

## REPORT ON

# SOCIO - ECONOMIC ASSESSMENT OF ROLE OF LIVESTOCK ENTERPRISES IN IMPROVEMENT OF LIVELIHOOD AND OVERCOME POVERTY OF KARBI, DIMASA AND BODO FARMERS IN KARBI ANGLONG DISTRICT OF ASSAM

Submitted By  
*Principal investigator:*

**Dr. R. K. Sarma, Principal Scientist  
Regional Agricultural Research Station  
Assam Agricultural University  
Diphu-782 460**

*Co-principal investigator:*

**Dr (Mrs) N. Deka, Associate professor  
Department of Agricultural Economics & FM  
Assam Agricultural University  
Jorhat -13**

**Funded By:**

**ASSAM INSTITUTE OF RESEARCH FOR TRIBALS AND SCHEDULED CASTES  
JAWAHARNAGAR, GUWAHATI - 22**

## DECLARATION

I hereby declare that I have completed this research project entitled 'Socio-Economic Assessment of Role of Livestock Enterprises in Improvement of Livelihood and Overcome Poverty of Karbi, Dimasa and Bodo Farmers in Karbi Anglong District of Assam' under supervision of Mr. H.C. Morang, Sr. Investigator, Assam Institute of Research for Tribals and Scheduled Castes, Guwahati -22.

This project report is the result of my own investigation, observation and analysis. Neither the report nor part has been submitted else-where for any purpose.

Dated

Diphu, the *19<sup>th</sup> June*...2015



Principal Investigator

## ACKNOWLEDGEMENT

I sincerely acknowledge my deep sense of gratitude to Mr. Udayan Hazarika, Director, Mr. D. Sarma, Ex-Director and Mr. G. C. Kakati, Joint Director, Assam Institute of Research for Tribals and Scheduled Castes, Guwahati -22 for giving me this opportunity to carry out the present study by providing necessary fund, fervent guidance and constructive suggestions.

I offer my profound sense of gratitude to Mr. H.C. Morang, Sr. Investigator, Assam Institute of Research for Tribals and Scheduled Castes, Guwahati -22 for his competent guidance, keen interest, constructive suggestion and constant encouragement throughout the course of investigation and in preparation of the manuscript.

I offer my thanks to the authority, Assam Agricultural University for giving me the permission to carry out the research at Regional Agricultural Research Station, Diphu.

I am grateful to Dr. A. Roy, Chief Scientist, Regional Agricultural Research Station, Diphu for his helpful suggestions at every stage of the investigation.

I am grateful to all the officers and staff members of Assam Institute of Research for Tribals and Scheduled Castes, Guwahati -22 for their timely help and co-operation during the course of study.

I am also grateful to all the scientists and staff members the Regional Agricultural Research Station, Diphu for their co-operation during the course of study.

I am highly indebted to my wife 'Madhusmita' and my son 'Reet' for their active interest, constant encouragement and help during the period of investigation and report preparation.

I acknowledge and offer my sincere thanks to all the farmers, Village Heads and Government Officials, who helped me directly or indirectly during the course of investigation.

I sincerely thank to Mr. D. Katakya, Proprietor and other employees of Diphu Press, Diphu for their sincere help in preparation manuscript with utmost care.

Dated

Diphu, the...19<sup>th</sup> June...2015



Principal Investigator

# CONTENTS

Chapter Number	Title	Page
I	<b>Introduction</b>  1.1 District profile of Karbi Anglong 1.2 Physiography 1.3 Soil 1.4 Rainfall pattern 1.5 Temperature 1.6 Demography 1.7 Literacy 1.8 Land resource 1.9 Economy 1.10 Rational for the study 1.11 Objectives	1 - 6
II	<b>Review of literature</b>	7 - 9
III	<b>Methodology</b>  2.1 Sample Selection 2.2 Data collection 2.3 Analytical Tools	10 - 11
IV	<b>Results and Discussion</b>  4.1 Socio-Economic Characters of Sample Farmers 4.2 Demographic Features 4.3 Educational Status 4.5 Working Status 4.6 Occupational Status 4.7 Land Resource and Its Use 4.8 Existing Agricultural Status 4.8.1 Status of Crop Enterprise	12 - 44

	<p>4.8.1.1 Crop varieties grown</p> <p>4.8.1.2 Cultural practices</p> <p>4.8.1.3 Crop productivity</p> <p>4.8.1.4 Income from crop enterprise</p> <p>4.8.2 Status of Livestock Enterprise</p> <p>4.8.2.1 Livestock system</p> <p>4.8.2.2 Size of livestock units</p> <p>4.8.2.3 Existing production practices</p> <p>4.8.2.4 Productivity of Livestock</p> <p>4.8.2.5 Income from livestock enterprise</p> <p>4.8.3 Income from other agricultural allied activities</p> <p>4.9 Farm Income</p> <p>4.9.1 Share of Livestock enterprise in the Total Farm Income</p> <p>4.10 Non- farm Income</p> <p>4.11 Total Household Income</p> <p>4.12 Impact of developmental programmes on improvement of Livestock Sector</p> <p>4.12.1 Farmer's Response</p> <p>4.13 Constraints of Livestock Production</p> <p>4.14 Opportunities in Livestock Production</p> <p>4.15 Need for Technical and Supportive Intervention</p>	
V	<p>Summary and Conclusion</p> <p>5.1 Summary</p> <p>5.2 Conclusion</p> <p>5.3 Policy Implication</p>	45 - 51
	Bibliography	52 - 53
	Appendices	

## LIST OF TABLES

Table number	Title	Page
1	Distribution of the sample population ( Nos.) according to their age and sex, 2013-14	12
2	Distribution of the sample population ( Nos.) according to their level of literacy, 2013-14	14
3	Distribution of sample population (Nos.) according to working status, 2013-14	15
4	Distribution of sample farmers (Nos.) according to their occupations, 2013-14	16
5	Land utilization ( hectares) pattern of sample farms, 2013 -14	17
6	Distribution of sample farmers (Nos.) according to the different farming system followed by them, 2013- 14	18
7	Distribution of sample farmers (Nos.) according to the farming component, 2013- 14	19
8	Average area, yield and production of major crops grown by the sample farmers, 2013-14	22
9	Costs and returns (Rs./farm) of different crops grown by the sample farmers, 2013-14	23
10	Distribution of sample farmers ( Nos.) according to livestock component they reared, 2013-14	25
11	Distribution of sample farmers ( Nos.) according to livestock combination they reared, 2013-14	26
12	Distribution of sample farmers (Nos.) according to unit size of different livestock, 2013-14	28
13	Average income ( Rs./farm) from livestock enterprise of the sample farms, 2013-14	31
14	Average annual income derived by the sample farmers from sericulture, fishery and forestry, 2013-14	33
15	Average annual income derived by the sample farmers from farm activities, 2013- 14	34
16	Share of livestock enterprise to the annual farm income of the sample farmers, 2013-14	35
17	Average annual income of sample farmers from non-farm activities, 2013-14	37
18	Average annual household income of sample farmers, 2013 - 14	38

## LIST OF FIGURES

Figure number	Title	Page
1	Map of Karbi Anglong District	2
2A	Distribution of total sample population (%) according to sex	13
2B	Distribution of total sample population (%) according to age group	13
3A	Proportion of literate and illiterate in total sample population	14
3B	Distribution of total literate population according the level of literacy	14
4	Working status of sample population	15
5	Prevalence of different farming system in the sample farms	19
6	Availability of different farming components in the sample farms	20
7	Per cent contribution of different crops to the total income from crop enterprise	24
8	Availability of different livestock components in the sample farms	25
9	Prevalence of different livestock combination in the sample farms	27
10	Per cent contribution of different livestock component to the total livestock income	32
11	Share of different enterprises in the annual farm income	34
12	Share of livestock in the average annual farm income of the sample farmers	36
13	Share of farm and non-farm activities in average annual household income	38

## ABSTRACT

In Karbi Anglong district of Assam more than 90 per cent of population from different tribal communities reside in rural interior hilly track practicing agriculture and allied activities as their basic source of livelihood. But, the production practices of almost all the farmers are traditional in nature. Commercialization of livestock enterprises through scientific management practices is highly needed for enabling tribal farmers of the district to increase their farm income and overcome poverty. The main aim of the present study was to generate systematic information on existing status of livestock sector, its profitability, constraints of production of tribal farmers and need for technical and supportive intervention in Karbi Anglong district of Assam which are pre requisites for proper planning and execution of developmental programme for commercialization of livestock enterprise in the district. The study was based on primary data collected through Focus Group Discussion (FGD) and Personal Interview method and the secondary data collected through personal discussion with the officials of related departments and from various published and unpublished sources.

The study of demographic pattern showed that 50.66 per cent of sample populations were male against 49.34 per cent of female population. Distribution of population according to age indicated that 51.17 per cent of populations were in the age group of 18 – 60 years which supplied the main work force for farm and nonfarm activities. On average 80.87 per cent of sample population were found literate. However, more than 50 per cent of population possessed only primary and M.E. level of education.

Distribution of population according to working status showed that 25.03 per cent were full time worker, 33.56 per cent were part time worker and 41.40 per cent were non-workers. Out of total sample households 46.87 per cent possessed only one source of livelihood. Agriculture was the primary source of livelihood for 77.92 per cent of sample households.

The average size of operational holding of the sample farmers was 2.02 hectares. Crop was the main enterprise for majority of the sample farmers. However, in a sizable number of



sample farms, average annual income derived from livestock enterprise were more than the average annual income derived from crop enterprise.

All most all the sample farmers practiced integrated farming system integrating different farm enterprises such as crop, livestock, sericulture, fishery, forestry etc. The major farming system followed by the sample farmers were Crop – Livestock, Crop – Livestock – Sericulture, Crop – Livestock – Fishery, Crop – Livestock – farm forestry, Crop – Livestock – Sericulture – Fishery and Crop – Livestock – Fishery – Farm forestry of which the most prevailing system was Crop – Livestock system.

Because of traditional method of cultivation, rainfed agriculture, lower use of manures and fertilizer etc. productivities of all the crops in the sample farms were low. The average annual income of the sample farms from the crop enterprise was Rs. 48655.00. Among the three communities considered in the present study, the average annual income derived from crop enterprise was slightly higher in case of Bodo community (Rs. 50879.00) followed by Dimasa community (Rs. 46970.00). It was the lowest in Karbi community (Rs. 46610.00).

The different livestock reared by the sample farmers were cattle, buffalo, pig, goat, poultry and duck. Poultry, goat and pig were more common amongst the sample farmers. Cattles were found mainly with the farmers from Dimasa and Bodo community. In case of Karbi community, only a few farmers were found to maintain cattle in their farms. Sample farmers were found to maintain livestock in 15 different combinations. The most prevailing combination was poultry – goat – pig followed by poultry – pig and poultry – goat – cattle. The size of livestock unit was very small. Because of poor financial condition, most of the sample farmers could not afford to rear more numbers of livestock.

Due to the rearing of indigenous breeds, lack of scientific production practices etc. the productivity of livestock in the sample farms were found very low. The average milk productivity per day of milch cattle was 0.75 literes and milch buffalo was 2.60 liters. In case of goat, the number of kid birth per lactation was found 2 to 3 numbers. The number of piglet birth per lactation was found to vary from 7 to 11 numbers. Normally the body weight attained by indigenous pigs were found to be 40 to 50 kg in 10 – 12 months while

during the same period the body weight attained by the cross breed pigs were found to be 120 to 130 kg. In case poultry and duck, the numbers of eggs laid per year per bird were found to vary from 30 to 60 numbers.

The average annual income of total sample population from livestock enterprises was Rs. 29124.00. Among the three different communities considered under study average annual income from livestock was the highest (Rs.33578.00) in Bodo community followed by Dimasa community. Among the different components, the average contribution was found the highest from the pig component followed by goat component. Average contribution from poultry component was in third rank ( 17.14 per cent) in case of Karbi community. However, in case of Dimasa and Bodo community the average contributions from cattle component were higher than the poultry component.

Other agricultural allied activities of the sample farmers under present study were sericulture, fishery and forestry. In pooled situation the average annual income generated from sericulture, fishery and farm forestry was Rs. 2445.00, Rs. 911.00 and Rs. 3312.00 respectively.

The average annual farm income of the sample farms was Rs. 79362.00 in Karbi community and Rs. 81968.00 in Dimasa community. It was slightly higher (Rs.90506.00) in Bodo community. Crop enterprise was observed as the highest contributor of annual farm income in all the three communities. The share of livestock enterprise to the household income was 32.32 per cent, 34.34 per cent and 37.10 per cent in Karbi, Dimasa and Bodo community, respectively.

The average annual non-farm income of the sample farmers was Rs. 24795.00 in Karbi community, Rs. 22040.00 in Dimasa community and Rs. 23868.00 in Bodo community. In pooled situation it was Rs. 23368.00.

The average annual household income per farm of sample farmers was Rs. 1,04,157.00 in case of Karbi community, Rs. 1,04,008 in Dimasa community and the highest Rs.1,14,374.00 in Bodo community. The share of farm activities in average annual household income was 76.19 in case Karbi community, 78.81 in Dimasa community and 79.13 in Bodo community.

The study showed that the department of Animal husbandry and Veterinary had a huge infrastructural net work in the district. But, the operating condition of most of these infra structures were not up to the expected level. The quality of extension service was also somewhat lacking in the district. Department of Animal Husbandry and Veterinary distributed cross breed piglets, improve kid goat, improved poultry chicks and duckling, seeds and planting materials for fodder production etc. amongst the farmers over the years under different distribution programmes. Programmes were also implemented on disease survey and eradication, vaccination, distribution of medicines, awareness programme on Artificial Insemination and fodder production etc. But, more than 60 per cent of respondent farmers were found ignorant about the government plan and programmes. Only few farmers were found aware about the departmental programmes on the development of livestock activities in their localities.

Sample farmers from all the three communities under present study were confronted with several constraints which adversely affected the productivity and profitability of different livestock in their farms. Some of the major constraints were lack of knowledge about scientific management practices, lack of motivation and risk bearing ability, poor resource base of the farmers, higher cost of modern inputs, disease problems, shortage of medicines, non availability of concentrate feed etc. Against all these difficulties sample farmers were found very much interested in livestock rearing and they had sufficient experience and traditional knowledge on livestock farming. Moreover there were huge market demand at reasonably high price for livestock product which made the livestock activity economically viable in the sample farms. Motivation of farmers towards commercial production of livestock, formation of Self Help Group, Livestock Interest Group, farmer's awareness camp and training on scientific management of livestock, provision of supply of quality birds, quality animals, concentrate feed and medicine at time, availability of hassle free institutional credit, insurance coverage of livestock, quality extension service etc. will increase the efficiency of livestock sector and help improve the livelihood of the tribal farmers in the district.

\$

# CHAPTER I

## INTRODUCTION

Agriculture is the mainstay of livelihood for majority of India's rural population. However, the economic condition of these rural populations continues to be of great concern and challenge. Dependence on rainfed agriculture, fragmentation of land, land degradation, shrinking resources etc. have posed serious threat to the agriculture. Under such circumstances, the importance of allied agricultural activities like piggery, poultry, goat farming etc. have been gaining importance day by day in providing livelihood and food security to the rural farming community, more particularly for small and marginal farmers.

### 1.1 District profile of Karbi Anglong

Karbi Anglong is the largest amongst the 27 administrative districts of Assam occupying an area of 10,434 square kilometers. It is one of the two hill districts of Assam bounded by Golaghat district on the east, Meghalaya state and Marigaon district on the west, Nagaon and Golaghat districts on the north and Dima Hasao district and Nagaland state on the south. (Fig 1)

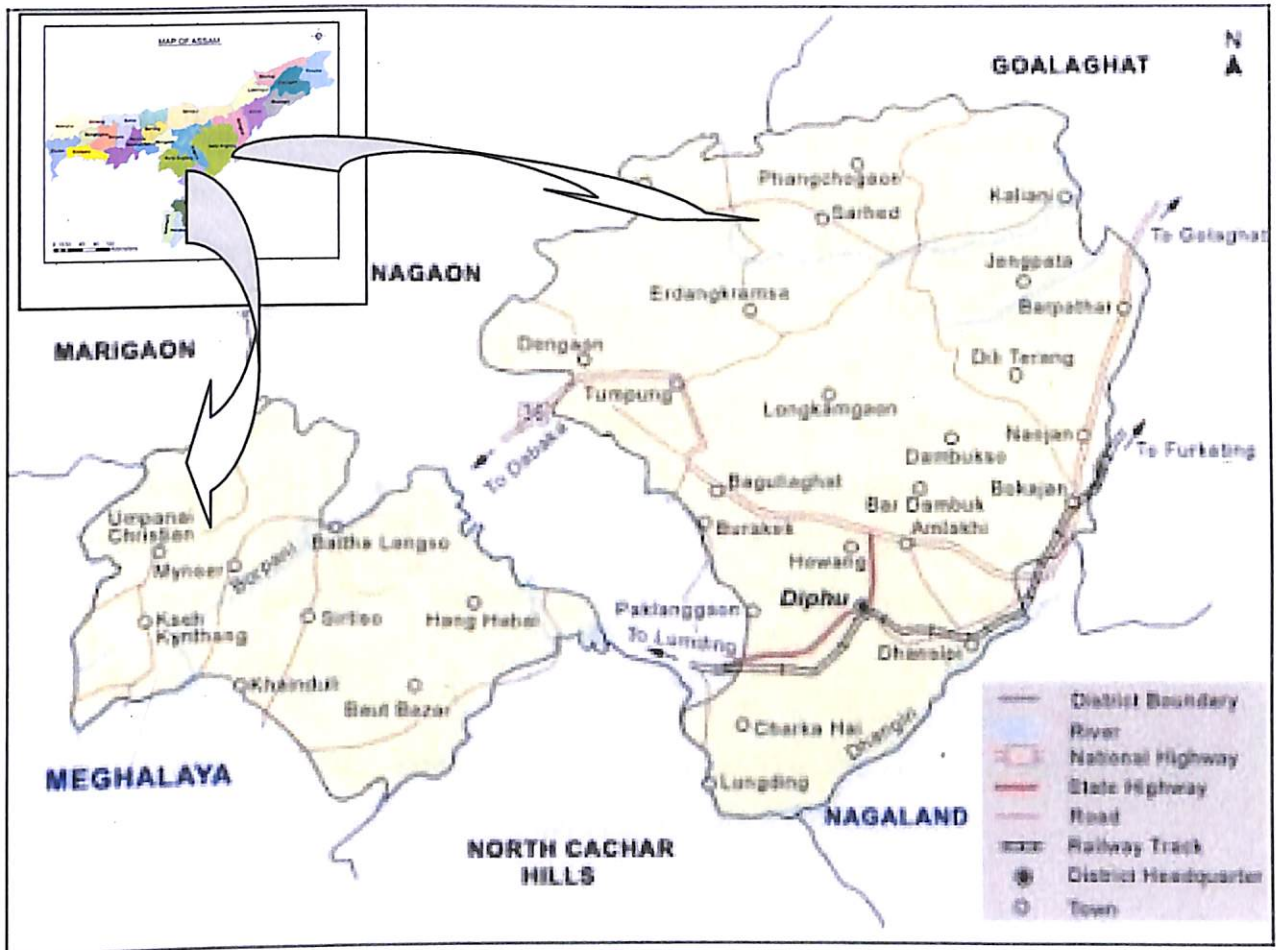
### 1.2 Physiography

Karbi Anglong is located between 25°33' - 26°35' North Latitudes and 92°10' - 93°50' East Longitudes. The district is characterized by undulating topography with a blend of hills and plains. It has three geographical tracts: plains, hills with gentle slopes and hills with stiff slopes. About 65 per cent of the district is covered by hills. The altitude of the district varies from 100m to 1400m above mean sea level. The highest peak, Sighasan, stands at about 1360 metres. Kapili and Dhansiri along with their tributaries form the main river system in the district.

### 1.3 Soil

The predominant soils of the district are lateritic on the slope and red loam in the valley. The texture of the soil varies from sandy clay loam/ clay loam to silty clay in surface

horizon and clay in sub-surface. Soils are acidic to moderate acidic (pH 4.40 -6.65) and rich in organic matter.



**Fig 1: Map of Karbi Anglong District**

### 1.4 Rainfall pattern

The rainfall is not uniform throughout the district. The average annual rainfall of the district ranges from 1000 to 1200mm. The average rainfall for the last 33 years (1980-2013) was 1244mm. Among the three different seasons the highest rainfall occurs in *kharif* season followed by summer. Rainfall is more reliable during *kharif* season while highest variation is observed during *rabi* season.

### 1.5 Temperature

The temperature data for last 33 years shows that the maximum temperature in the district varies from its lowest 15.2<sup>0</sup>C in January to the highest 36.9<sup>0</sup>C in August. Similarly, the

minimum temperature ranges from its lowest 4.2<sup>0</sup>C in January to the highest 27.0<sup>0</sup>C in August.

### **1.6 Demography**

According to the 2011 census, the total population of Karbi Anglong District is 9, 65,280 of which 4, 93,482 male and 4, 71,798 female. The density of population is 93 inhabitants per square kilometer and its population growth rate over the decade 2001-2011 is 17.58 per cent. The composition of rural and urban population is 851158 and 114122, respectively. In respect of religion groupings, the majority of Karbi Anglong's people are Hindus (82%) followed by Christian (15%) and others (Muslim, Jain, Buddhist, etc). The ST community comprises 56 per cent of the district population. It is the second highest tribal-dominated district in the state after Dima Hasao. Karbi Anglong is home to many tribes including Karbi, Dimasa, Bodo, Mann Tai, Kuki, Rengma, Jayantia, Hmar and Adivasi. There are also people from Nepali, Bihari, Bengalee and Assamese-speaking general community. Karbi is the largest tribe followed by Bodo, Dimasa and Kuki.

### **1.7 Literacy**

The district has a literacy rate of 73.52 per cent. The literacy rate amongst Male population is 82.12 per cent and Female population is 64.62 per cent.

### **1.8 Land resource**

The total land resource of Karbi Anglong district is 10, 43,396 hectares of which 3, 18,056 hectares are under forest. The net cropped area in the district is 1, 62,410 hectares while gross cropped area is 2, 27,598 hectares. Around 73 per cent of operational holdings are small and marginal holdings. The average size of operational holding is 2.04 hectare which is greater than the state average.

### **1.9 Economy**

The economy of the Karbi Anglong district is agrarian in nature and hence the economic development of the district is highly dependent on agriculture and allied activities. In the district, more than 90 per cent of population from different tribal communities reside in

rural interior hilly track practicing agriculture and allied activities as their basic source of livelihood. The economic condition of these rural mass is very poor. In 2006, the Indian government entered Karbi Anglong in the list of country's 250 most backward districts. It is one of the eleven districts in Assam currently receiving funds from the Backward Regions Grant Fund Programme.

Agriculture is the main economic activity. About 85 per cent of work force in the district is engaged in agriculture. The diverse climatic conditions, soil and topography of the district favours the cultivation of wide range of crops. The major food-grain crops grown in the district are rice, maize, wheat and different pulses. However, agriculture in the interior hilly track of the district is less developed than the plains areas of the state. The undulating terrain, inaccessible areas, inadequate transport and communication, slow pace of transfer of technology etc. are contributing to the backwardness of agriculture in the district. In addition, the socio-economic problems of the various tribal groups and the land ownership pattern in the region are not conducive for proper development of agriculture. Shifting cultivation, locally known as 'Jhum', which is one of the ancient system of cultivation still being continued in the district.

Rice is the major food-grains both in terms of area and production. Among oil seed, rape and sesame are dominating crops. Jute and cotton are important fiber crops. Sugarcane is an important cash crop grown both in hill slope and in plains.

The district is a rich reservoir of genetic variation of a large number of fruits like citrus, banana, pineapple, papaya and many indigenous minor fruits. The climate of the district also favours the cultivation of fruits like mango, litchi, pear, guava, jackfruit and pomegranates. Besides, the district is home of many indigenous fruits like leteku, ponjol, jamun, kordoi, amla, autenga etc. Pine apple, oranges and other citrus fruits, banana and papaya are widely cultivated fruit crops in the district. Spices such as turmeric, ginger and chillies are also produced in large quantities in the district. Yam, tapioca, colocasia, sweet potatoes are important tuber crops in the district. Cabbage, cauliflower, knolkhol, radish, carrot, tomato, brinjal, ridgegourd, pumpkin, ashgourd, bottle gourd, bitter gourd, okra etc. are widely grown vegetables in the district. Several other indigenous vegetables are prevalent in the district some of which are very rich in vitamins and minerals and pleasant

in taste and flavor. In spite of all these natural resource abundance, the development of horticulture is still in its initial stage.

The livestock sector occupies an important place in the economy of the district. Mixed farming involving crop and livestock integration has been a way of life of the farmers. Abundance of green fodder, availability of grazing land, suitable climate etc. makes the district favourable for dairy development. However, the commercial dairy farming is restricted to Nepali and Bihari communities only. The tribal farmers maintain small unit of few cattle and/or buffaloes. The rearing of pigs is most popular and traditional activity in Karbi Anglong. Almost all the tribal family rear one or two pigs in their backyard, but large scale pig farms are very rare. Commonly the local breeds are reared which are smaller in size, have low conversion ability and mature late. Presently cross breeds of pig become popular amongst the farmers because of its faster growth and bigger size. There is high market demand for pork. Pork is so popular in the district that serving of pork is almost certain in the feasts relating any social or religious function. The region offers a very congenial environment for goat rearing. The demand for mutton is quite high in the urban and the semi urban areas. But the goat rearing is yet to take off as commercial scale. Small backyard goatery units are maintained by most of the tribal families for sustenance or as a supplementary occupation. Similarly there is hardly any tribal family who do not rear a few birds in their house. Rearing of poultry is an age old practice among the local tribal people. But, poultry is also confined to back yard rearing while duckery in the water bodies wherever available. The demand for meat and egg far exceeds the production in the district and thus the demand is fulfilled from outside supply. However, in recent times, the broiler farming is gaining its popularity amongst the youth in the district.

Karbi Anglong occupies a dominant position in the map of sericulture activity in Assam. Sericulture is not only an economic activity but it is the heritage and culture of the tribal people in the district. Being a labour intensive and income generating agro-based industry, sericulture plays a major role in sustaining the economy of the district. About 40 per cent farm families are involved in sericulture activities.

Fishing is one of the oldest activities in the hill zone of Assam. Community fishing among Karbi people called 'Okepru' is an age-old practice. However, the district is not a major



producer of fish. The district can meet hardly the half of the demand for fish in the district. Nearly 90 per cent of the tribal population is non-vegetarian and their preference to fish is next to pork. The deficits in requirements are met by imports from outside the district.

### **1.10 Rational for the study**

Commercialization of livestock enterprises through scientific management practices is the need of the hour for enabling tribal farmers of Karbi Anglong as well as entire North East Region to increase their farm income and overcome poverty apart from attaining nutritional security. However, systematic information on existing resource utilization, management practices, productivity, profitability, problems, constraints etc. are conspicuous by their absence which are pre requisites for planning and proper execution of developmental programme. This study has, therefore, been conducted to examine the existing status of livestock sector, its profitability, constraints of production, need for technical and supportive intervention with special reference to Karbi, Dimasa and Bodo farmers in Karbi Anglong district of Assam.

### **1.11 Objectives**

The study was conducted to examine the existing status of livelihood sector, its profitability, constraints of production, need for technical and supportive intervention with special reference to Karbi, Dimasa and Bodo farmers in Karbi Anglong district of Assam with the following specific objectives:

1. To study the existing size, productivity and profitability of livestock enterprises
2. To examine the contribution of livestock enterprises to the total farm income
3. To examine the impact of the development programme implemented by concerned departments and to have farmers' response
4. To find out the production constraints and need for technical and supportive intervention

\$

# CHAPTER II

## REVIEW OF LITERATURE

C. S. Murty (1998) in his study on farm diversification and income in Andhra Pradesh found dairy as a rewarding enterprise. The percentage share of dairy enterprise to the total agricultural income was 13.15 per cent. The share was 0.83 per cent for fishery enterprise.

A. Ravishankar and Pratap S. Birthal (1999) reported that livestock sector plays critical role in the welfare of India's rural population. It contributed 9 per cent to Gross Domestic Product and employed 8 per cent of the labour force.

A.R. Verma and A. M. Rajput (2000) conducted a study on role of poultry enterprise in Indore district of Madhya Pradesh and reported that the net returns per layer amounted to Rs. 56.70, Rs. 52.61 and Rs. 49.74 on small, medium and large size poultry farms, respectively. Better breeding, feeding and management on small size poultry farms resulted in higher egg production and returns.

Irini Maltoglou and Kiyoshi Taniguchi (2004) in a study on poverty, livestock and household typologies found that livestock contributed significantly both in the farm for home consumption and agricultural cash income. Overall 3 out of 4 households owned livestock. In mountain and hilly areas every households owned livestock. Overall 87.7 per cent of the households owned cows, buffalos or yaks while 54.8 per cent of households owned sheep and goats and 51.2 per cent of households owned poultry. Few households (10 %) owned pig.

Irini Maltoglou and George Rapsomanikis (2006) conducted a study to assess the role that livestock play for poor households in Vietnam and found that most of the rural household owned livestock and earned a considerable portion of their income from livestock. Rural households derived 25 per cent to 30 per cent of their agricultural income from livestock. Pigs generated the highest average livestock income in all types of households considered under the study followed by poultry. Pigs were found important in

determining the position of households relative to poverty threshold. They opined that policy oriented at improving pig production could significantly contribute to poverty alleviation in rural Vietnam.

S. Kazybayeva, J. Otte and D. Rolan Holst (2006) in their study to examine structure of household's income and to elucidate the role of livestock for the rural population of Senegal found that 68 per cent of households had farming as their principal occupation. Livestock production was carried out by approximately every second rural households (55 %). However, the overall contribution of agriculture and livestock keeping to household income was relatively low corresponding to the large number of households engaged in these activities. The low return from livestock was due to the low production level in the sector and weak links of livestock producers to markets.

Shantanu Kumar, Radha Krishan and S. Nigam (2008) noted livestock as an integral component of farming system in Indian agriculture. Households having less than 2 hectares of land possessed a large share of livestock. Landless, marginal and small farmers owned 84 per cent of the total livestock.

G.T. Gopala et al. (2010) conducted a study on constraints in goat farming and found that goat keepers in Bidar district of Karnataka state had constraints pertaining to availability of fodder during summer season, disease problems, wild animal's attacks on goats, problem of ticks and housing problem in rainy and winter season.

G.T. Gopala et al. (2010) in their study to assess the impact of goat rearing among livestock interest groups on empowerment of rural poor revealed goat rearing as an income generating activity. A small unit of four goats provided 180 mandays of annual employment and an average income of Rs. 26560.00 per number in a span of about two years.

L K Mabe, M A Antwi and O I Oladele (2010) in their study in North west province, South Africa found livestock as an integral component farming systems. Livestock contributed a large proportion of the income of farmers with small land holdings. In general, women were more involved in livestock production, especially small

ruminants. Among different livestock the highest income was derived from cattle followed by sheep.

Abdul Sami Musa Ibrahim, Xu Shiwei and Yu Wen (2013) observed that livestock was not only an important source of food and income, but also the sign of assets in rural areas for poor people. The livestock raised in the rural areas were mainly cow, sheep and goat with very few camels. It was found that 32 per cent of households depended on livestock activity as their main income source.

\$

# CHAPTER III

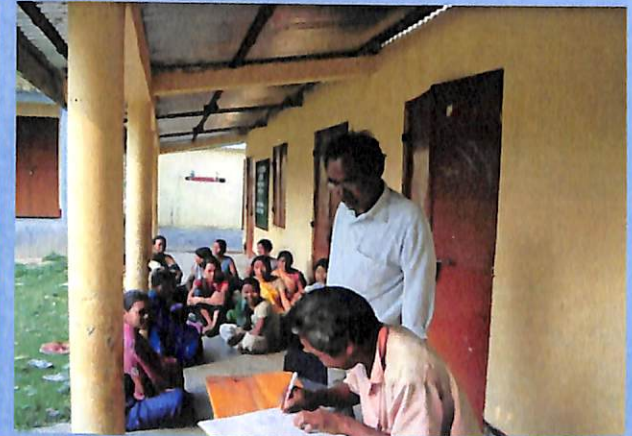
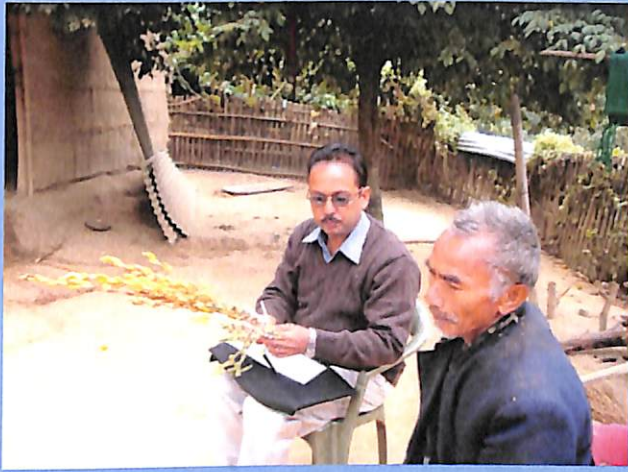
## METHODOLOGY

### 2.1 Sample Selection

The study was conducted in Karbi Anglong district of Assam using multistage random sampling procedure. In first stage of sampling, 6 localities of Karbi, Dimasa and Bodo majority areas spreading over the different corners of the district were randomly selected for the study. In second stage of sampling, all the Karbi, Dimasa and Bodo villages from these 6 selected localities were listed out and 24 villages, 8 villages from each of Karbi, Dimasa and Bodo communities were randomly selected from the list. In third stage, 20 number of farm households from each of the selected villages were selected randomly through lottery method without replacement. This resulted an ultimate sample of 480 number of farm households comprising 160 number of farm households from Karbi community, 160 number of farm households from Dimasa community and 160 farm households from Bodo community.

### 2.2 Data collection

The study was based on primary as well as secondary data. Primary data were collected from sample farmers by Participatory Rural Appraisal (PRA) technique such as Focus Group Discussion (FGD) and by Personal Interview method. For Personal Interview method, a specially designed pre tested schedule was used for data collection. Secondary data were collected through personal discussion with the officials of related departments and from various published and unpublished sources.



**DATA COLLECTION**

### 2.3 Analytical Tools

Simple tabular analyses were carried out for the analysis of data and logical interpretation of different aspects and results of the study.

The cost of cultivation was worked out by using standard cost concepts as defined and used in the economics of farm management.

**Variable cost** = All costs incurred in cash or kind on all material inputs. Hired human labour, bullock labour, machinery used and interest on working capital

**Cost A1** = All variable costs + Depreciation, repairs and other miscellaneous charges

**Cost A2** = Cost A1 + Rental value of leased in land

**Cost B** = Cost A2 + Rental value of own land

**Cost C** = Cost B + Imputed value of family labour

The gross income and farm business income were worked as follows,

**Gross income** = Total production X net price received by the producer

**Farm business income** = Gross income – Cost A1

**Family labour income** = Gross income – Cost B

**Net income** = Gross income – Cost C

\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$

# CHAPTER IV

## RESULTS AND DISCUSSION

### 4.1 Socio-Economic Characters of Sample Farmers

The socio-economic characters of the sample farmers are closely related with their economic activities. It helps in explaining the results of the investigation. Hence, an attempt has been made to discuss briefly some of the socio-economic variables such as family size, age and sex, level of education, farm family occupation, land resource and its use for the sample farmers of the study.

### 4.2 Demographic Features

Farm family size plays an important role in selection of enterprises and their scale of operation. The potential labour force of a farm family can be worked out from the distribution of family members according to their sex and age. It is more important in subsistence tribal farms as the most of the agricultural operations under such group of farms are carried out by family labour. Table 1 shows the distribution of the sample population according to their age and sex.

Table 1: Distribution of the sample population ( Nos.) according to their age and sex, 2013-14

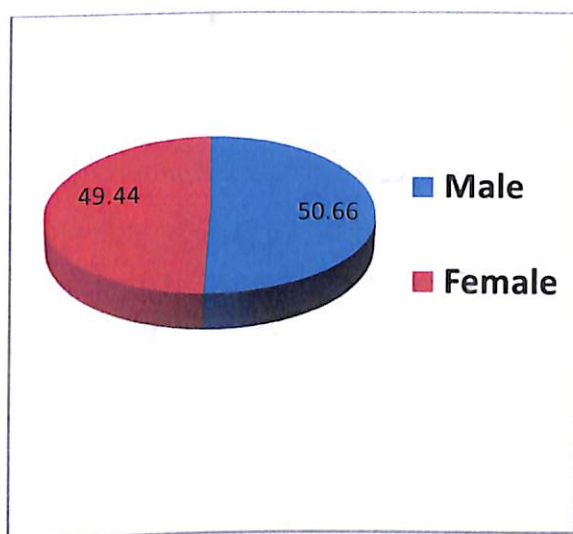
Community	Total sample population			Below 18 years			18 to 60 years			Above 60 years		
	M	F	T	M	F	T	M	F	T	M	F	T
Karbi	502 <i>50.91</i>	484 <i>49.09</i>	986 <i>100.00</i>	210 <i>21.30</i>	209 <i>21.20</i>	419 <i>42.50</i>	266 <i>26.98</i>	243 <i>24.65</i>	509 <i>51.62</i>	26 <i>2.64</i>	32 <i>3.25</i>	58 <i>5.88</i>
Dimasa	491 <i>50.88</i>	476 <i>49.22</i>	967 <i>100.00</i>	196 <i>20.27</i>	201 <i>20.79</i>	397 <i>41.05</i>	264 <i>27.30</i>	239 <i>24.72</i>	503 <i>52.02</i>	31 <i>3.21</i>	36 <i>3.72</i>	67 <i>6.93</i>
Bodo	474 <i>50.27</i>	469 <i>49.73</i>	943 <i>100.00</i>	205 <i>21.74</i>	197 <i>20.89</i>	402 <i>42.63</i>	237 <i>25.13</i>	233 <i>24.71</i>	470 <i>49.84</i>	32 <i>3.39</i>	39 <i>4.14</i>	71 <i>7.53</i>
Total	1467 <i>50.66</i>	1429 <i>49.34</i>	2896 <i>100.00</i>	611 <i>21.10</i>	607 <i>20.96</i>	1218 <i>42.06</i>	767 <i>26.48</i>	715 <i>24.69</i>	1482 <i>51.17</i>	89 <i>3.07</i>	107 <i>3.69</i>	196 <i>6.77</i>

\*Figures in Italics indicate percentage

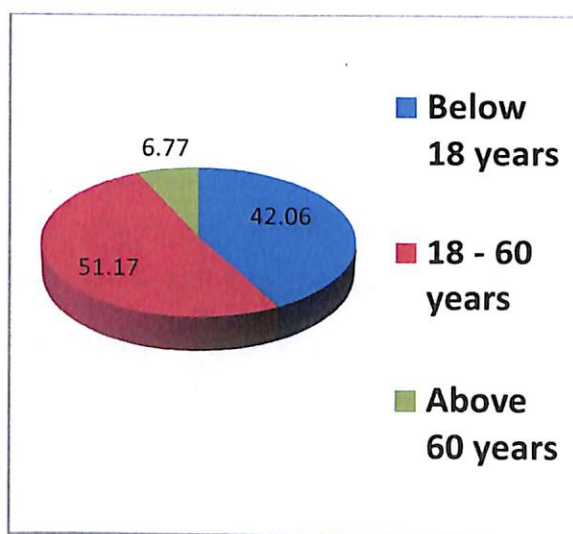
Source: Primary data collected from sample farmers



Table shows that, out of total sample population of 50.66 per cent were male and 49.34 per cent were female. Distribution of population according to age indicated that 42.06 per cent of populations were below the age of 18 years and 6.77 per cent of population were above the age of 60 years while 51.17 per cent of populations were in the age group of 18 – 60 years which supplied the main work force for different farm and nonfarm activities. The demographic pattern was almost similar in the sample households belong to Karbi, Dimasa and Bodo communities. The average family size in the total sample households was found to be 6.



**Fig 2A: Distribution of total sample population (%) according to sex**



**Fig 2B: Distribution of total sample population (%) according to age group**

### 4.3 Educational Status

Literacy helps in making rational farm and home decisions in a socio-economic environment. Commercialization of farm activities is very much dependent on the level of education of the farmer. Table 2 shows the distribution of the sample population according to their level of literacy.

Table 2: Distribution of the sample population (Nos.) according to their level of literacy, 2013-14

Community	Illiterate	Literate						Total
		Primary level	M.E. level	HSLC passed	HSSLC passed	Graduate & above	Others	
Karbi	183 <i>18.56</i>	224 <i>22.72</i>	267 <i>27.08</i>	186 <i>18.86</i>	69 <i>7.00</i>	25 <i>2.54</i>	32 <i>3.24</i>	803 <i>81.44</i>
Dimasa	195 <i>20.17</i>	259 <i>26.78</i>	243 <i>25.13</i>	156 <i>16.13</i>	67 <i>6.93</i>	20 <i>2.07</i>	27 <i>2.79</i>	772 <i>79.83</i>
Bodo	176 <i>18.66</i>	228 <i>24.18</i>	264 <i>28.00</i>	147 <i>15.59</i>	73 <i>7.74</i>	24 <i>2.54</i>	31 <i>3.29</i>	767 <i>81.34</i>
Total	554 <i>19.13</i>	711 <i>24.55</i>	774 <i>26.73</i>	489 <i>16.89</i>	209 <i>7.22</i>	69 <i>2.38</i>	90 <i>3.12</i>	2342 <i>80.87</i>

\*Figures in Italics indicate percentage

Source: Primary data collected from sample farmers

Table 2 shows that the literacy percentage of sample population under Karbi, Dimasa and Bodo communities was 81.44, 79.83 and 81.34 per cent, respectively. The average literacy of total sample population was 80.87 per cent. However, out of total literates in all the communities, majority of them possessed only primary and M.E. level of education. On an average 24.55 per cent of total sample population had primary level of literacy, 26.73 per cent had ME level of education, 16.89 per cent were HSLC passed, 7.22 per cent were HSSLC passed and 2.38 per cent were graduate and above .

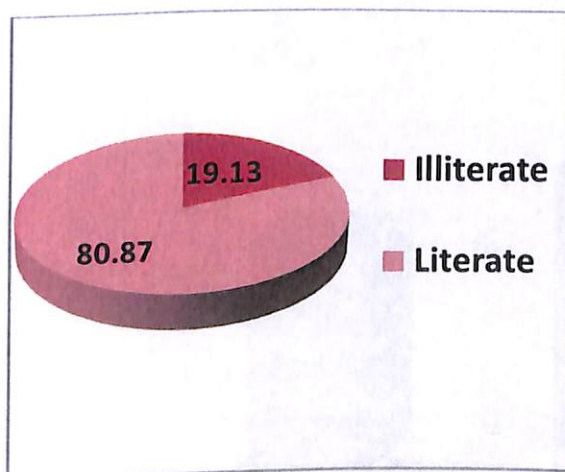


Fig3A: Proportion of literate and illiterate in total sample population

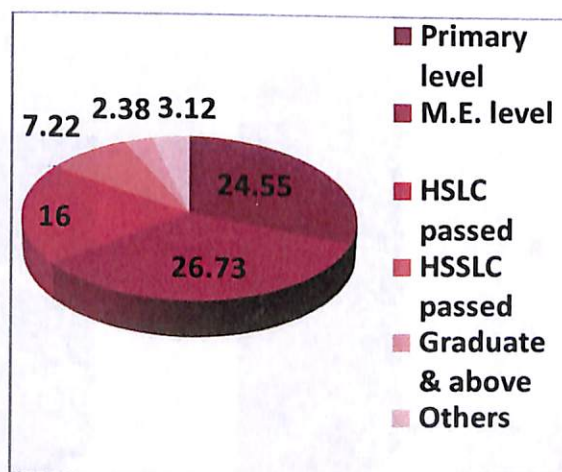


Fig 3B: Distribution of total literate population according to the level of literacy

#### 4.5 Working Status

Based on time spent exclusively for farm activities family members were categorized as full-time worker, part-time worker and non-worker. A person who works 183 days or more in farming by devoting 8 hours a day was considered as full-time worker and one who devotes less than the stipulated period was considered as part-time worker. A non-worker rarely renders his service in farming or does not work in the farm at all. Table 3 represents the distribution of the sample population according to their working status.

Table 3: Distribution of sample population (Nos.) according to working status, 2013-14

Community	Full time worker	Part time worker	Non worker	Total
Karbi	231 <i>23.43</i>	331 <i>33.57</i>	424 <i>43.00</i>	986 <i>100.00</i>
Dimasa	239 <i>24.71</i>	341 <i>35.26</i>	387 <i>40.02</i>	967 <i>100.00</i>
Bodo	255 <i>27.04</i>	300 <i>31.81</i>	388 <i>41.15</i>	943 <i>100.00</i>
Total	725 <i>25.03</i>	972 <i>33.56</i>	1199 <i>41.40</i>	2896 <i>100.00</i>

\*Figures in Italics indicate percentage

Source: Primary data collected from sample farmers

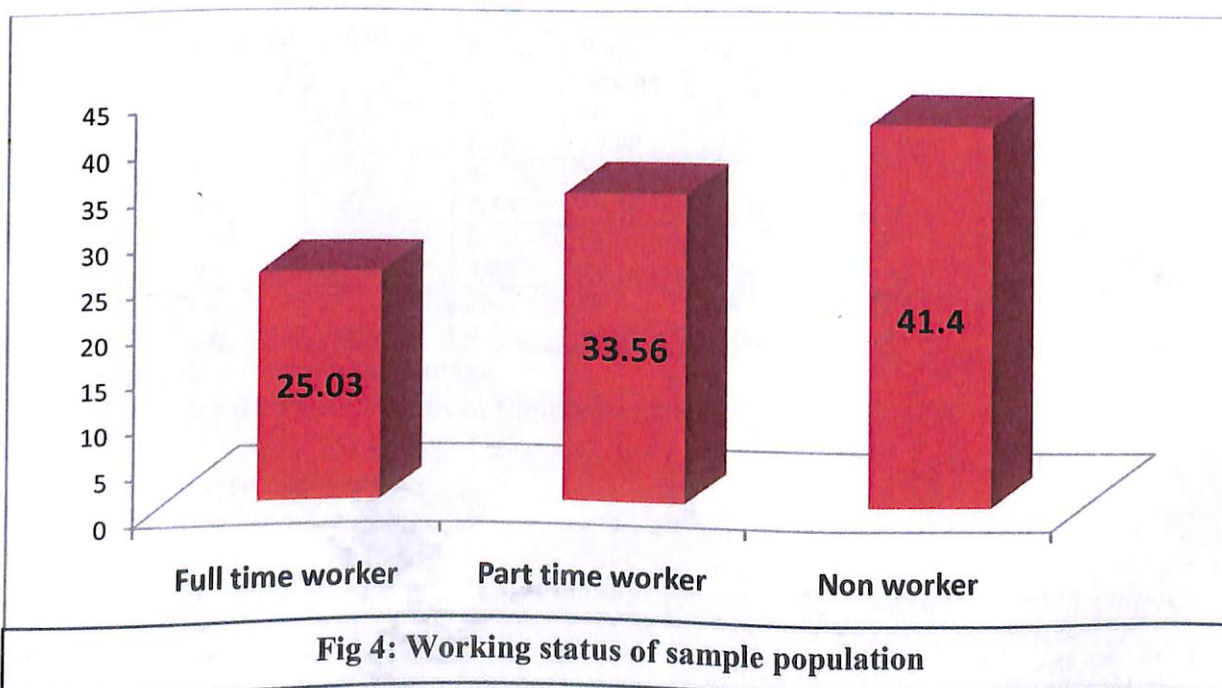


Fig 4: Working status of sample population

Table 3 reveals that, out of total sample population 25.03 per cent were full-time workers, 33.56 per cent were part time workers and 41.40 per cent were non-workers. In all three communities, proportion of part-time workers was higher than full-time workers. Percentage of full-time workers was slightly higher in the sample farms of Bodo communities than the Karbi and Dimasa communities.

#### 4.6 Occupational Status

The distribution of sample farmers according to their occupations indicates that 46.87 per cent of total sample households possessed only one source of livelihood while 53.13 per cent of households possessed secondary source of income. Agriculture was the primary source of livelihood for 77.92 percent of sample households while 10.83 per cent of households were dependent on wage earning activity as their primary source of income. Only 7.08 per cent of households primarily earned their income from business while 4.17 per cent earned their livelihood from service. Agriculture was found the secondary source of livelihood for 22.08 per cent of households while 18.96 per cent households were involved in wage earning activities for their secondary source of income.

Table 4: Distribution of sample farmers (Nos.) according to their occupations, 2013-14

Community	Primary occupation				Secondary occupation			
	Agriculture	Business	Service	Wage earning	Agriculture	Business	Service	Wage earning
Karbi	122 <i>76.25</i>	12 <i>7.50</i>	10 <i>6.25</i>	16 <i>10.00</i>	38 <i>23.75</i>	19 <i>11.88</i>	6 <i>3.75</i>	29 <i>18.13</i>
Dimasa	124 <i>77.50</i>	9 <i>5.63</i>	4 <i>2.50</i>	23 <i>14.38</i>	36 <i>22.50</i>	10 <i>6.25</i>	4 <i>2.50</i>	38 <i>23.75</i>
Bodo	128 <i>80.00</i>	13 <i>8.13</i>	6 <i>3.75</i>	13 <i>8.13</i>	32 <i>20.00</i>	15 <i>9.38</i>	4 <i>2.50</i>	24 <i>15.00</i>
Total	374 <i>77.92</i>	34 <i>7.08</i>	20 <i>4.17</i>	52 <i>10.83</i>	106 <i>22.08</i>	44 <i>9.17</i>	14 <i>2.92</i>	91 <i>18.96</i>

\*Figures in Italics indicate percentage

Source: Primary data collected from sample farmers

#### 4.7 Land Resource and Its Use

Land is the main input of agricultural production system which determines the volume of production as well as efficiency in using other resources. The size and type of land

influence the cropping pattern and scale of production. The land utilization pattern of sample farmers is presented in the table 5.

Table 5: Land utilization (hectares) pattern of sample farms, 2013 – 14

Community	Total land resource	Land unfit for agril. purpose	Land used for non agril. purpose	Land kept fallow	Operational holding	Land under perennial crops and trees	Land under field crops
Karbi	2.98	0.31	0.10	0.38	2.19	0.47	1.72
Dimasa	2.69	0.25	0.12	0.31	2.01	0.52	1.49
Bodo	2.32	0.17	0.14	0.14	1.87	0.36	1.51
Total	2.66	0.24	0.12	0.28	2.02	0.45	1.57

Source: Primary data collected from sample farmers

In pooled situation, the average size of land resource of the sample farmers was estimated to be 2.66 hectares of which 9.02 per cent were unfit for cultivation, 4.51 per cent were used for non-agricultural purpose and 10.53 per cent were kept fallow. The average operational holdings of the sample farmers was 2.02 hectares of which 0.45 hectares were occupied by perennial crops and trees and the rest 1.57 hectares were found under field crops. The average size of operational holdings was slightly higher in Karbi community followed by Dimasa community.

#### 4.8 Existing Agricultural Status

Crop was observed as the main enterprise for majority of the sample farmers from all the three communities. However, livestock enterprise was found to play an important role on the economy of all the sample farmers. All most all the sample farmers in the study area were found to practice integrated farming system integrating different farm enterprises such as crop, livestock, sericulture, fishery, forestry etc. in different combination. Most of the farms were subsistence in nature and their marketable surplus was very low. They generally produced to meet their home consumption and marketed only the left over portion. The major farming system followed by the sample farmers were:

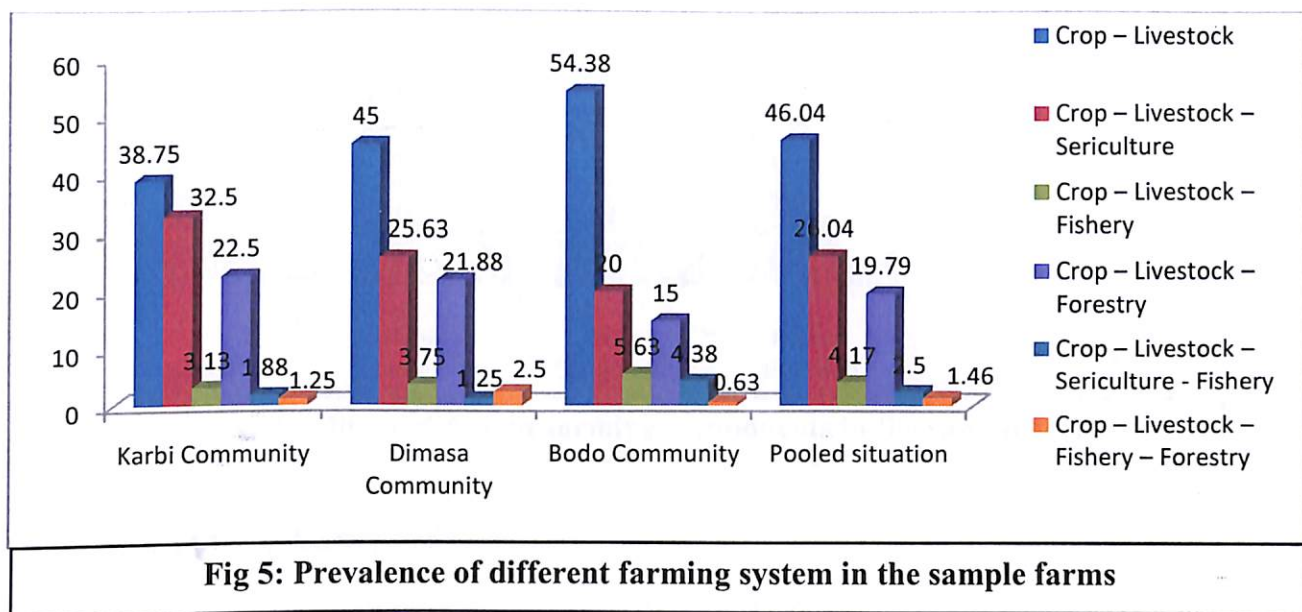
1. Crop – Livestock
2. Crop – Livestock – Sericulture
3. Crop – Livestock – Fishery
4. Crop – Livestock – farm forestry
5. Crop – Livestock – Sericulture – Fishery
6. Crop – Livestock – Fishery – Farm forestry

The distribution of sample farmers according to the different farming system followed by them during the time of investigation showed that crop – livestock system was the most prevalent system amongst the sample farmers of all three communities. More than forty five per cent of sample farmers were found to follow this system. The second most prevailing system was crop - livestock – sericulture system. This system was found to practice by 26.05 per cent of sample households under present study. (Table 6 & Fig 5)

Table 6: Distribution of sample farmers (Nos.) according to the different farming system followed by them, 2013- 14

Farming System	Karbi Community	Dimasa Community	Bodo Community	Total
Crop – Livestock	62	72	87	221
Crop – Livestock – Sericulture	52	41	32	125
Crop – Livestock – Fishery	5	6	9	20
Crop – Livestock – Farm forestry	36	35	24	95
Crop – Livestock – Sericulture – Fishery	3	2	7	12
Crop– Livestock– Fishery– Farm forestry	2	4	1	7
Total	160	160	160	480

Source: Primary data collected from sample farmers



**Fig 5: Prevalence of different farming system in the sample farms**

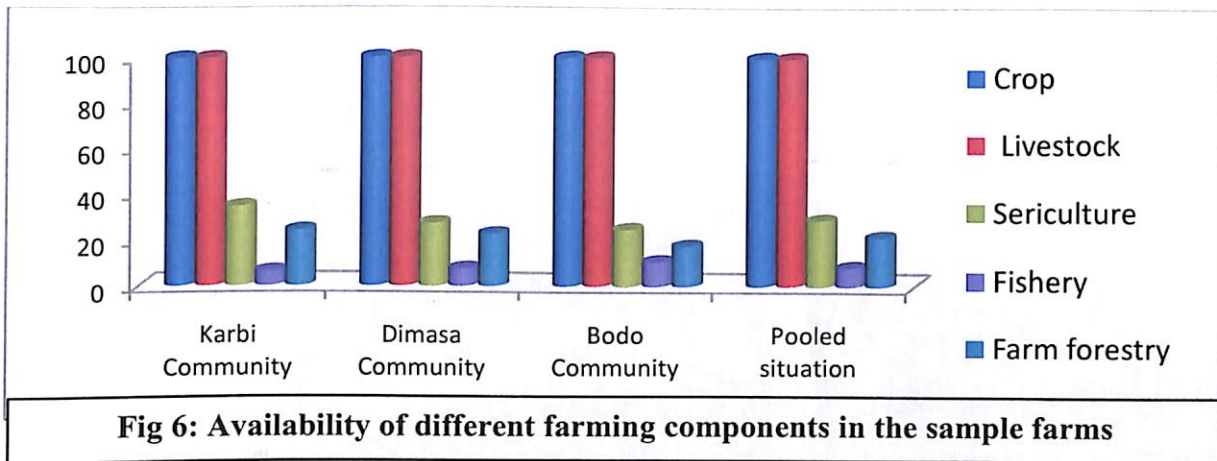
Again, the distribution of sample farmers according to farming component showed that all the sample farmers from all three communities grew crops and reared at least one kind of livestock in their farms. In pooled situation the proportion of sample famers found to involve in sericulture, fishery and forestry activities were 28.54 per cent, 8.13 per cent and 21.25 per cent, respectively. Sericulture and farm forestry were more prevalent in Karbi community while fishery component was found slightly higher in Bodo community. (Table 7 & Fig. 6)

Table 7: Distribution of sample farmers (Nos.) according to the farming component,

2013- 14

Farming Component	Karbi Community	Dimasa Community	Bodo Community	Total
Crop	160	160	160	480
Livestock	160	160	160	480
Sericulture	55	43	39	137
Fishery	10	12	17	39
Farm forestry	38	36	28	102

Source: Primary data collected from sample farmers



**Fig 6: Availability of different farming components in the sample farms**

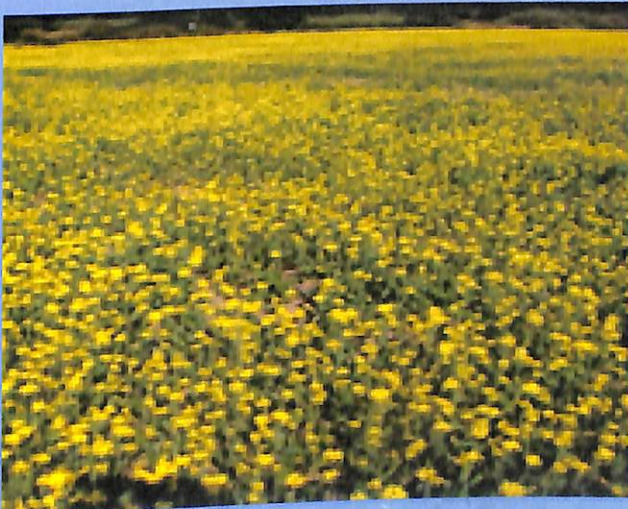
#### 4.8.1 Status of Crop Enterprise

The major crops grown by the sample farmers were rice, maize, rape seed, sesame, summer and winter vegetables, ginger, turmeric, pineapple, banana and areca nut. Some of the farmers started rubber plantation in the recent years. On the hill slope, sample farmers were found to follow two types of cultivation practices- shifting cultivation and settled cultivation. Under shifting cultivation farmers grew rice, maize, sesame, vegetables, ginger, turmeric etc. either in mix cropping system or as single crop. Under settled cultivation farmers used to grow pineapple, banana, papaya, areca nut, rubber, bamboo and small number of other fruit crops like mango, jackfruit etc. In low laying and plain areas, sample farmers grew their food grains and horticultural crops as single crop. However, most of the cultivated area of the sample farmer was confined to mono-cropping. In pooled situationm the per farm gross cropped area of the sample farms was observed to be 2.13 hectares. It was 2.29 hectares in case of Karbi community, 2.01 hectares in case of Dimasa community and 2.08 hectares in case of Bodo community. The average cropping intensity of the sample farmers was 1.33 per cent in case of Karbi farmers, 1.35 per cent in case of Dimasa farmers and 1.38 per cent in case of Bodo farmers.

##### 4.8.1.1 Crop varieties grown

In case of *Sali* rice, sample farmers grew both high yielding varieties and their own traditional varieties. 'Ranjit' and 'Mahshuri' were found two most preferred and well accepted high yielding varieties of the sample farmers which occupied around 45 per cent





**CROP ACTIVITIES OF SAMPLE FARMERS**

area under *Sali* rice. The widely grown and highly preferred farmer's own *Sali* rice variety was 'Gaya'. About 25 per cent of *Sali* rice area was observed under rice variety 'Gaya'. For maize and sesame, sample farmers used to grow their traditional varieties. In case of other crops like rape seed, pulses, ginger, turmeric and vegetables most of the sample farmers were found ignorant about the varieties. They used to grow whatever seed or planting materials became available with them or in the market.

#### **4.8.1.2 Cultural practices**

Most of the sample farmers used to grow almost all the crops with their traditional way and style. The use of recommended scientific cultural practices was rarely observed amongst the sample farmers. It was because of their ignorance about the modern practices or sometimes because of their lack of interest. Capital intensive nature of modern cultural practices also restricted the farmers to their traditional ways of cultivation. Use of manure and fertilizer and other agricultural chemicals were also found very limited. Supply of irrigation water was almost nil in the fields of sample farmers. Though some infrastructures for irrigation were observed in certain areas, most of these were found nonfunctioning and farmers were completely dependent on rainfall for watering their crops. As reported by the sample farmers, the lack of irrigation was the most limiting factors for increasing crop productivity as well as for multiple cropping.

#### **4.8.1.3 Crop productivity**

The average area, productivity and production of different crops grown by the sample farmers are presented in the table 8.

Table shows that the productivities of all the crops in the sample farms were low. It was because of traditional method of cultivation, rainfed agriculture, lower use of manures and fertilizer etc. Rice was the dominating crop occupying around 60 per cent of gross cropped area of the sample farms. The average productivity of rice crop in the study area was 28.74 quintal per hectare. In respect of productivity, there was very little variation among the farms of different communities included under the study. However, sample farmers showed large variation regarding the total production of rice per year per farm. This was

mainly contributed by the difference in per farm area under rice. The average annual production of rice was 36.10 quintal per farm.

Table 8: Average area, yield and production of major crops grown by the sample farmers, 2013-14

Crop	Community									Pooled		
	Karbi			Dimasa			Bodo					
	A ha	Y q/ha	P q/farm	A ha	Y q/ha	P q/farm	A ha	Y q/ha	P q/farm	A ha	Y q/ha	P q/farm
Rice	1.32	27.36	36.12	1.18	28.68	33.84	1.27	30.18	38.33	1.26	28.74	36.10
Maize	0.08	24.30	1.94	0.06	22.86	1.37	0.04	21.05	0.84	0.06	22.74	1.36
Sesame	0.12	5.56	0.67	0.09	4.32	0.39	0.05	4.15	0.21	0.09	4.67	0.42
Toria	0.08	6.27	0.50	0.09	6.14	0.55	0.11	6.68	0.73	0.09	6.36	0.57
Blackgram	0.03	7.88	0.24	0.03	7.24	0.22	0.03	7.36	0.22	0.03	7.49	0.22
Ginger	0.10	84.54	8.45	0.08	86.08	6.89	0.07	80.20	5.61	0.08	83.61	6.69
Turmeric	0.07	93.76	6.56	0.07	91.43	6.40	0.06	87.57	5.25	0.07	90.92	6.36
Chilli	0.04	30.89	1.24	0.04	32.48	1.30	0.04	36.25	1.45	0.04	33.21	1.33
Brinjal	0.04	44.30	1.77	0.04	47.90	1.92	0.04	45.21	1.81	0.04	45.80	1.83
Potato	0.02	43.26	0.87	0.03	40.68	1.22	0.03	40.92	1.23	0.03	41.62	1.25
Tomato	0.02	60.17	1.20	0.03	58.84	1.77	0.04	64.02	2.56	0.03	61.01	1.83
Radish	0.02	32.78	0.66	0.02	37.23	0.74	0.03	40.55	1.22	0.02	36.85	0.74
Cabbage	0.02	54.40	1.09	0.03	56.76	1.70	0.03	60.82	1.82	0.03	57.33	1.72
Cauliflower	0.01	33.18	0.33	0.02	34.26	0.69	0.03	37.95	1.14	0.02	35.13	0.70
Knolkhol	0.01	23.36	0.23	0.01	24.10	0.24	0.01	27.08	0.27	0.01	24.85	0.25
Cowpea	0.04	22.46	0.90	0.03	18.56	0.56	0.03	20.66	0.62	0.03	20.56	0.62
Okra	0.03	36.34	1.09	0.02	37.54	0.75	0.03	32.87	0.99	0.03	35.58	1.07
Pineapple	0.05	86.34	4.32	0.05	89.20	4.46	0.04	94.56	3.78	0.05	90.03	4.19
Papaya	0.01	68.40	0.68	0.01	76.28	0.76	0.01	72.52	0.73	0.01	72.40	0.72
Banana*	0.04	1275	51	0.05	1360	68	0.06	1500	90	0.05	1378	70
Arecanut	0.05	43.75	2.19	0.06	40.80	2.45	0.06	49.66	2.98	0.06	44.74	2.54
Coconut**	0.02	4506	90	0.02	5408	108	0.02	6850	137	0.02	5588	112

\*Number of bunch      \*\*Number      A= Area      Y= Yield      P= Production

Source: Primary data collected from sample farmers

#### 4.8.1.4 Income from crop enterprise

Per farm average incomes from crop enterprise for the financial year 2013-14 was derived by summing up the average farm business income from all the crops during that year. Table 9 shows the average costs incurred and gross income and farm business income received by the sample farmers from different crops during the year 2013-14.

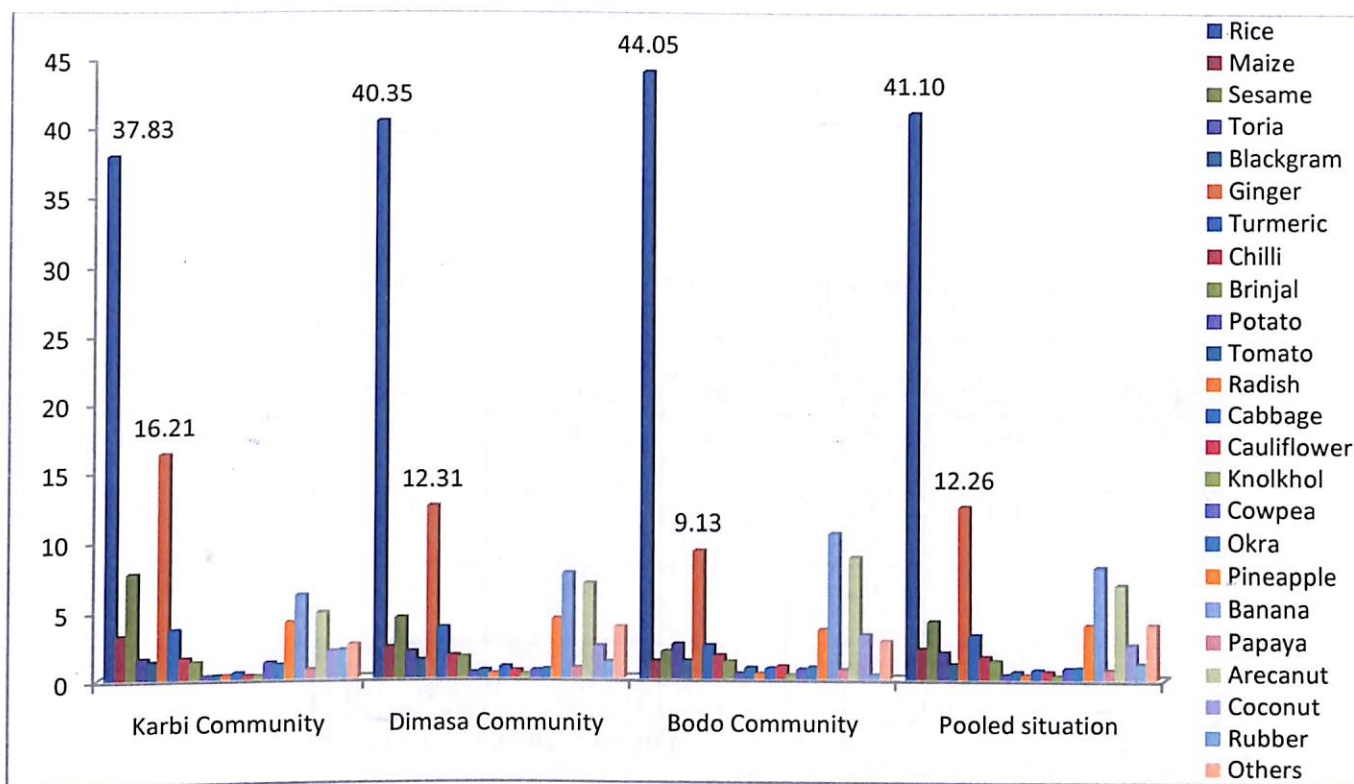
Table 9: Costs and returns (Rs./farm) of different crops grown by the sample farmers, 2013-14

Crop	Community									Pooled		
	Karbi			Dimasa			Bodo					
	Gross income	Cost	Farm business income	Gross income	Cost	Farm business income	Gross income	Cost	Farm business income	Gross income	Cost	Farm business income
Rice	29314	11682	17632	31302	12350	18952	35877	13464	22413	32498	12499	19999
Maize	2228	752	1476	1604	548	1056	998	352	646	1610	551	1059
Sesame	4360	856	3551	2802	1048	2054	1480	674	1006	2881	859	2022
Toria	1320	674	708	1630	723	907	2180	914	1266	1710	770	940
Blackgram	1028	325	603	1020	602	618	1040	578	662	1029	502	527
Ginger	15010	7547	7554	12102	6322	5780	9898	5254	4644	12337	6374	5963
Turmeric	5576	3901	1675	5240	3529	1711	4443	3218	1225	5086	3549	1537
Chilli	1468	749	719	1530	768	762	1710	858	852	1569	792	777
Brinjal	1406	817	589	1536	822	714	1428	795	633	1457	811	646
Potato	957	880	77	1205	1030	175	1210	1018	192	1124	976	148
Tomato	528	406	122	784	523	261	1132	732	400	815	554	261
Radish	264	136	128	296	154	142	388	196	192	316	162	154
Cabbage	438	229	209	680	302	378	726	342	384	615	291	324
Cauliflower	231	121	110	483	241	242	798	342	456	504	235	269
Knolkhol	207	106	101	216	98	118	243	102	141	222	102	120
Cowpea	1020	459	561	606	345	261	682	334	348	769	379	390
Okra	817	338	479	542	246	296	734	312	422	698	299	399
Pineapple	4536	2627	1909	4483	2470	2013	3869	2067	1802	4296	2388	1908
Banana	4845	2033	2812	6060	2513	3547	8250	2973	5277	6385	2506	3879
Papaya	476	168	308	536	187	349	514	174	340	509	176	333
Arecanut	3475	1238	2237	5025	1822	3203	6250	1846	4404	4917	1635	3282
Coconut	1350	419	931	1628	526	1102	2192	565	1627	1723	503	1220
Rubber	1904	936	968	1225	648	577	378	219	159	1169	601	568
Others	2005	854	1151	2810	1058	1752	2355	967	1388	2390	460	1930
Total	84763	38253	46610	85345	38875	46970	88775	38296	50879	86629	37974	48655

Source: Primary data collected from sample farmers

It is observed that average annual income of the sample farms from the crop enterprise was Rs. 48655.00. Among the three communities considered in the present study, the average annual income derived from crop enterprise was slightly higher in case of Bodo community (Rs. 50879.00) followed by Dimasa community (Rs. 46970.00). It was the lowest in Karbi community (Rs. 46610.00).

Rice, maize, sesame, ginger, turmeric, pineapple, banana, areca nut, coconut and bamboo are the major crops in respect of their contribution to the total income derived from crop enterprise. In pooled situation, rice alone contributed 41.10 per cent to the total income from crop enterprise. The share of rice to the total crop income was 37.83 per cent, 40.35 per cent and 44.05 per cent in Karbi, Dimasa and Bodo communities respectively. Ginger was found in second position contributing 12.26 per cent of total crop income followed by banana (7.97 per cent), areca nut (6.75), sesame (4.16) and pineapple (3.92).



**Fig 7: Per cent contribution of different crops to the total income from crop enterprise**

#### 4.8.2 Status of Livestock Enterprise

Livestock enterprise was found to play a vital role on the economy of the sample farmers under present study. All the sample farmers reared at least one or more kinds of livestock along with their crops as a supplementary source of income apart from meeting their family consumption. In a sizable number of sample farms, average annual income derived from livestock enterprise were more than the average annual income derived from crop enterprise. The different livestock reared by the sample farmers were cattle, buffalo, pig, goat, poultry and duck. The distributions of sample farmers according to the livestock component they reared are presented in the table 10 and figure 8.

It shows that poultry, goat and pig were more common amongst the sample farmers under present study. In pooled situation the highest (88.13 per cent) number of sample farmers was found to rear poultry followed by goat (72.71 per cent) and pig (68.75 per cent). Cattles were found mainly with the farmers from Dimasa (39.38 per cent) and Bodo

community (46.25). In case of Karbi community, only 11.88 per cent of farmers were found to maintain cattle in their farms. In pooled situation the percentage of sample farmers having duck were 15.42 per cent while only 5.83 per cent of sample farmers were found to maintain buffalo.

Table 10: Distribution of sample farmers (Nos.) according to livestock component they reared, 2013-14

Situation	Livestock					
	Cattle	Buffalo	Pig	Goat	Poultry	Duck
Karbi community	19	4	117	108	144	13
Dimasa community	63	13	100	121	140	22
Bodo community	74	11	113	120	139	39
Pooled	156	28	330	349	423	74

Source: Primary data collected from sample farmers

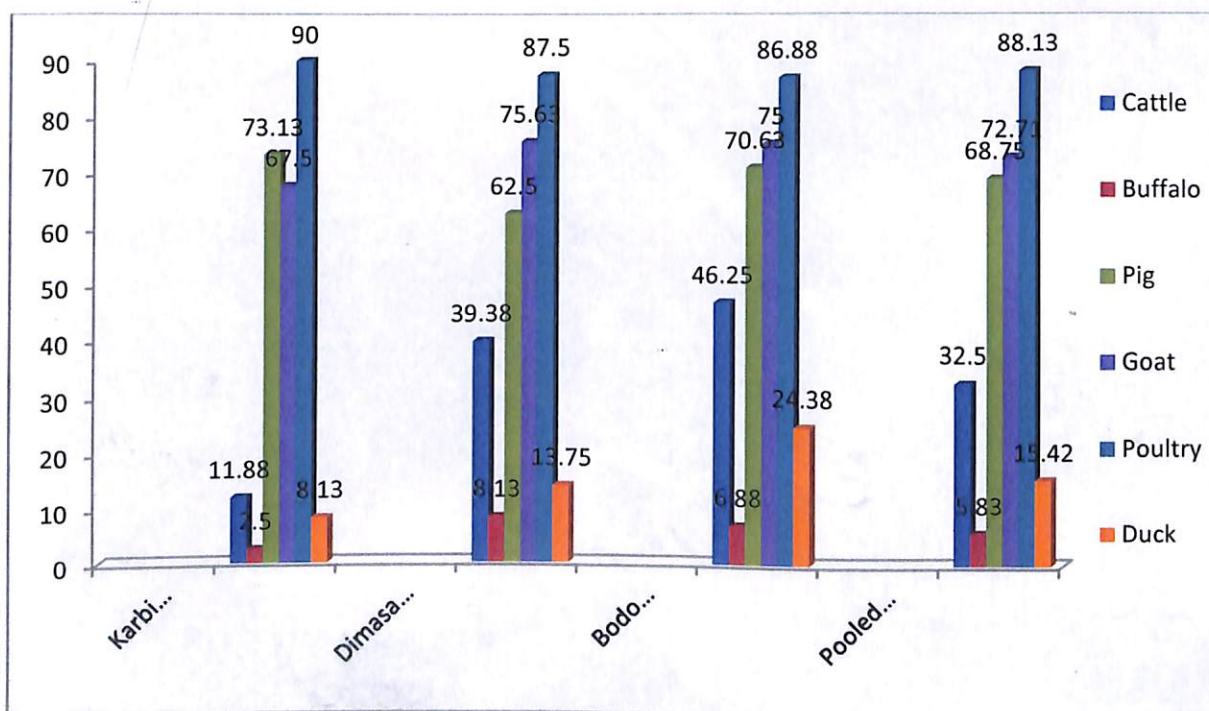


Fig 8: Availability of different livestock components in the sample farms



**LIVESTOCK ACTIVITIES OF SAMPLE FARMERS**

#### 4.8.2.1 Livestock system

Majority of the sample farmers under the present study were found to keep small units of more than one kind of livestock in their farming system. This diversification was mainly to minimize production risk and to allocate the scarce family resources optimally. The distribution of sample farmers according to the combinations of livestock they maintained was examined and is presented in the table 10 figure 9.

Table 11: Distribution of sample farmers (Nos.) according to livestock combination they reared, 2013-14

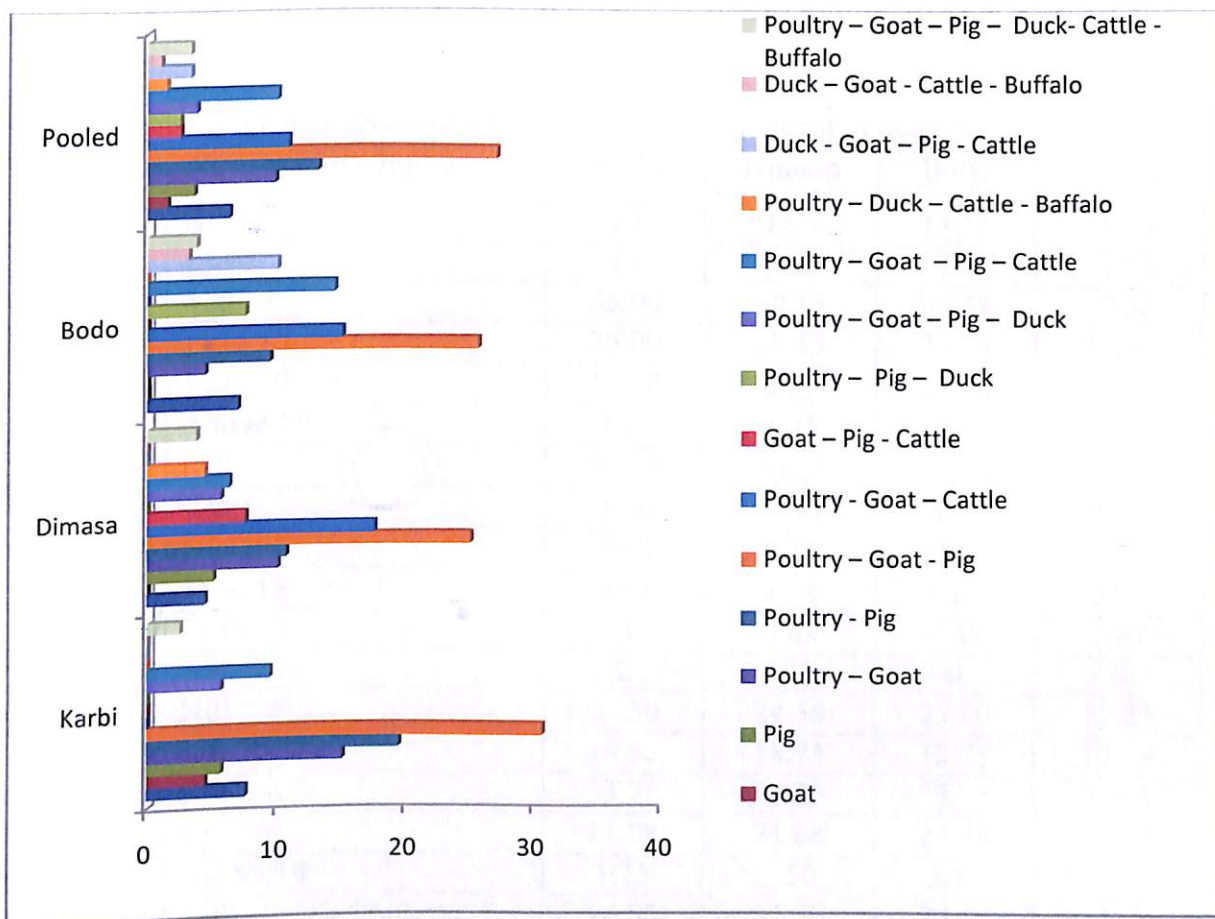
Livestock combination obtained	Number of household involved			
	Karbi	Dimasa	Bodo	Total
Poultry	12	7	11	30
Goat	7	0	0	7
Pig	9	8	0	17
Poultry – Goat	24	16	7	47
Poultry - Pig	31	17	15	63
Poultry – Goat - Pig	49	40	41	130
Poultry - Goat – Cattle	0	28	24	52
Goat – Pig - Cattle	0	12	0	12
Poultry – Pig – Duck	0	0	12	12
Poultry – Goat – Pig – Duck	9	9	0	18
Poultry – Goat – Pig – Cattle	15	10	23	48
Poultry – Duck – Cattle - Buffalo	0	7	0	7
Duck - Goat – Pig - Cattle	0	0	16	16
Duck – Goat - Cattle - Buffalo	0	0	5	5
Poultry – Goat – Pig – Duck- Cattle - Buffalo	4	6	6	16

Source: Primary data collected from sample farmers

Livestock was found in 15 different combinations of which 6 combinations i.e. poultry alone, poultry – goat, poultry – pig, poultry – goat – pig, poultry-goat-pig-cattle and poultry – goat – pig – duck – cattle – buffalo were found in all three communities under study. However, the numbers of farmers practiced poultry – goat – pig – duck – cattle – buffalo system were very few. The most prevailing system was poultry – goat – pig followed by poultry – pig and poultry – goat – cattle. In pooled situation, 27.08 per cent of farmers were found to practiced poultry – goat – pig system. Some Dimasa farmers were found restricted to rear pig by their traditional beliefs. However, most of the sample



farmers could not raise more than one or two kinds of livestock because of their poor financial condition and lack of infrastructure.



**Fig 9: Prevalence of different livestock combination in the sample farms**

#### 4.8.2.2 Size of livestock units

The rearing of livestock was observed as a popular and traditional activity of the sample farmers under the present study. But, in most cases the size of their livestock units was very small. Because of poor financial condition, most of the sample farmers could not afford to rear more numbers of livestock. Moreover, lack of infrastructure and lack of proper commercial motivation of the farmers also acted as a hindrance in maintaining more numbers of animals and birds in the farms of sample farmers. In general, sample farmers preferred to grow their crops and livestock with the resources both physical and financial within their reach. They were found less interested to bear additional risk by increasing the

size of livestock units with borrowed fund or physical assets. Distribution of sample farmers according to the unit size of different livestock is presented in Table 12.

Table 12: Distribution of sample farmers (Nos.) according to unit size of different Livestock, 2013-14

Type of livestock	Unit size (Number of animals /birds)	Percent of household			
		Karbi	Dimasa	Bodo	Pooled
Poultry	Nil	10	12.5	13.13	11.88
	1 to 5	15	11.25	7.5	11.25
	6 to 10	35.00	38.13	39.38	37.50
	11 to 15	25.00	28.13	23.75	25.63
	16 to 20	11.88	6.25	13.75	10.63
	Above 20	3.13	3.75	2.5	3.13
Duck	Nil	91.88	86.25	75.63	84.58
	1 to 5	2.50	5.00	3.13	3.54
	6 to 10	5.00	6.25	11.25	7.50
	11 to 15	0.63	1.88	5.63	2.71
	16 to 20	0	0.63	4.38	1.67
	Above 20	0	0	0	0
Goat	Nil	32.50	24.38	25.00	27.29
	1 to 2	19.38	18.75	13.75	17.29
	3 to 5	33.75	32.50	33.75	33.33
	6 to 10	11.88	21.88	24.38	19.38
	Above 10	1.25	2.50	3.13	2.29
Pig	Nil	26.88	37.50	29.38	31.25
	1 to 2	21.25	24.38	22.50	22.71
	3 to 5	25.63	27.50	23.75	25.63
	6 to 10	21.88	8.13	20.00	16.25
	Above 10	4.38	2.50	4.38	3.75
Cattle	Nil	88.13	60.63	53.75	67.50
	1 to 2	5.63	11.25	13.13	10.00
	3 to 5	5.00	17.50	24.38	15.63
	6 to 10	1.25	10.63	16.25	9.38
	Above 10	0	0	0	0
Buffalo	Nil	97.50	91.88	93.13	94.17
	1 to 2	0	0	0	0
	3 to 5	2.50	3.13	2.5	2.71
	6 to 10	0	3.75	4.38	2.71
	Above 10	0	1.25	0	0.42

Source: Primary data collected from sample farmers

Table shows that 88.22 per cent of total sample farms had poultry units in their farm. However 48.75 per cent of sample farmers had their unit size consisting 10 or less than 10 birds. Only 3.13 per cent of farmers had more than 20 birds. Duck component was found only in 15.42 per cent of sample farms of which 11.04 per cent had 10 or less than 10 birds. No sample farmer was found to maintained more than 20 birds. In case of goat, more than 50 per cent of farmers had their unit size consisting 1 to 5 numbers. Only 2.29 per cent of sample farmers maintained more than 10 goats. In case pig, 48.34 per cent of sample farmers had 1 to 5 numbers, 16.25 per cent of farmers had 6 to 10 numbers and only 3.75 per cent of farmers had more than 10 numbers of animals. Cattle was observed in 32.50 per cent of sample farms of which 25.63 per cent farmers kept 1 to 5 animals and 9.38 per cent kept 6 to 10 animals. No farmer was found to maintain more than 10 animals. Buffalo was found only in 5.87 per cent of farms of which 5.42 had their unit size consisting 3 to 10 animals.

#### **4.8.2.3 Existing production practices**

The existing production practices for livestock in the sample farms of all the three communities were traditional in nature. In case of cattle and buffalo only the indigenous breeds were available with the sample farms of all three communities. No commercial dairy farm was seen among the sample farmers. In the district, commercial dairy farms with cross breeds of milch cattle were observed with the farmers from Nepali and Bihari communities. Small units of indigenous cattle or buffalo consisting one or two milch animal and/ or one or two pairs of drought animal were the common practice followed by the sample farmers. Buffalos were found to maintain mainly for drought purpose. In case of pig, cross breeds were found along with the local breeds of the farmers. The local breeds of pig were smaller in size with low conversion efficiency, litter size was also small as compared to cross breed animal, yet the preference to the local pigs was observed among the resource poor sample farmers. This was mainly because of wider adaptability, feeding habit and disease tolerance capacity of local the breeds. Cross breeds of pig were popular because of its faster growth and bigger size. In case of goat, 'Assam Hill Goat' a recommended breed for North East Hill region was found in the sample farms. In case of

poultry and duck both indigenous and improved breeds were observed in the sample farms. Sample farmers reported that 'Vanraja' breed of poultry became popular among the farmers because of its faster growth, higher egg laying capacity and more body weight.

Majority of the sample farmers were not aware about the scientific management of livestock such as proper feeding, proper housing and vaccination, disease management etc. Of course, sample farmers had sufficient traditional knowledge on feed and herbal medicine for different livestock. They fed their animals and birds whatever feeds and grass available in the households and farms. This was for the minimization of production cost. They were reluctant to procure different feed mixture available in the market either because of their ignorance or due to higher cost of these feed mixtures. Some farmers kept their animals under open sky. Similarly, for animal health care also, majority of the sample farmers did not vaccinate the animals and birds. They generally used to consult veterinary doctors if they could not cure the diseased animals or birds with their traditional medicines or practices.

#### **4.8.2.4 Productivity of Livestock**

Due to the rearing of indigenous breeds, lack of scientific production practices etc. the productivity of livestock in the sample farms were found very low. The average milk productivity per day of milch cattle was found to be 0.75 liters with an approximate average lactation period of 7 months. The average milk productivity per day of milch buffalo was 2.60 liters. Some sample farmers maintained their buffalo only for draft purpose. Milking was not done in case of goat. In case of goat, the number of kid birth per lactation was found 2 to 3 numbers. As reported by the sample farmers, indigenous goat took 6 to 8 months for two successive kid births. In case of pig also time taken for two successive piglet births was reported as 6 to 8 months. The number of piglet birth per lactation was found to vary from 7 to 11 numbers. Normally the body weight attained by indigenous pigs were found to be 40 to 50 kg in 10 – 12 months while during the same period the body weight attained by the cross breed pigs were found to be 110 to 120 kg. In

case poultry and duck, the numbers of eggs laid per year per bird were found to vary from 30 to 60 numbers.

#### 4.8.2.5 Income from livestock enterprise

Per farm average incomes from livestock enterprise for the financial year 2013-14 was derived by summing up the average farm business income from different livestock enterprises during that year and are presented in Table 13 and figure 10.

Table 13: Average income (Rs. /farm) from livestock enterprise of the sample farms, 2013-14

Livestock	Community									Pooled		
	Karbi			Dimasa			Bodo					
	Gross income	Cost	Farm business income	Gross income	Cost	Farm business income	Gross income	Cost	Farm business income	Gross income	Cost	Farm business income
Cattle	1782	714	1068	7247	2921	4326	10825	4105	6720	6618	2580	4038
Buffalo	570	182	388	1926	570	1356	1556	467	1089	1351	406	945
Pig	18161	6518	11643	14213	5045	9168	17653	6617	11036	16676	6060	10616
Goat	10829	3104	7725	11629	3415	8214	12162	3474	8688	11540	3331	8209
Poultry	7034	2639	4395	6847	2617	4230	7027	2518	4509	6969	2591	4378
Duck	588	162	426	1151	296	855	2057	521	1536	1265	326	939
Total	38964	13319	25645	43013	14864	28149	51280	17702	33578	44419	15295	29124

Source: Primary data collected from sample farmers

Table shows that average annual income of total sample population from livestock enterprises was Rs. 29124.00. Among the three different communities considered under study average annual income from livestock unit was the highest (Rs.33578.00) in Bodo community followed by Dimasa community. This was because of higher contribution of cattle component in case Bodo and Dimasa community. Among the different components, the average contribution was found the highest from the pig component followed by goat component. In pooled situation the average contribution from pig component was 36.45 per cent and goat component was 28.19 per cent. Average contribution from poultry component was in third rank (17.14 per cent) in case of Karbi community. However, in

case of Dimasa and Bodo community the average contributions from cattle component were higher than the poultry component. Generation of income from livestock enterprise was observed low because of smaller unit size and lower productivities of birds and animals.

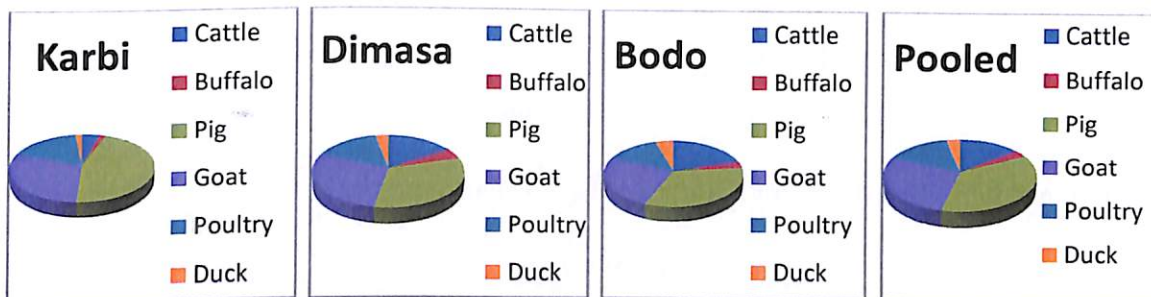


Fig 10: Contribution of different livestock component to the total livestock income

#### 4.8.3 Income from other agricultural allied activities

Other agricultural allied activities of the sample farmers under present study were sericulture, fishery and forestry. In pooled situation 28.54 per cent of sample household were found involved in sericulture related activities. The major sericulture activities were rearing of 'Eri, cocoon, spinning and weaving. However the volume of production in individual sample farmer was very low.

Fishery activity was not common to the sample farmers. Only 8.13 per cent of sample farmers found to have fishery component in their farms. Two types of fisheries were observed in the study area- permanent fishery and seasonal fishery. Seasonal fisheries were observed in the valleys in between two hillocks.

Another important farming activity of the sample farmers was farm forestry i.e. plantation of tree, bamboo, broom grass etc. in their backyard plots. The common tree species found to grow by the sample farmers were teak, sal, gomari, sishu etc. In pooled situation 21.25 per cent of sample farmers had tree plantation in their farms. The average annual income derived by the sample farmers from sericulture, fishery and forestry were calculated and presented in the table 14.

In pooled situation the average annual income generated from sericulture, and farm forestry was Rs. 2445.00 and Rs. 3312.00 respectively. Due to less number of fisheries available among the sample farmers, the average annual income derived from this enterprise was only Rs. 911.00. In respect of three communities considered under the study, the contribution of sericulture was the highest in Karbi community followed by Dimasa and Bodo community. However, the contribution of fishery was higher in Bodo community than Dimasa and Karbi community.

Table 14: Average annual income derived by the sample farmers from sericulture, fishery and forestry, 2013-14

Situation	Average annual income (Rs./farm)		
	Sericulture	Fishery	Farm Forestry
Karbi community	2778	642	3687
Dimasa community	2465	856	3528
Bodo community	2092	1235	2722
Pooled	2445	911	3312

Source: Prithary data collected from sample farmers

#### 4.9 Farm Income

The average annual farm income was calculated by summing up the income derived from the different farm enterprises considered in the study i.e. crop, livestock, sericulture, fishery and farm forestry. Table 15 represents the average annual farm income generated by the sample farms during the year 2013-14.

The average annual farm income of the sample farms was found to be Rs. 79362.00 in Karbi community and Rs. 81968.00 in Dimasa community. It was slightly higher (Rs.90506.00) in Bodo community. In pooled situation the average annual income from farming was Rs. 84448.00. Similarly the per capita farm income of the sample farmers was Rs. 12883.00 in case of Karbi community, Rs. 13571.00 in case of Dimasa community and the highest Rs. 15366.00 in case of Bodo community. In pooled situation the per capita farm income was found Rs. 13940.00.

Table 15: Average annual income derived by the sample farmers from farm activities, 2013- 14

Enterprise	Average annual income (Rs./farm)			
	Karbi community	Dimasa community	Bodo community	Pooled
Crop	46610	46970	50879	48655
Livestock	25645	28149	33578	29124
Sericulture	2778	2465	2092	2445
Fishery	642	856	1235	911
Forestry	3687	3528	2722	3312
Annual farm income	79362	81968	90506	84448
Per capita farm income	12883	13571	15366	13940

Source: Primary data collected from sample farmers

Crop enterprise was observed as the highest contributor of annual farm income followed by livestock in all the three communities considered under the study. In pooled situation crop and livestock enterprise contributed 57.62 per cent and 34.49 per cent average annual farm income, respectively

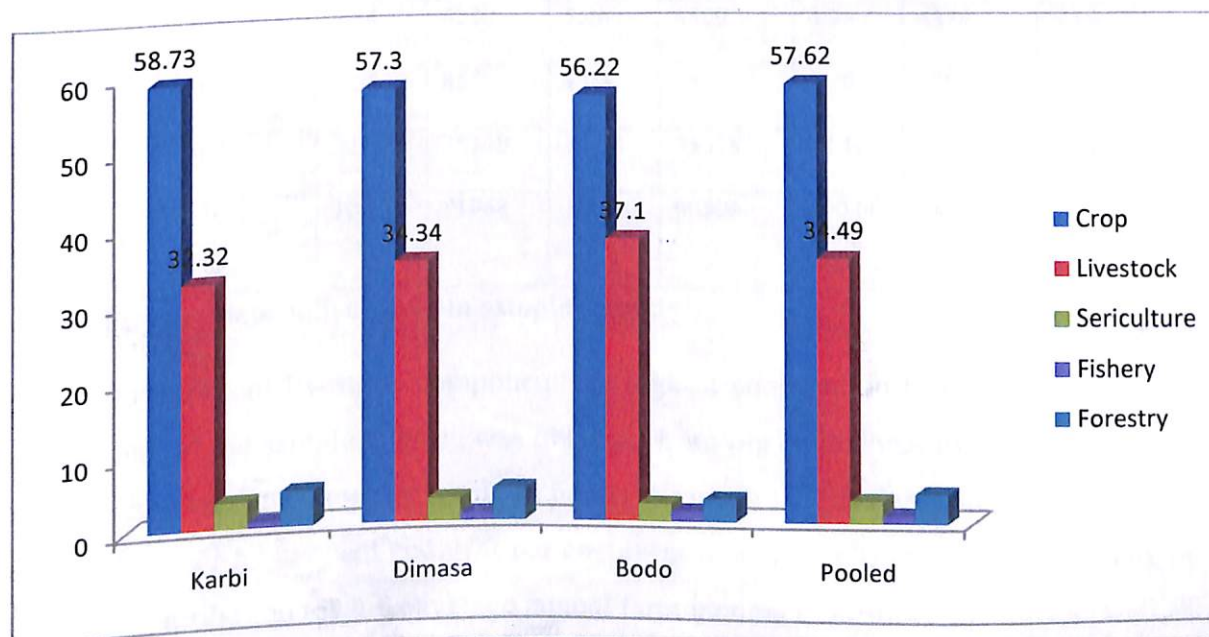


Fig 11: Share of different enterprises in the annual farm income



#### 4.9.1 Share of Livestock enterprise in the Total Farm Income

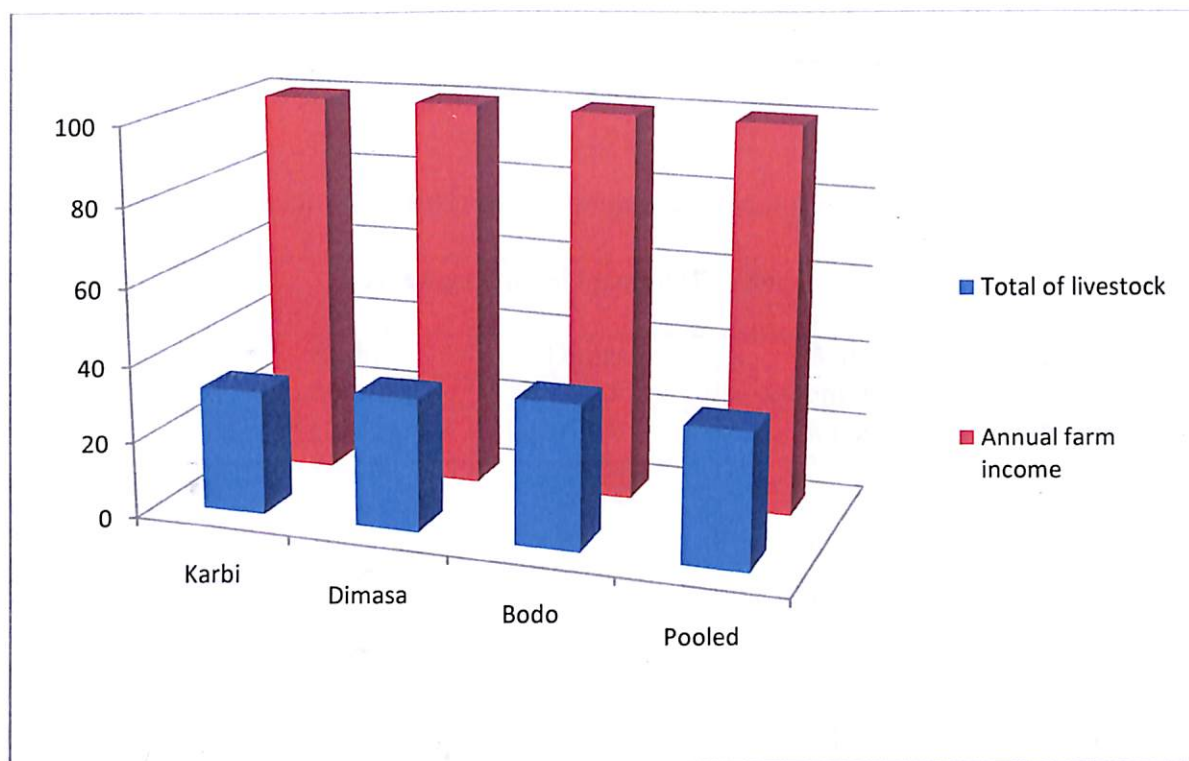
Livestock enterprise plays a very important role in respect of its share to the household income of tribal farmers. In pooled situation livestock enterprise shared 34.49 per cent of average annual farm income of the sample farms. Its contribution was 32.32 per cent, 34.34 per cent and 37.10 per cent in Karbi, Dimasa and Bodo community, respectively.

Table 16: Share of livestock enterprise to the annual farm income of the sample farmers, 2013-14

Livestock	Average annual income							
	Karbi		Dimasa		Bodo		Pooled	
	Rs./farm	Per cent	Rs./farm	Per cent	Rs./farm	Per cent	Rs./farm	Per cent
Cattle	1068	1.35	4326	5.28	6720	7.42	4038	4.78
Buffalo	388	0.49	1356	1.65	1089	1.20	945	1.12
Pig	11643	14.67	9168	11.18	11036	12.19	10616	12.57
Goat	7725	9.73	8214	10.02	8688	9.60	8209	9.72
Poultry	4395	5.54	4230	5.16	4509	4.98	4378	5.18
Duck	426	0.54	855	1.04	1536	1.70	939	1.11
Total of livestock	25645	32.32	28149	34.34	33578	37.10	29124	34.49
Annual farm income	79362	100.00	81968	100.00	90506	100.00	84448	100.00

Source: Primary data collected from sample farmers

Among the different livestock component the highest contribution to the average annual farm income of the sample farmers was obtained from pig component followed by goat in all the three communities under study. In pooled situation the per cent contributions of pig and goat were 12.57 per cent and 9.72 per cent respectively. Poultry occupied third rank in respect of contribution towards average annual farm income in Karbi community as well as in pooled situation. However, in case of Dimasa and Bodo community, the third rank was occupied by cattle component.



**Fig 12: Share of livestock in the average annual farm income of the sample**

#### 4.10 Non- farm Income

In the present study the income derived by the sample farmers from service, business and wage earnings activities were considered as the non-farm income. The annual income derived by the sample farmers from these three non-farm activities were worked out and is presented in Table 17.

Table shows that average annual non-farm income of the sample farmers was Rs. 24795.00 in Karbi community, Rs. 22040.00 in Dimasa community and Rs. 23868.00 in Bodo community. In pooled situation it was Rs. 23368.00. There were no significant variations among the communities in respect of non-farm income. Among the three non-farm components, the contribution of service activity was the highest (46.13 per cent) in Karbi community and the lowest in Dimasa community (25.54 per cent) while the contribution from business activity was the highest in Bodo community (42.63 per cent) and the lowest

in Karbi community (30.19 per cent). The wage earning activity contributed more in Dimasa community (39.44) than the other two communities.

Table 7: Average annual income of sample farmers from non-farm activities, 2013-14

Non-farm Component	Average annual income (Rs./farm)			
	Karbi community	Dimasa community	Bodo community	Pooled
Service	11437	5630	8672	8580
	46.13	25.54	36.33	36.72
Business	7485	7518	10175	8393
	30.19	34.11	42.63	35.92
Wage earnings	5673	8692	4821	6395
	22.88	39.44	20.20	27.37
Annual non-farm income	24795	22040	23868	23368
	100.00	100.00	100.00	100.00
Per capita non-farm income	4025	3649	4052	3909

Source: Primary data collected from sample farmers

#### 4.11 Total Household Income

The annual household income of a farm family comprises the income derive from farm activities as well as income derive from non-farm activities. The annual household income per farm per annum generated by the sample farmers was worked out and is presented in Table 18

The average annual household income per farm of sample farmers was Rs. 1,04,157.00 in case of Karbi community, Rs. 1,04,008 in Dimasa community and the highest Rs.1,14,374.00 in Bodo community. It was Rs. 1, 07,816.00 in pooled situation. Similarly the per capita income was Rs. 16909.00, Rs. 17220.00 and Rs. 19418.00 in Karbi, Dimasa and Bodo community, respectively.

Table 18: Average annual household income of sample farmers, 2013 – 14

Source	Average annual income (Rs./farm)			Pooled
	Karbi community	Dimasa community	Bodo community	
Annual farm income	79362 <i>76.19</i>	81968 <i>78.81</i>	90506 <i>79.13</i>	84448 <i>78.33</i>
Annual non-farm income	24795 <i>23.81</i>	22040 <i>21.19</i>	23868 <i>20.87</i>	23368 <i>21.67</i>
Annual household income	104157 <i>100.00</i>	104008 <i>100.00</i>	114374 <i>100.00</i>	107816 <i>100.00</i>
Per capita income	16909	17220	19418	17849

Source: Primary data collected from sample farmers

The share of farm and non-farm activities in average annual household income was 76.19:23.81 in case Karbi community, 78.81:21.19 in Dimasa community, 79.13:20.87 in Bodo community and 78.33:21.67 in pooled situation.

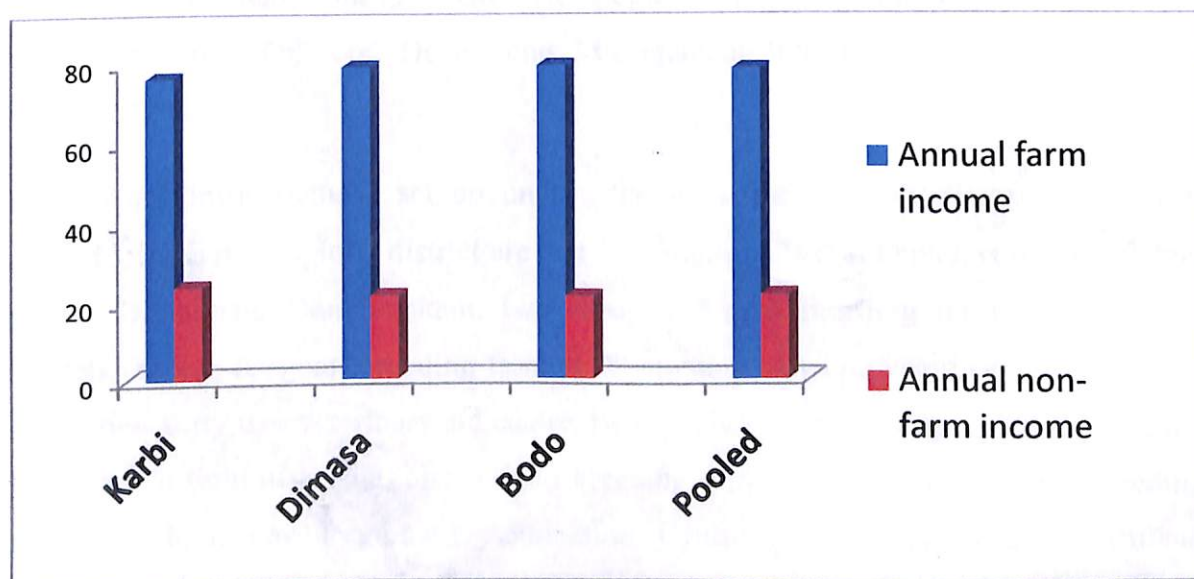


Fig.13: Share of farm and non-farm activities in average annual household income

#### **4.12 Impact of developmental programmes on improvement of Livestock Sector**

With an objective to examine impact of different development programmes implemented by the concerned departments for bringing improvement on tribal farmer's economic condition by upgrading livestock sector, respondent farmers were asked certain pre structured question to have their response on these programmes and schemes. Information on developmental programmes / schemes and infrastructure for livestock development in Assam in general and Karbi Anglong district in particular were gathered from discussion with departmental personnel, departmental reports and other published and unpublished sources. Some of the major central sponsored schemes/ programmes implemented in the state during last couple of years were: Assam Agricultural Competitiveness Project (AACP), Assistance to State for Control of Animal Disease (ASCAD), Livestock Insurance, Establishment and Strengthening of Veterinary Dispensaries and Hospitals, Hundred percent central assistance to the state poultry farms, Rural backyard poultry development project, National project on cattle and buffalo breeding etc. The schemes implemented by the Animal Husbandry & Veterinary Department of Karbi Anglong district under HADP for last few years were Cattle Development, Breed Upgradation Programme, Animal Disease Control , Fodder Development, Creation of new infrastructure, Strengthen of existing infrastructure, Poultry & Duck Development, Piggery Development, Sheep & Goat Development, Capacity Building among Farmers and Departmental Officers, Developing Management Information & Communication System [MICS] etc.

Some major infrastructural set up under the department of Veterinary and Animal Husbandry in Karbi Anglong district are one feed mixing plant at Diphu, two pig breeding farms at Diphu and Donkamokam, two sheep and goat breeding farm at Diphu and Khanduli, sheep & goat breeding farm at Silonijan twenty one veterinary hospitals and dispensaries, forty two veterinary aid centre, two mobile veterinary dispensaries, one cattle demonstration farm at Manja, one buffalo breeding farm at Silonijan, one duck breeding farm at Phuloni, one Regional Insemination Centre at Sarihajan, twenty Artificial Insemination centre, one milk chilling plant at Manja, two Government poultry farm at Diphu and Hamren, one demonstration farm at Kheroni, one feed mixing plant at Diphu

etc. However, in spite of all these infrastructures of the Animal Husbandry and Veterinary Department, the quality of extension service in the district is somewhat lacking. The operating condition of most of these structures during the time of investigation was not up to the expected level. Government farms were not in a position to supply required number of cross breed animals. Both the pig breeding farms were not in a position to meet the growing demand for quality piglets. Chick producing capacity of Government poultry farm was not sufficient to meet the local needs for improved chick. Sheep and goat breeding farm at Khanduli and poultry farm at Hamren and Kheroni were in very bad shape. The condition of duck breeding farm at Phuloni was also not good. Pig feed production at the Government feed mixing plant at Diphu was negligible. In the district, there were a few private stockiest of 'balanced feed, but the same was available at higher price. Quality concentrated feeds were not available locally. Medicines etc. were often found to be in short supply in the interior places. The birds and animals were exposed to the risk of being affected by various diseases. The milk chilling plant at Manja was not functioning at its full capacity.

The department of Animal Husbandry and Veterinary, Assam has been implementing several schemes and projects under three major thrust areas such as, Artificial Insemination to increase cross breed cattle population for increasing milk production, Layer poultry farming to increase egg production and for Self employment opportunities. The programme of Artificial Insemination has been introduced with a view to provide A.I. services at farmer's door step. However, in Karbi Anglong district this AI programme has benefited mainly the non tribal farmers only. The programme is yet to gain popularity among tribal farmers. Considering the importance of proper feeding, the department of Animal Husbandry and Veterinary has also taken several programmes on fodder production and development. But this is also not popular among tribal farmers. Under thrust area II, programmes have been launched to increase egg production in the state as well as to provide self-employment of the rural unemployed youth, women folk and weaker section and to improve nutritional status of the rural poor. The district poultry farms have been strengthen under DRDA (SGSY) programme and used to rear parent stock of poultry to supply the day old chick and hatching egg to farmers at a reasonable price. Under thrust area III, the department of Animal Husbandry and Veterinary has been

trying to educate and to bring awareness among the farmers and unemployed youths to take up animal husbandry practices as a full time source of income.

In Karbi Anglong district, the department of Animal Husbandry and Veterinary has been distributing cross breed piglets, improve kid goat, improved poultry chicks and duckling, seeds and planting materials for fodder production etc. in reasonable price / subsidized rate over the years under different distribution programmes. Programmes have also been implementing on disease survey and eradication, vaccination, distribution of medicines, awareness programme on Artificial Insemination and fodder production etc. But farmers in the district have difference in their views regarding the effectiveness of these programmes and its impact in bringing improvement on tribal farmer's economic condition by upgrading livestock sector.

#### **4.12.1 Farmer's Response**

As reported in the annual plan under HADP for the year 2012-13, Karbi Anglong Autonomous Council, the cattle population of the district increased from 3,06,959 during 2005-06 to 4, 25,300 numbers in 2012, due to continued endeavor of the Department throughout the Eleventh Five Year period for sustainable livestock development. The increase was over five percent per year resulting in 38% increase during the 11<sup>th</sup> Plan period. During the same period the milk production of the district increased from 20.36 million liters during 2005-06 to 23.16 million liters in 2012. This provided livelihood and an alternative source of family income to more than one lac households of the district. Similarly, due to the constant endeavor for sustainable poultry and livestock development initiatives of the department, the egg production per annum in the district was increased from 8.86 millions in 2005-06 to 10.12 millions in 2012. This helped lacs of woman and other weaker sections as the production was by the masses. In piggery sector, as a result of massive upgradation programme of the locally available pig population all over the district through Pork production Centre, Donkamokam and Govt. pig cum Poultry Farm, Diphu the numbers of cross-breed pigs increased from 1,25,336 to 1,68,438 in 2011. This created gainful employment avenues among the farmers and unemployed youth. Department also organized massive training programmes for capacity building among farmers.

However, sample farmers under the present study showed a mix response regarding the functioning, performance and impact of different structural facilities created and schemes implemented by the concerned department for improvement of livestock sector in the present study area. More than 60 per cent of respondent farmers were found ignorant about the government plan and programmes for the development of livestock sector either in their locality or in the district. They informed that they never got any input or training under any scheme. Another 30 per cent of respondent farmers viewed that they got some inputs and trainings once or twice, but they did not know about the schemes. Only few farmers were found aware about the departmental programmes concern with the development of livestock activities in their localities. A sizable numbers of respondent farmers informed that they got training on scientific rearing of pig, goat, poultry etc. from the Krishi Vigyan Kendra, Karbi Anglong in last 6-7 years. Most of the respondent farmers were not satisfied with the benefit they could derive from the departmental programmes. They were also found unsatisfied due to the lack of required facilities in the veterinary hospitals and dispensaries.

#### **4.13 Constraints of Livestock Production**

Sample farmers of all the three communities under present study confronted with numbers of constraints which adversely affected the productivity and profitability of the livestock sector in the study area. Some of the major production constraints faced by the sample farmers were,

- Subsistence nature of livestock farming through traditional practices with local breeds of birds and animals.
- Lack of knowledge about scientific management practices such as proper feeding to the animals and birds, animal healthcare, proper housing etc.
- Lack of motivation and risk bearing ability of the farmers to take up livestock on commercial lines.
- Problem of disease, thefts, wild animals etc.



- Smaller unit size livestock components that makes livestock farming less economic.
- Poor resource base, low purchasing power and high costs of inputs which make it difficult for the farmers to support more number of birds and animals in their farms.
- Non availability of quality inputs, shortage of concentrate feeds etc.
- Often short supply of medicines in the interior areas
- Delay and difficulties in institutional credit
- Lack of interest and knowledge of the farmers regarding insurance of livestock
- Remoteness, lack of proper road connectivity and transportation

#### **4.14 Opportunities in Livestock Production**

- Farmer's likings in livestock rearing: farmers are very much interested on livestock rearing because it is not only their way of livelihood, but also their tradition and culture.
- Traditional knowledge and experience of the farmers: Most of the livestock farmers in the district have sufficient indigenous traditional knowledge (ITK) on feeding and treatment against common diseases of birds and animals. They know different herbs and shrubs available in the locality that can be used for feeding or treating the birds and animals.
- Huge market potential for livestock product: Almost all the tribal people are non vegetarian. Hence there is great demand for livestock product like meat and eggs. The district is not self sufficient to meet the requirement of eggs and meats. The gap is supplemented by importing eggs, poultry, pig, goat etc from other districts and from outside the state. There are great opportunities for the farmers of the district to tap this market potential and thereby to improve their economic condition and lively hood status.

- High price for livestock product: Farm gate prices for livestock products are high and it makes the livestock farming quite remunerative for the farmers.
- Abundance of green foliage and availability of grazing grounds

#### **4.15 Need for Technical and Supportive Intervention**

- Training and guidance on scientific production of livestock
- Motivation to take livestock rearing in commercial basis which they have already been doing traditionally in subsistence way.
- Quality breeds of birds and animals,
- Concentrate feed and medicines as and when required.
- Hassle free and timely institutional credit for the interested farmers
- Insurance coverage for livestock
- Quality of extension services from veterinary department throughout the year at farmer's doorstep.

\$

# CHAPTER V

## SUMMARY AND CONCLUSION

### 5.1 Summary

Allied agricultural activities like piggery, poultry, goat farming etc. have been gaining importance day by day in providing livelihood and food security to the rural farming community, more particularly for small and marginal farmers. In Karbi Anglong district of Assam more than 90 per cent of population from different tribal communities reside in rural interior hilly track practicing agriculture and allied activities as their basic source of livelihood. Mixed farming involving crop and livestock integration has been a way of life of the farmers. However, production practices of almost all the farmers are traditional in nature. Commercialization of livestock enterprises through scientific management practices is highly needed for enabling tribal farmers of the district as well as entire North East Region to increase their farm income and overcome poverty for which systematic information on existing resource utilization, management practices, productivity, profitability, problems, constraints etc. are very much important for proper planning and execution of developmental programme. The main aim of the present study was to examine the existing status of livestock sector, its profitability, constraints of production, need for technical and supportive intervention with special reference to Karbi, Dimasa and Bodo farmers in Karbi Anglong district of Assam.

The study was based on primary data collected collected from sample farmers through Focus Group Discussion (FGD) and Personal Interview method and the secondary data collected through personal discussion with the officials of related departments and from various published and unpublished sources.

The study of demographic pattern showed that 50.66 per cent of sample populations were male against 49.34 per cent of female population. Distribution of population according to age indicated that 51.17 per cent of populations were in the age group of 18 – 60 years which supplied the main work force for farm and nonfarm activities.

On average 80.87 per cent of sample population were found literate. However, more than 50 per cent of population possessed only primary and M.E. level of education.

Distribution of population according to working status showed that 25.03 per cent were full time worker, 33.56 per cent were part time worker and 41.40 per cent were non-workers. Out of total sample households 46.87 per cent possessed only one source of livelihood. Agriculture was the primary source of livelihood for 77.92 per cent of sample households.

Land is the main input of agricultural production system. The average size of operational holding of the sample farmers was 2.02 hectares. Crop was the main enterprise for majority of the sample farmers. However, livestock enterprise was played an important role on the economy of all the sample farmers from all the three communities. In a sizable number of sample farms, average annual income derived from livestock enterprise were more than the average annual income derived from crop enterprise.

All most all the sample farmers practiced integrated farming system integrating different farm enterprises such as crop, livestock, sericulture, fishery, forestry etc. The major farming system followed by the sample farmers were Crop – Livestock, Crop – Livestock – Sericulture, Crop – Livestock – Fishery, Crop – Livestock – farm forestry, Crop – Livestock – Sericulture – Fishery and Crop – Livestock – Fishery – Farm forestry of which the most prevailing system was Crop – Livestock system. All the sample farmers from all three communities grew crops and reared at least one kind of livestock in their farms.

The major crops grown by the sample farmers were rice, maize, rape seed, sesame, summer and winter vegetables, ginger, turmeric, pineapple, banana and arecanut. Because of traditional method of cultivation, rainfed agriculture, lower use of manures and fertilizer etc. productivities of all the crops in the sample farms were low. The average annual income of the sample farms from the crop enterprise was Rs. 48655.00. Among the three communities considered in the present study, the average annual income derived from crop enterprise was slightly higher in case of Bodo community (Rs. 50879.00) followed by Dimasa community (Rs. 46970.00). It was the lowest in Karbi community (Rs. 46610.00).

The different livestock reared by the sample farmers were cattle, buffalo, pig, goat, poultry and duck. Poultry, goat and pig were more common amongst the sample farmers. In pooled situation the highest (88.13 per cent) number of sample farmers was found to rear poultry followed by goat (72.71 per cent) and pig (68.75 per cent). Cattles were found mainly with the farmers from Dimasa (39.38 per cent) and Boro community (46.25). In case of Karbi community, only 11.88 per cent of farmers were found to maintain cattle in their farms.

Livestock was found in 15 different combinations of which 6 combinations i.e. poultry alone, poultry – goat, poultry – pig, poultry – goat – pig, poultry-goat-pig-cattle and poultry – goat – pig – duck – cattle – buffalo were found in all three communities under study. The most prevailing system was poultry – goat – pig followed by poultry – pig and poultry – goat – cattle.

In most of the sample farms the size of livestock unit was very small. Because of poor financial condition, most of the sample farmers could not afford to rear more numbers of livestock. The existing production practices for livestock in the sample farms of all the three communities were traditional in nature. Majority of the sample farmers were not aware about the scientific management of livestock such as proper feeding, proper housing and vaccination, disease management etc.

Due to the rearing of indigenous breeds, lack of scientific production practices etc. the productivity of livestock in the sample farms were found very low. The average milk productivity per day of milch cattle was 0.75 literes with an approximate average lactation period of 7 months. The average milk productivity per day of milch buffalo was 2.60 liters. In case of goat, the number of kid birth per lactation was found 2 to 3 numbers. The number of piglet birth per lactation was found to vary from 7 to 11 numbers. Normally the body weight attained by indigenous pigs were found to be 40 to 50 kg in 10 – 12 months while during the same period the body weight attained by the cross breed pigs were found to be 120 to 130 kg. In case poultry and duck, the numbers of eggs laid per year per bird were found to vary from 30 to 60 numbers.

The average annual income of total sample population from livestock enterprises was Rs. 29124.00. Among the three different communities considered under study average annual

income from livestock unit was the highest (Rs.33578.00) in Bodo community followed by Dimasa community. Among the different components, the average contribution was found the highest from the pig component followed by goat component. Average contribution from poultry component was in third rank ( 17.14 per cent) in case of Karbi community. However, in case of Dimasa and Bodo community the average contributions from cattle component were higher than the poultry component.

Other agricultural allied activities of the sample farmers under present study were sericulture, fishery and forestry. In pooled situation the average annual income generated from sericulture, fishery and farm forestry was Rs. 2445.00, Rs. 911.00 and Rs. 3312.00 respectively.

The average annual farm income of the sample farms was Rs. 79362.00 in Karbi community and Rs. 81968.00 in Dimasa community. It was slightly higher (Rs.90506.00) in Bodo community. Crop enterprise was observed as the highest contributor of annual farm income in all the three communities. The share of livestock enterprise to the household income was 32.32 per cent, 34.34 per cent and 37.10 per cent in Karbi, Dimasa and Bodo community, respectively. Among the different livestock component the highest contribution to the average annual farm income of the sample farmers was obtained from pig component followed by goat in all the three communities under study. In pooled situation the per cent contributions of pig and goat were 12.57 per cent and 9.72 per cent respectively.

The average annual non-farm income of the sample farmers was Rs. 24795.00 in Karbi community, Rs. 22040.00 in Dimasa community and Rs. 23868.00 in Bodo community. In pooled situation it was Rs. 23368.00.

The average annual household income per farm of sample farmers was Rs. 1,04,157.00 in case of Karbi community, Rs. 1,04,008 in Dimasa community and the highest Rs.1,14,374.00 in Bodo community. Similarly the per capita income was Rs. 16909.00, Rs. 17220.00 and Rs. 19418.00 in Karbi, Dimasa and Bodo community, respectively. The share of farm activities in average annual household income was 76.19 in case Karbi community, 78.81 in Dimasa community and 79.13 in Bodo community.

The study showed that the department of Animal husbandry and Veterinary had a huge infrastructural net work in the district. But, the operating condition of most of these infra structures were not up to the expected level. The quality of extension service was also somewhat lacking in the district. Department of Animal Husbandry and Veterinary distributed cross breed piglets, improve kid goat, improved poultry chicks and duckling, seeds and planting materials for fodder production etc. amongst the farmers over the years under different distribution programmes. Programmes were also implemented on disease survey and eradication, vaccination, distribution of medicines, awareness programme on Artificial Insemination and fodder production etc. But farmers in the district showed difference in their views regarding the effectiveness of these programmes and its impact in brining improvement on tribal farmer's economic condition. More than 60 per cent of respondent farmers were found ignorant about the government plan and programmes for the development of livestock sector either in their locality or in the district. Only few farmers were found aware about the departmental programmes on the development of livestock activities in their localities.

Some of the major constraints of livestock production faced by the sample farmers were lack of knowledge about scientific management practices, lack of motivation and risk bearing ability, poor resource base of the farmers, higher cost of modern inputs, disease problems, shortage of medicines, non availability of concentrate feed etc. However, against of all these difficulties sample farmers were found very much interested in livestock rearing, they had sufficient experience and traditional knowledge on livestock farming. Some technical and supportive intervention urgently needed by the farmers to make the livestock enterprise more remunerative for them were training and guidance on scientific production of livestock, motivation to take livestock rearing in commercial basis which they have already been doing traditionally in subsistence way, arrangement for quality breeds of birds and animals, supply of concentrate feed and medicines as and when required, hassle free and timely institutional credit, insurance coverage for livestock and quality of extension services from veterinary department throughout the year at farmer's doorstep.

## **5.2 Conclusion**

Livestock is an integral component of farming system in the Karbi Anglong district of Assam. Almost every tribal household in the district rear at least one or more kind of livestock in their farm. Rearing of livestock like pig and poultry is not only an income and employment generating activity, but also a part of their tradition and culture. In existing situation the sample farmers under present investigation derive 32 per cent to 37 per cent of their annual household income from livestock activities in spite of lower productivities of all the different livestock. So there is ample scope to uplift the economic condition of the farmers in the district through increase in productivity of livestock sector. Tribal farmers are very much interested in livestock rearing. They have sufficient experience and traditional knowledge on livestock farming. But they are not motivated to adopt livestock rearing in commercial way. Most of the farmers do not have knowledge on scientific livestock management practices. Moreover, poor resource base of the farmers and higher cost of inputs restrict the farmers from commercial production of livestock. Also, the farmers are being confronted with several constraints which adversely affect the productivity and profitability of different livestock in their farms. On the other hand, there are huge market demand and reasonably high price for livestock product for which the livestock activities become economically viable in the district. Hence, motivation of farmers towards commercial production of livestock, formation of Self Help Group, Livestock Interest Group, organizing farmer's awareness camp and training on scientific management of livestock, provision of supply of quality birds, quality animals, concentrate feed and medicine at time, availability of hassle free institutional credit, insurance coverage of livestock, quality extension service etc. will increase the efficiency of livestock sector and help improve the livelihood of the tribal farmers in the district.

## **5.3 Policy Implication**

- Farmers should be trained on scientific production technique of livestock.
- Self help group (SHG) or livestock interest group (LIG) may be formed to take livestock rearing in commercial basis



- Quality breeds of birds and animals should be made available by the veterinary department to replace the local breeds.
- Concentrate feed and medicines should be made available as and when required.
- Availability of institutional credit should be made hassle free and timely for the interested farmers
- Insurance coverage for livestock should be ensured. Farmers are to be encouraged to insure their livestock
- Quality of extension services from veterinary department should be improved. Services should be made available throughout the year at farmer's doorstep.
- Proper functioning of government feed mixing plant should be ensured to meet the shortage of concentrate feed supply. The number of feed mills may be increased.
- Slaughter houses are to be constructed for maintenance of proper hygiene standards
- Establishment of livestock breeding farm, feed mixing plant in private – public partnership may be encouraged
- Steps may be taken for multiplication of Assam Hill Goat

\$

## BIBLIOGRAPHY

A.Ravishankar and Pratap S. Birthal (1999). Policy brief, Livestock sector in India:

Agenda for the Future, national centre for agricultural economics and

Policy research, New delhi

Gopala, G. T., K. C. Veeranna and Shivakumar K. Radder ( 2010). Constraints in goat

farming in Bidar district of Karnataka State, Research Journal of Animal

Husbandry and Dairy Science, Vol. 1, No. 2, pp 80-82

Gopala, G. T., K. C. Veeranna, Shivakumar K. Radder and Shivan S. Kumar ( 2010).

Impact of Goat rearing among livestock interest groups on empowerment of

poor rural people, veterinary Science Research Journal, Vol.1, No. 2

Ibrahim, Abdel Sami Musa, Xu Shiwei and Yu Wen (2013). The Impact of Social Factors

of Rural Households on Livestock Production and Rural household Income

in White Nile State of Sudan, International Journal of Agricultural and Food

Research, Vol.2, No. 4, pp 1-13

Kazybayeva, S., J. Otte and D. Roland Holst (2006). Livestock Production and Household

Income Patterns in Rural Senegal, Pro-poor Livestock Policy Initiative

(PPLPI) Research Report.

Kumar, Shantanu, Radha Krishan and S. Nigam (2008). Contribution of Livestock in Indian Scenerio, Agricultural Situation in India, Vol , No. 4

Maltsoglou, Irini and kiyoshi Taniguchi (2004). Poverty, Livestock and Household Typologies in Nepal, working Paper, Pro-poor Livestock Policy Initiative (PPLPI) Research Report.

Maltsoglou, Irini and George Rapsomanikis (2006). The Contribution of Livestock to Household Income in Vietnam: A Household Typology Based analysis, working Paper, Pro- poor Livestock Policy Initiative (PPLPI) Research Report.

Mabe, L. K., M. A. Antwi and O. I. Oladele (2010). Factors Influencing Farm Income in Livestock Producing Communities of North-West Province, South Africa, Livestock research for Rural Development, Vol. 22, No. 8

Verma, A. R., and A. M. Rajput (2000). Role of Poultry Enterprise in Indore District of Madhya Pradesh, The Bihar Journal of Agricultural Marketing, Vol. 8, No. 1

Murty, C. S. (1998 ). Farm Diversification and Income: A Village Study in Andhra Pradesh, Agricultural Economics Research Review, Vol. 11, No. 2

\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$

## APPENDICES

### Appendix I

#### LIST OF SAMPLE VILLAGES

Sl. No.	Name of the Village
1	Silpukhuri
2	Luthimari
3	Milonpur
4	Surupodum
5	Pudumpukhuri
6	Pakriguri
7	Joypur No.1
8	Anandpur
9	Sibnagar
10	Kharnaidisa
11	Disagisim
12	Bokdadisa
13	Majh gaon
14	Longkoi Bey gaon
15	Kheroni
16	Doldoli
17	Sarthe Timung gaon
18	Rongturbong
19	Kania Bey gaon
20	Longki Hanse gaon
21	Rso hanse gaon
22	Bey Tilot gaon
23	Purna Hanse gaon
24	Mizo Teron gaon