is the main occupation (85.2 %) in all the clusters [Table 13]. In Gossaingaon cluster of Kokrajhar district 92 per cent of the surveyed family depends on Agriculture, while in Diphu cluster, 79.2 per cent families depend on Agriculture. Agriculture labour percentage to the total population is highest in Diphu cluster whereas lowest in Lakhimpur cluster. The student percentage was found to be highest in Lakhimpur cluster (39.2%) and lowest in Hamren cluster (21.6%). The percentage of dependent persons are very high (above 55.00 %) in all the clusters.

3.2 Family Assets of Sample farmers

More than 80% families have wrist watch/clock (Table 14). The highest TV (30.3%), wrist watch (95.0%) and fan (41.0) was observed in Lakhimpur cluster of Lakhimpur district. Kokrajhar cluster witnessed the highest percent of telephone/mobile phone (68.3%), radio (25.3%), power tiller (9.6%), irrigation pump (9.6), sewing machine (3%) and vehicles (20.8%). The Hamren cluster of Karbi Anglong district has the lowest per cent of wrist watch (75.3%), radio (7.5%), irrigation pump (1.6%), sewing machine (1%), telephone (42.6%) and vehicles (8%). Poultry and piggery equipments related with production were not available in any one of the clusters [Table 15].

3.3 Average Annual Family Expenditure

The average annual expenditure was highest in Gossaingaon cluster of Kokrajhar district (Rs. 28326.50) and was lowest in Dhakuakhana cluster (Rs. 21150.00) of Lakhimpur district [Table 16]. The highest expenditure was incurred in daily consumption in all the clusters (39.4 %) followed by social functions (12 %), cloths (8 %), equipments (7.99 %), shelters (7.99 %), health (6.6 %), livestock (5.17) and education (4

%) respectively. In all the clusters, annual expenditures in education was found to be very less; ranged from Rs. 514.55(2%) to Rs. 1356.25(5%).

The expenditure on daily consumption was found to be highest in Gossaingaon cluster (Rs.12746.92). In case of expenditure on education, social functions, equipment purchase and savings, Lakhimpur cluster ranked first. In case of cloths and health, the highest expenditure was incurred by Diphu (Rs. 2480.00) and Hamren (Rs.2058.20) cluster, respectively. No expenditure was made in case of loan repayment probably because they were not taking loan from any financial institution and in case of legal issues as they do not like to approach legal authorities due to unnecessary formalities & rules.

Table 13. Occupation (%) of the respondents in different clusters

Cluster	Agril	Agril labour	Ricksho w/hand cart puller	House helper (maid)	Professio nal(carpe nter, mason etc)	Business	NGO worker	Student	Housewife	Service	Dependent
Lakhimpur											
(a) Lakhimpur	85.6	12.8	-	2.4	3.2	14.4	0	39.2	34	18.4	65.6
(b) Dhakuakhana	89.6	21.6	-	5.6	2.4	12.8	0	33.6	36	10.4	59.2
Kokrajhar											
(a) Kokrajhar	81.6	16.8	-	1.6	3.2	9.6	3.2	22.4	31	12.8	58.4
(b) Gossaingaon	92.0	18.4	-	0.8	4.0	11.2	2.4	26.4	29	15.2	56.0
Karbi Anglong											
(a) Diphu	79.2	23.2	-	2.4	4.8	8	3.2	23.2	38	8	62.4
(b) Hamren	83.2	19.2	-	1.6	3.2	8.4	4.0	21.6	35	13.6	65.6
All clusters											
Average	85.2	18.7	-	2.4	3.5	10.7	3.2	27.7	33.8	13.1	61.2

Table 14. Household asset (% families)

Cluster	Wrist watch/clock	Radio	TV	Sewing machine	Fan	Telephone /Mobile	Power tiller	Irrigation pump	Vehicle
Lakhimpur									
(a) Lakhimpur	95.0	16.3	30.3	3	41	65.0	4.8	4.0	16.0
(b) Dhakuakhana	90.0	14.3	4.0	2	2	20.0	1.6	2.4	12.0
Kokrajhar									
(a) Kokrajhar	93.0	25.3	28.0	3	39	68.3	9.6	9.6	20.8
(b) Gossaingaon	93.0	22.3	27.3	3	37	66.2	8.8	8.0	20.0
Karbi Anglong									
(a) Diphu	86.0	8.3	18.0	2	25.0	50.0	0.8	1.6	9.6
(b) Hamren	75.3	7.5	12.0	1	23.6	42.6	2.4	1.6	8.0
All clusters									
Average	88.7	15.7	19.9	2.3	27.9	52.0	4.7	4.5	14.4

Table 15. Household asset (% families)

Cluster	Fishing net	Spade	Sickle	Weeder	Plough	Khurpi	Poultry equipments	Piggery equipments
Lakhimpur								
(a) Lakhimpur	2.4	100	100	20.0	100	8.00	-	-
(b) Dhakuakhana	9.6	100	100	12.0	100	9.60	-	-
Kokrajhar								
(a) Kokrajhar	8.0	100	100	9.6	100	100	-	-
(b) Gossaingaon	8.0	100	100	8.8	100	100	-	-
Karbi Anglong								
(a) Diphu	7.2	100	100	0	100	100	-	-
(b) Hamren	6.4	100	100	0	100	100	-	-
All clusters								
Average	6.9	100.0	100.0	12.6	100.0	69.6		

Table 16. Average annual family expenditure (Rs.) per household in different clusters

Particulars	Lakhimpur		Kokrajhar		Karbi Anglong		All clusters
	Lakhimpur	Dhakuakhana	Kokrajhar	Gossaingaon	Diphu	Hamren	
Education	1356.25 (5)	846.00 (4)	1005.00 (4)	1133.06 (4)	744.00 (3)	514.55 (2)	933.1 (4)
Health	1898.75 (7)	1269 (6)	1507.5 (6)	1699.59 (6)	1736.00 (7)	2058.2 (8)	1694.8 (6.6)
Loan repayments	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cloths	2170.00 (8)	1903.5 (9)	2010.00 (8)	1699.59 (6)	2480.00 (10)	2058.2 (8)	2053.5 (8.0)
Livestock/ poultry	1085.00 (4)	1057.5 (5)	1256.25 (5)	1699.59 (6)	1488.00 (6)	1286.38 (5)	1312.12 (5.17)
Agril equipments	813.75 (3)	423.00 (2)	753.75 (3)	566.53 (2)	496.00 (2)	514.55 (2)	594.6 (2.3)
Social functions	4068.75 (15)	2961.00 (14)	2512.5 (10)	2549.38 (9)	2976.00 (12)	3344.58 (13)	3068.7 (12.0)
Shelter/house	2170.00 (8)	1692.00 (8)	2010.00 (8)	2266.12 (8)	2232.00 (9)	1800.93 (7)	2028.5 (7.9)
Equipments	2712.5 (10)	1903.5 (9)	2010.00 (8)	2266.12 (8)	1736.00 (7)	1543.65 (6)	2028.6 (7.9)
Legal issues	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Religious issues	813.75 (3)	634.5 (3)	502.5 (2)	566.53 (2)	744.00 (3)	1286.38 (5)	757.94 (2.9)
Daily consumption	8408.75 (31)	7825.5 (37)	10301.25 (41)	12746.92 (45)	9672.00 (39)	11062.8 (43)	10002.8 (39.4)
Savings	1627.5 (6)	634.5 (3)	1256.25 (5)	1133.06 (4)	496.00 (2)	257.275 (1)	900.7 (3.55)
Total	27125.00 (100)	21150.00 (100)	25125.00 (100)	28326.5 (100)	24800.0 (100)	25727.5 (100)	25375.6 (100.0)

* Figures in the parentheses are the per cent values of total expenditure

CHAPTER IV**PROFILE OF LAND AND WATER USES OF SAMPLE FARMERS****4.0 Introduction**

Land and water are the two non-renewable natural endowments which are pivotal to steer agricultural development to facilitate peoples' food security in a sustainable and eco-friendly manner. The baseline data of the target villages collected by random sampling on various land and water use are presented herewith.

4.1 Profile of land use and irrigated area

In the entire clusters, medium land constitutes about half of the total land holding followed by low land, homestead land and other land [Table 17]. Homestead covered 9.5 % (Dhakuakhana) to 17.9 % (Hamren) land.

Table 17. Land use (%) in different clusters

Cluster	Homestead land (Bari)	Medium land	Low land	Other (bamboo/uncultivated land)
Lakhimpur				
(a) Lakhimpur	10.0	57.9	30.0	2.1
(b) Dhakuakhana	9.5	48.5	41.0	2.0
Kokrajhar				
(a) Kokrajhar	12.0	45.0	40.0	3.0
(b) Gossaingaon	16.2	45.0	35.0	3.8
Karbi Anglong				
(a) Diphu	15.0	47.0	35.0	3.0
(b) Hamren	17.9	52.0	26.0	4.1
All clusters				
Average	13.4	49.2	34.5	3.0

4.2 Soil testing and use

Soils are not yet tested by the farmers of the surveyed clusters.

4.3 Irrigation facilities

River and canal irrigation facilities are not available in the surveyed villages under the project. Shallow Tube Well (STW) facilities are available only in Kokrajhar district. Drip and sprinkler are not at all used in the surveyed villages [Table 2].

CHAPTER V**CROPPING PATTERN AND NET AGRICULTURAL INCOME****5.1 Cropping Intensity**

In all the surveyed clusters, the average land holding per cluster ranged from 1.11 ha to 1.4 ha. The average land holding was found to be highest in Lakhimpur cluster (1.4 ha) whereas the lowest was found in Diphu cluster (1.11 ha). Dhakuakhana cluster have highest gross sown (1.62 ha) and lowest in Diphu cluster (1.28 ha). In different clusters, Cropping Intensity (CI) varied from 110.0 % to 128.1% and overall CI was found to be 119.35 %. The highest Cropping Intensity was observed in Gossaingaon Cluster of Kokrajhar district while Lakhimpur Cluster of Lakhimpur district recorded the lowest CI [Table 18].

Table 18. Average land holding & cropping intensity of the sample respondents

Particulars	Lakhim pur	Dhakua khana	Kokrajhar	Gossaingaon	Diphu	Hamren	Total
Land Holdings (ha)	1.4	1.33	1.21	1.19	1.11	1.2	1.24
Total cultivable area (ha)	1.4	1.33	1.21	1.19	1.11	1.2	1.24
Area sown more than once (ha)	0.14	0.29	0.28	0.33	0.17	0.21	0.24
Gross sown area (ha)	1.54	1.62	1.49	1.52	1.28	1.41	1.48
Cropping Intensity (%)	110.0	122.1	123.0	128.1	115.0	117.9	119.35

5.2 Gross Revenue for Agriculture and Horticulture

Gross Revenue from Agriculture and Horticulture in different clusters are presented in Table 19.

Table 19. Gross revenue (Rs.) per year in different clusters from Agriculture and Horticulture

Cluster	Gross Revenue (Rs.)		
	Land Holdings		
	0- 5 Bigha	5-10 Bigha	> 10 Bigha
Lakhimpur			
(a) Lakhimpur	9888.00	21000.00	30000.00
(b) Dhakuakhana	10500.00	25000.00	32500.00
Kokrajhar			
(a) Kokrajhar	10670.00	26100.00	33663.00
(b) Gossaingaon	11121.00	27233.00	34342.00

Karbi Anglong			
(a) Diphu	10100.00	22300.00	31200.00
(b) Hamren	10320.00	22523.00	33300.00
All clusters			
Average	10433.2	24026.0	32500.8

Average Gross revenue for Agriculture and Horticulture in all three land holding patterns was highest in Gossaingaon cluster of Kokrajhar district in all the category of land holding while the lowest values were observed in Lakhimpur Cluster of Lakhimpur district. [Table 19].

5.3 Net Agricultural income and family household income

Net Agricultural income in all the three land holding categories was highest in Gossaingaon cluster of Kokrajhar in all the three land holding patterns while the lowest values were observed in Lakhimpur Cluster of Lakhimpur district [Table 20].

Table 20. Net agricultural income per year in different clusters

Cluster	Income (Rs.)		
	Land Holdings		
	0- 5 Bigha	5-10 Bigha	> 10 Bigha
Lakhimpur			
(a) Lakhimpur	8300.00	16100.00	22000.00
(b) Dhakuakhana	9000.00	20300.00	24600.00
Kokrajhar			
(a) Kokrajhar	9150.00	21200.00	26200.00
(b) Gossaingaon	9620.00	27233.00	26850.00
Karbi Anglong			
(a) Diphu	8510.00	17500.00	24000.00
(b) Hamren	8800.00	17455.00	26250.00
All clusters			
Average	8896.7	19964.7	24983.3

Table 21. Family household income per year in different clusters

Cluster	Income (Rs.)		
	Land Holdings		
	0- 5 Bigha	5-10 Bigha	> 10 Bigha
Lakhimpur			
(a) Lakhimpur	25150.00	29100.00	52100.00
(b) Dhakuakhana	15000.00	27300.00	43560.00
Kokrajhar			

(a) Kokrajhar	19050.00	31200.00	46150.00
(b) Gossaingaon	19420.00	37233.00	46650.00
Karbi Anglong			
(a) Diphu	22100.00	27500.00	44120.00
(b) Hamren	24000.00	27455.00	46230.00
All clusters			
Average	20786.7	29964.7	46468.3

Lakhimpur cluster has highest household income in both the categories of 0-5 *bigha* and >10 *bigha* while Gossaingaon cluster has highest in one category (5-10 *bigha*) [Table 21]. On the other hand, Dhakuakhana cluster has the lowest family household income on all the three categories. The highest household income in Lakhimpur was probably due to the presence of more service holders and traders in the cluster.

CHAPTER VI

POST HARVEST ACTIVITIES

6.1 Introduction

Post harvest activities are important in regard to minimizing loss of the product, quality of the product, value addition, storage, transshipment etc.

The baseline data of the target villages on various post harvest activities are presented herewith.

6.2 Cleaning and grading

No mechanized cleaning and grading are done in any of the clusters of the district. All post harvest operations are done manually.

6.3 Disposal of produce

In all the clusters, produce of the farmers are disposed in local market and in *mandi* mostly either by themselves (in case of rice and vegetables) or through middleman, in an unorganized manner.

6.4 Market information

Farmers are generally not aware about the daily changes of price of the commodities. In fact they do not possess the kind of attitude for knowing the market price day to day basis. They have to sale their produce whatever price is fetched in the local market or the middlemen offer and in most of the cases under duress.

6.5. Storage of the produce

There were no cold storages or other scientific storage structure in the surveyed clusters. Farmers used their conventional methods of storage, e.g. in Lakhimpur and Kokrajhar districts, rice was stored in raised *bhoral* while in Karbi Anglong, bamboo bins are used for rice storage. These bins are mud layered from inside.

CHAPTER VII**LIVESTOCK, POULTRY AND FISHERIES ACTIVITIES****7.1 Livestock stakes of sample farmers**

In Lakhimpur and Dhakuakhana cluster of Lakhimpur district, 92.0 and 83.2 per cent families, respectively have cows/bullock [Table 22]. In Diphu and Hamren cluster, poultry ranked first i.e., 80.0 and 75.2 per cent families have poultry, respectively. More than 60 per cent families have pigs in all the clusters, but most dominant in Gossaingaon (90.4%) and Kokrajhar (84.0%).

Table 22. Livestock stakes (%) of different clusters

Cluster	Cow/Bullock	Buffalo	Pigs	Poultry
Lakhimpur				
(a) Lakhimpur	92.0	12.0	60.8	66.4
(b) Dhakuakhana	83.2	20.0	68.0	72.8
Kokrajhar				
(a) Kokrajhar	80.0	8.0	88.0	84.0
(b) Gossaingaon	82.4	9.6	90.4	84.8
Karbi Anglong				
(a) Diphu	64.8	2.4	70.4	80.0
(b) Hamren	65.6	7.2	72.0	75.2
All clusters				
Average	78.0	9.9	74.9	77.2

7.2 Gross Annual Income from Milk Production

Gross annual income from milk was less than Rs. 1000/- in all the districts. Generally, the milk produced was used for domestic consumption [Table 23].

Table 23. Gross annual income per year from milk (%)

Cluster	Per cent families		
	Less than Rs. 1000/-	Rs 1000/- to 2500/-	>Rs. 2500/-
Lakhimpur			
(a) Lakhimpur	25.0	-	-
(b) Dhakuakhana	37.6	-	-
Kokrajhar			
(a) Kokrajhar	24.6	-	-
(b) Gossaingaon	28.0	-	-

Karbi Anglong			
(a) Diphu	39.2	-	-
(b) Hamren	38.4	-	-
All clusters			
Average	38.6		

7.3 Annual expenditure for livestock

In Hamren and Diphu cluster of Karbi Anglong, 84.0 and 67.2 per cent families did not incur any expenditure for livestock [Table 24]. In Diphu cluster, only 2.4 per cent families spent more than Rs 1000/- per year for livestock. In both the clusters of Kokrajhar district, more 60 per cent families did not spend for their livestock. Generally the expenditure is related with feed and medicine. The farmers of Lakhimpur were the highest spender (11.2%) i.e., more than Rs.1000/-.

Table 24. Gross annual expenditure per year for livestock

Cluster	Per cent families			
	No expenditure	Less than Rs. 500/-	Rs 500/- to 1000/-	>Rs. 1000/-
Lakhimpur				
(a) Lakhimpur	25.6	36.8	26.4	11.2
(b) Dhakuakhana	48.0	27.2	19.2	5.6
Kokrajhar				
(a) Kokrajhar	64.0	19.2	10.4	6.4
(b) Gossaingaon	60.8	18.4	11.2	9.6
Karbi Anglong				
(a) Diphu	67.2	20.0	10.4	2.4
(b) Hamren	84.0	9.6	6.4	0
All clusters				
Average	58.3	21.9	14.0	7.04

7.4 Income from live stock other than milch cattle

In case of pigs, the highest families (30.4%) earned more than Rs. 4000/- annually in Dhakuakhana followed by farmers of Hamren [Table 25].

Table 25. Gross annual income per year from other than milch cattle

Cluster	Per cent families				
	Pig (Rs.4000/- <)	Pig (>Rs.4000/-)	Calf (>Rs.1000/-)	Poultry (Rs.2000/- <)	Poultry (>Rs.2000/-)
Lakhimpur					
(a) Lakhimpur	36.8	24.0	23.2	46.4	20.0
(b) Dhakuakhana	37.6	30.4	38.4	43.2	24.8
Kokrajhar					
(a) Kokrajhar	50.4	29.6	19.2	64.8	19.2
(b) Gossaingaon	55.2	27.2	24.8	62.4	22.4
Karbi Anglong					
(a) Diphu	48.0	22.4	23.2	64.0	16.0
(b) Hamren	52.8	19.2	19.2	57.6	17.6
All clusters					
Average	46.8	25.5	24.7	56.4	20.0

In Gossaigoan, Hamren and Kokrajhar districts about half of the populations earn less than Rs. 4000.00 from piggery. Likewise, in poultry, it was again Dhakuakhana with 24.8% families earning more than Rs. 2000/- annually. The other clusters Kokrajhar, Diphu and Gossaingaon were also important. It was again Glilamora, where 38.4% farmers earned more than Rs 1000/- from sale of calf annually.

7.5 Average Annual Income from Livestock

More than 50 % families in all the clusters are having average annual income of more than Rs. 5000/- from livestock, the highest (65.3 %) being in Diphu cluster of Karbi Anglong [Table 26]. Livestock provided good income to all the farmers of the surveyed villages.

Table 26. Average annual income per year from livestock (% families)

Cluster	Below Rs. 2000/-	Rs. 2000/- to Rs. 5000/-	More than Rs. 5000/-
Lakhimpur			
(a) Lakhimpur	11.9	32.5	55.6
(b) Dhakuakhana	11.5	31.2	57.3
Kokrajhar			
(a) Kokrajhar	8.0	32.0	60.0
(b) Gossaingaon	8.0	30.4	61.6
Karbi Anglong			
(a) Diphu	12.2	22.5	65.3
(b) Hamren	13.6	24.8	61.6
All clusters			
Average	10.9	28.9	60.2

7.6 Income from Fresh water Fisheries

Most of the families have small ponds ranging from 0.03 to 0.1 ha. Most of the families earned below Rs. 5000/- from fisheries [Table 27]. In Dhakuakhana cluster about 30% families earned more than Rs. 5000/-. In Gossaigaon cluster, 74.0% farm families have small pond which is followed by Kokrajhar (73.8%). In Hamren, 48.0 % of farm families have ponds ranging from 0.03 to 0.1 ha.

Most of the families earn below Rs. 5000.00 from fisheries. In Hamren cluster 42.4% families earn more than Rs. 5000.00 per year.

Table 27. Size of pond and annual income per year from fish

Cluster	Per cent families				
	Size of pond			Income	
	No pond	0.03-0.1 ha	0.1 -0.26 ha	Below Rs. 5000/-	Above Rs. 5000/-
Lakhimpur					
(a) Lakhimpur	7.20	60.72	32.08	60.72	32.08
(b) Dhakuakhana	8.8	56.26	34.94	56.26	34.94
Kokrajhar					
(a) Kokrajhar	5.6	73.8	20.6	73.8	20.6
(b) Gossaingaon	10.40	74.0	15.6	74.0	15.6
Karbi Anglong					
(a) Diphu	13.60	53..6	32.8	53..6	32.8
(b) Hamren	9.60	48.0	42.4	48.0	42.4
All clusters					
Average	9.2	62.6	29.7	62.6	29.7

CHAPTER VIII**INCOME FROM OTHER SUBSIDIARY OCCUPATIONS AND WAGE EMPLOYMENT**

In all the clusters income from the service was the highest followed by the income from petty business [Table 28] and both of these two components (greater than Rs. 50,000.00 and Rs. 37,500.00 respectively) contributed highest to the average income. Income from weaving, handicraft and sericulture were very meager. The highest income from weaving and sericulture was revealed in Dhakuakhana cluster of the Lakhimpur district. The wage employees also earned highest in this cluster. Earning from handicraft was highest in Hamren cluster of Karbi Anglong district.

Table 28. Average income (Rs.) from subsidiary occupations and wage employment per year

Cluster	Weaving	Wage employee	Handicraft	Service	Sericulture	Petty business
Lakhimpur						
(a) Lakhimpur	1500.00	12000.00	700.00	>50,000.00	3000.00	36000.00
(b) Dhakuakhana	3500.00	18000.00	1000.00	>50,000.00	5000.00	35000.00
Kokrajhar						
(a) Kokrajhar	2000.00	15000.00	1000.00	>50,000.00	-	38500.00
(b) Gossaingaon	2500.00	15000.00	1100.00	>50,000.00	-	37500.00
Karbi Anglong						
(a) Diphu	1000.00	8000.00	1300.00	>50,000.00	-	40000.00
(b) Hamren	1200.00	12000.00	1550.00	>50,000.00	1500.00	38000.00
All clusters						
Average	1950.00	13333.33	1108.33	>50,000.00	3166.66	37500.00

CHAPTER IX**SOURCES OF KNOWLEDGE****9.0 Introduction**

In recent era, Knowledge based agriculture is gaining importance considering the food security, sustainable and eco-friendly rural livelihood. It becomes utmost important to facilitate the access to the farmers the improved technologies through various information channels.

9.1 Source of Knowledge

In all the clusters major sources of knowledge were from friends followed by the state extension agencies [Table 29]. Contribution of mass media was lowest in Diphu cluster of Karbi Anglong, while Lakhimpur cluster of Lakhimpur ranked first. Market middlemen, voluntary organizations and kisan melas also play a role in sharing knowledge of improved technologies with the farmers.

Table 29. Sources of knowledge (%) of farmers in different clusters

Cluster	From Friends	Market middle-man	Mass media	State Extension Agencies	Voluntary Organization	Kisan mela
Lakhimpur						
(a) Lakhimpur	60.0	14.4	25.6	48.0	9.5	7.6
(b) Dhakuakhana	65.6	26.4	24.0	51.2	17.0	5.6
Kokrajhar						
(a) Kokrajhar	68.8	17.6	8.8	59.6	10.3	10.6
(b) Gossaingaon	70.0	12.8	7.9	60.3	20.5	9.3
Karbi Anglong						
(a) Diphu	56.8	12.0	3.2	56.8	5.6	11.2
(b) Hamren	67.2	6.4	7.2	62.4	13.4	4.8
All clusters						
Average	64.73	12.64	12.78	56.38	12.72	8.18

9.2 Suggestions for strengthening knowledge base

In order to strengthen the knowledge base following steps may be taken –

1. Training on specific agro-technique including fisheries, animal husbandry, bee keeping, sericulture, handicraft etc. in addition to crop production.
2. Organizing farmers group for knowledge sharing and production.
3. Demonstration on improved technologies in large areas.
4. Demonstration on new varieties suited to the different land situations of the clusters
5. Organizing field days
6. Provision of farm literature made available
7. Organizing Farmers – Scientist interactions in regular manner through KVKs.
8. Formation and capacity building of self help groups, farmers' science club.
9. Empowering Farm women in various farming activities, decision support system, reduction in drudgery, health and child care etc.
10. Strengthening of the activities of the different development departments of the Govt., Semi-Govt. autonomous organizations etc.
11. Building partnership of stakeholders like, public – private partnership etc.
12. Social networking through linkages amongst different farmers' interest groups.

CHAPTER X**PERCEPTION OF FARMERS****10.0 Introduction**

The perceptions of the farmers on the causes of lower productivity of crops were surveyed and the views are enumerated here under.

10.1 Farmers' perception on low yields

Perception of farmers regarding low yields varied in different clusters [Table 30]. In Lakhimpur and Karbi Anglong districts, farmers felt that their production was low due to the occurrence of natural calamities like flood and drought. However, in Kokrajhar district farmers felt that low yielding varieties, lower fertilizer dose, lack of irrigation facility and natural calamities are the major limiting factors. In Karbi Anglong, natural calamities and lack of irrigation facilities are the primary factors of lower productivity.

Table 30. Farmers' perception on low yield (in %)

Cluster	Per cent farmers						
	Non sufficient water	Low yielding seed	Low dose of fertilizer	Weed infestation	Spread of diseases/insects	High price of inputs	Natural calamities (Flood/Drought)
Lakhimpur							
(a) Lakhimpur	32.8	45.6	46.4	15.2	25.6	26.4	80.0
(b) Dhakuakhana	20.0	44.0	47.2	13.6	23.2	28.8	84.0
Kokrajhar							
(a) Kokrajhar	33.6	39.2	36.8	16.0	24.8	24.8	36.0
(b) Gossaingaon	35.2	40.8	40.0	17.6	25.6	26.4	33.6
Karbi Anglong							
(a) Diphu	44.0	20.0	28.8	11.2	14.4	15.2	63.2
(b) Hamren	44.8	15.2	23.2	5.6	6.4	12.0	88.8
All clusters							
Average	35.07	34.13	37.07	13.20	20.00	22.27	64.27

Farmers' of Karbi Anglong faced the problem of high flood followed by drought during the main crop season. They cultivate low yielding traditional varieties and do not have any knowledge about HYVs. Lower doses of fertilizers, weed infestation, insect and disease occurrence are also major constraints in regards to higher productivity in Karbi Anglong district. Surveyed farmers of Karbi Anglong district used lowest amount of fertilizers, as such they considered fertilizer a limiting factor to less extent. Covering the entire study area, natural calamities (64.27 %), lower dose of fertilizers (37.07 %) and insufficient irrigation water (35.07 %) were major reasons for low yield.

10.2 Suggestions for improving the yields

For improving the yield, the following measures may be adopted in different clusters:

1. Agro techniques suitable for flood and drought conditions should be introduced in Lakhimpur and Karbi Anglong district.
2. Irrigation facilities should be developed in all the clusters more specifically in Lakhimpur, Dhakuakhana, Diphu and Hamren.
3. HYVs and improved varieties should be popularized in all the clusters.
4. Agro technique for weed, disease and pest management should be popularized in all the districts.
5. Balanced fertilization and the methods of fertilizer application should be popularized amongst the farmers.
6. Farmers should be trained to minimize water loss during different stages of crop production.
7. Post harvest loss reduction strategies should be formulated as low yielding varieties are used.
8. Capacity building of the farmers in different aspects of agriculture needs urgency.

10.3 Use of new crop varieties

In Lakhimpur district, more than 40 per cent farmers used new HVYs of rice, while in Kokrajhar and Karbi Anglong district adoption was less than 30% and 20% respectively [Table 31]. Adoption of oilseeds varieties ranged from 25.3-35.0 per cent. In pulse crops new varieties were used by less than 15 per cent families. Only the surveyed farmers' of Karbi Anglong district adopted new varieties of maize where as, the new

varieties of sugarcane were used by the farmers of both Karbi Anglong and Kokrajhar districts. The levels of adoption of horticultural crops varied from 15.2 to 25.2 percent in all the districts. Increasing area under HYVs in rice and vegetables are of major concern.

Table 31. Use of new crop varieties (existing HYVs) in different clusters

Clusters	Per cent farmers					
	Rice	Pulse	Oilseeds	Sugarcane	Maize	Hort. crops
Lakhimpur						
(a) Lakhimpur	40.8	11.0	30.0	-	-	25.2
(b) Dhakuakhana	44.0	13.5	33.3	-	-	20.8
Kokrajhar						
(a) Kokrajhar	25.0	10.3	32.0	10.0	-	20.0
(b) Gossaingaon	28.8	10.5	35.0	12.0	-	22.8
Karbi Anglong						
(a) Diphu	14.0	3.5	25.3	20.0	30.3	16.0
(b) Hamren	13.2	3.5	26.3	22.5	33.3	15.2
All clusters						
Average	27.6	8.7	30.3	16.1	31.8	20.0

CHAPTER XI

MIGRATION STATUS

11.1 Period of Migration

Migration was highest in Hamren cluster (9.7%) of Karbi Anglong while in Lakhimpur cluster of Lakhimpur district, migration was the lowest (3.1%) [Table 32]. People migrated in search of work during September – October i.e. after rice transplanting (as there is less field operations left) and during the months of February- May after harvest and post harvest operations are over. There was overall 5.2 % population from the entire study areas who migrates in search of work.

Table 32. Migration of people in different clusters

Clusters	Migrated (%)	Reasons of migration	Period of migration
Lakhimpur			
(a) Lakhimpur	3.1	In search of work	Sep-Oct, Feb-May
(b) Dhakuakhana	5.2	In search of work	Sep-Oct, Feb-May
Kokrajhar			
(a) Kokrajhar	4.3	In search of work	Sep-Oct, Feb-May
(b) Gossaingaon	4.2	In search of work	Sep-Oct, Feb-May
Karbi Anglong			
(a) Diphu	4.9	In search of work	Sep-Oct, Feb-May
(b) Hamren	9.7	In search of work	Sep-Oct, Feb-May
All clusters			
Average	5.2		

11.2 Nature of work during migration period and average earning

In migration periods, people are generally engaged as labour in illegal coal mines (as found in Hamren cluster) and wage earning in the nearby townships, bamboo and wood works in the nearby areas etc in other clusters. Average earning was highest in Kokrajhar district (Rs. 120/day) and lowest in Karbi Anglong district (Rs.80/day) as mentioned in Table 33.

Table 33. Nature of work during migration period and average earning

Clusters	Nature of work	Average earning (Rs/day)
Lakhimpur		
(a) Lakhimpur	Unskilled	110.00
(b) Dhakuakhana	Unskilled	110.00
Kokrajhar		
(a) Kokrajhar	Unskilled	120.00

(b) Gossaingaon	Unskilled	120.00
Karbi Anglong		
(a) Diphu	Unskilled	80.00
(b) Hamren	Unskilled	80.00
All clusters		
Average		103.00

CHAPTER XII**EXTENSION SERVICES****12.1 Availability of extension services for agriculture, poultry, livestock, fishery and other services**

Satisfaction level of the respondents for extension services varied from cluster to cluster and also for different disciplines i.e. Agriculture, veterinary and fisheries [Table 34]. In Lakhimpur cluster of Lakhimpur and Gossaingaon cluster of Kokrajhar, satisfaction level was 50 per cent or more for Agricultural Extension, while in other clusters it was below 50 per cent. As agricultural extension system is well organized, so satisfaction level is higher than fishery and veterinary sectors. Fishery is the sector with which the farmers were most dissatisfied (more than 91.0%).

Table 34. Farmers' perception (%) towards extension services

Clusters	Agriculture		Veterinary		Fisheries	
	Satisfied	Unsatisfied	Satisfied	Unsatisfied	Satisfied	Unsatisfied
Lakhimpur						
(a) Lakhimpur	52.0	48.0	35.3	64.7	8.1	91.9
(b) Dhakuakhana	45.0	55.0	27.3	72.7	6.5	93.5
Kokrajhar						
(a) Kokrajhar	45.5	54.5	30.3	69.7	5.5	94.5
(b) Gossaingaon	50.0	50.0	28.2	71.8	5.9	94.1
Karbi Anglong						
(a) Diphu	35.0	65.0	18.3	81.7	5.5	94.5
(b) Hamren	31.0	69.0	15.6	84.4	4.9	95.1
All clusters						
Average	43.08	56.92	25.83	74.17	6.07	93.93

CHAPTER XIII

ACCESS TO MICRO CREDIT AND LOAN FACILITIES

13.1 Micro Credit Facilities

Micro credit facilities are moderately available to SHGs which are engaged in providing credit to its members/ beneficiaries to meet up their unforeseen household needs, but not for agricultural activities like, procurement of inputs/equipments etc.

13.2 Loan and its Utilization

None of the respondent in any of the clusters availed loans individually from any government or non-government organizations.

13.3 Vocational Training undertaken by the respondents

State Department of Agriculture imparts vocational training in Lakhimpur district. In case of Kokrajhar and Karbi Anglong districts NGOs, functioning in those areas, organize such training programme among farmers.

CHAPTER XIV

CONTRACT FARMING

It was found, during survey in all three target districts comprising of all clusters and villages that farmers are completely unaware of contract farming which leaves a great room to infuse them with the concept in future and thereby usher in a new era of farming.

CHAPTER XV

CONCLUDING REMARKS

15.1 Economic Profile of sample farmers

Total population of the selected villages of the three district was 17345 of which male constituted 7499 (43.23 %), females 6946 (40.05 %) and children 2917 (16.82 %). The average literacy level of the selected clusters was 51.16 %, of this 57.72 % comprised by male and 43.58 % by the female population. Among all the clusters, the literacy level was highest in Gossaingaon (60.0%) and Kokrajhar (55.0%).

In the selected clusters, about 80 % people were engaged in agriculture. Occupational group like Professional workers (carpenter, mason etc.) accounted for only 2.4 % to 4.0 % of the total surveyed population. The average land holding in the selected clusters was 1.24 ha. The average gross sown area in the entire selected village was 1.48 ha with an average cropping intensity of 119.35 % in the study area.

Stream (5.2 %) and pond (6.13 %) irrigation are the main source of irrigation in the project area. Only 2.53 % of the surveyed population availed STW as source of irrigation along with stream and pond.

Farm mechanization level was found poor in the surveyed area. Eleven numbers of tractors were found in the surveyed areas out of which ten was from Kokrajhar district. Use of power tiller was also found very low (35 nos.) in the study area. Mould Board plough and Paddy weeder use was not seen in Karbi Anglong district. However, very less number of farmers in Kokrajhar and Lakhimpur district uses MB Plough and weeder. Other farm implements like sprayer, spade, sickle, *khurpi* etc. are extensively used.

Financial institutions/ bank establishments were not available in all the areas. Mostly RRBs and Lead banks were found active in the study areas. In all the study areas, postal and health care facilities are available. But services rendered by these institutions were not sufficient to improve the living condition of the people. Major storage structures in the study areas include *duli* and *bhoral*. These two structures are made out of locally available materials like bamboo, cane, wood etc. In Kokrajhar and Lakhimpur districts, semi-concrete *bhorals* are also seen in every household. Majority of the farmers in Karbi Anglong district store their produce (rice) in bamboo made *dulis* which is mud plastered from inside.

In the study area, awareness level of farm technologies viz., Integrated Pest Management (IPM), Integrated Nutrient Management (INM) and Waste Management was not encouraging. Though some of the farmers follow these techniques, they do not know the scientific basis of these practices.

All the study areas under the project have road connection. Locally available transportation facilities are available though it is not regular and time bound. Generally people use *thella*, rickshaw, bicycle, *bhar pachi*, animal drawn carts as local mode of transportation to *mandis* or local markets. Other vehicles like bus, pick up van, tempo, gramya taxi etc. are available as medium and long distance modes of conveyance.

Average annual household expenditure was Rs. 27,125.00, Rs. 21,150.00, Rs. 25,125.00, Rs. 28,326.5, Rs. 24,800.00 and Rs. 25,725.5, respectively in Lakhimpur, Dhakuakhana, Kokrajhar, Gossaigaon, Diphu and Hamren clusters. Major expenditure incurred in all the clusters was on daily consumption followed by social functions and health sector. In the study area, no mechanized cleaning and grading is practiced. Manual cleaning, winnowing is done in case of rice and for some other crops. Farm produce are disposed in local market and *mandis* either by farmer himself or through middleman.

15.2 Key indicators and their baseline levels of sample respondents and target area of the study in relation to NAIP approved subprojects

Key indicators and their cluster wise baseline values are presented in the Table 35.

Table 35. Key indicators and baseline levels (Total sample size 750; cluster wise sample size 125)

Key indicators	Baseline levels (Cluster wise)						All clusters (Total/Average)
	Lakhimpur	Ghila-mora	Kokra-jhar	Gossai-gaon	Diphu	Hamren	
Total Population (nos.)	2722	3713	1547	4210	1080	4073	17351
Male	1102	1489	608	1649	545	2106	7499
Female	999	1409	540	1490	535	1973	6946
Children	621	816	399	1081	-	-	2917
Literacy (%) Total	49.2	46.0	55.0	60.0	47.3	49.5	51.5

Male	51.9	49.2	65.2	69.0	56.6	54.4	57.7
Female	46.1	42.6	43.0	47.8	37.7	44.3	43.5
Average land holding (ha)	1.4	1.33	1.21	1.19	1.11	1.2	1.24
Occupation of the respondents (%):							
Agriculture	85.6	89.6	81.6	92.0	79.2	83.2	85.2
Agricultural labour	12.8	21.6	16.8	18.4	23.2	19.2	18.7
Professionals like carpenter, mason etc.	3.2	2.4	3.2	4.0	4.8	3.2	3.5
Business	14.4	12.8	9.6	11.2	8.0	8.4	10.7
NGO worker	0	0	3.2	2.4	3.2	4.0	3.2
Households income (Rs.) from:							
Agriculture (net)	15,467	17,967	18,850	21,234	16,670	17,502	17,948
Avg. Income from wages	12,000	18,000	15,000	15,000	8,000	12,000	13,333
Employment (Man days/ year):							
On own farm	112	108	117	120	107	109	112
On others farm	25	31	29	32	26	23	28
Non agricultural activities within the village	16	22	18	20	18	22	19
Labour outside the village	27	35	32	36	33	41	34
Families (Nos. and %) using different Sources of Irrigation:							
Stream	6 (4.8)	4 (3.2)	8 (6.4)	3 (2.4)	4 (3.2)	14 (11.2)	39 (5.2)
STW	0 (0)	0 (0)	11 (11.2)	7 (5.6)	0 (0)	0 (0)	18 (2.4)
Pond	15 (12.0)	9 (7.2)	6 (4.8)	4 (3.2)	5 (4.0)	7 (5.6)	46 (6.1)

Farm Machineries (Nos):							
Tractor (nos.)	0	0	5	5	0	1	11
Power tillers	6	2	12	11	1	3	34
MB Plough	51	24	45	33	0	0	153
Water pump	5	3	10	12	2	2	34
Paddy weeder	25	15	12	11	0	0	63
Sprayer	50	11	75	70	15	14	235
Spade	315	260	301	305	325	331	1837
Sickle	350	326	324	314	335	340	1989
Khurpi	10	12	150	156	201	215	744
Infrastructures (Nos.):							
Financial institution/bank	1	0	2	0	1	3	7
Post office	1	1	2	1	1	2	8
PCO	3	0	3	2	5	2	15
Health care center	1	1	2	1	1	2	8
Veterinary services	1	0	1	0	1	1	4
Primary Agricultural Cooperatives	1	0	1	1	1	1	5
Storage structure (traditional)	135	131	129	136	141	147	818
Awareness levels of IPM, INM and Waste Management:							
IPM	19 (15.2)	22 (17.6)	09 (7.2)	13 (10.4)	17 (13.6)	21 (16.8)	101 (13.5)
INM	14 (11.2)	11 (8.8)	20 (16.0)	15 (12.0)	10 (8.0)	13 (10.4)	83 (11.1)
Waste Management	45 (36)	51 (40.6)	49 (39.2)	54 (43.2)	59 (47.2)	60 (12.8)	318 (42.4)

Cropping Intensity (%)	110.0	122.1	123.0	128.1	115.0	117.9	119.35
Major crops:							
Total cropped area (ha)	191.13	199.15	195.06	199.77	167.04	190.57	1142.72
Rice: Area (ha)	159.5	146.7	147.30	145.4	134.7	148.2	881.8
Yield (q/ha)	31.85	28.88	30.95	29.55	27.84	29.20	29.7
Maize: Area (ha)	0	0	2.0	2.8	6.70	8.30	19.8
Yield (q/ha)	0	0	31.43	34.72	36.31	38.75	35.3
Sugarcane: Area (ha)	0	0	5.0	6.7	3.35	4.75	19.8
Yield (q/ha)	0	0	216.32	231.45	183.24	275.00	226.5
Vegetable: Area (ha)	6.10	9.60	9.60	11.25	3.7	4.65	44.9
Yield (q/ha)	210.6	221.5	280.7	273.6	225.3	244.8	242.8
Livestock:							
Cow / Bullocks (nos.)	315	304	298	291	256	275	1739
Buffalo (nos.)	16	28	12	18	4	13	91
Pig (nos.)	148	164	205	217	169	173	1076
Milk yield (l. /day/cow)	1.21	1.09	1.73	1.36	1.00	0.75	
Poultry (nos.):	382	415	486	505	460	436	2684
Fisheries (pond):							
Pond with fish culture (nos.)	103	105	104	106	96	103	617
Pond without fish culture (nos.)	13	9	14	6	12	10	64

Home consumption of grains (% of total produce)	12	11.2	14.4	13.6	12.8	14.4	13.06
Sale of produce and market place:							
To local buyers soon after the harvest (% of produce)	48	56.8	53.6	55.2	62.4	68	57.3
Sale after some time of harvest (at higher price)	-	-	-	-	-	-	-
Agencies providing agriculture and allied services (no. of visit/month):							
State Agricultural Department	2	1	1	1	1	1	1.3
Veterinary Department	1	1	1	1	1	1	1
Voluntary organization (NGOs etc.)	0	0	1	1	1	0	0.5
Cooperatives	1	0	1	1	0	0	0.5
No. of farmer groups (SHGs, FIGs etc.)	5	4	6	7	5	7	34
Availability of micro credit & loan facilities	0	0	0	0	0	0	0

ANNEXURE I**Annexure I. List of surveyed villages (Cluster wise):**

District	Cluster	Village Name
1. Lakhimpur	a) Lakhimpur	i) Nagaon
		ii) Majgaon
		iii) Hunpur
		iv) Bosachuk
		v) Khalihoimari
		vi) Horyoni
	b) Dhakuakhana	i) Gadangorchuk
		ii) Keceruguri
		iii) Bilmukh
		iv) Bangkeleng
v) Dakshin Gaon		
2. Kokrajhar	a) Kokrajhar	i) North Ghoshkata
		ii) South Ghoshkata
		iii) Middle Ghoshkata
		iv) Shikargaon
		v) South Modati
		vi) Goraimari
	b) Gossaigaon	i) Bamunkura
		ii) Tulsibil
		iii) Kachukata
		iv) Dobhai
		v) Aminkata
		vi) Choutara
		vii) Kusumbil
		viii) Mainatola
3. Karbi Anglong	a) Diphu	i) Bonglong
		ii) Sikangterang
		iii) Kauripahar
		iv) Kacheriarongpi
		v) Kachiruirongpi
		vi) Beykulla
		vii) Bandhan
	b) Hamren	i) East Rongkhang
		ii) Chengbong
		iii) East Belapara
		iv) Wakhantagroup No. 8
		v) North Rongkhang No. 2
		vi) Rengtama No. 10
		vii) Kheroni
		viii) Ampathar
		ix) Phelangpi Pator gaon
		x) Prilo