CHAPTER-VIII
SUMMARY AND CONCLUSION

8.1 Summary:

The present study on agricultural practices among different communities of Sipajhar revenue circle, Darrang has been organized into eight chapters. An in-depth analysis for clear exposition of the desired objectives of the investigation has been made.

The chapter-1 begins by laying out the statement and relevance of the problem; literature review, historical and physical background of the study area; objectives, hypotheses, methodology and organisation of the study. The statement of the problem unfolds that the present pattern of agricultural practices in Sipajhar revenue circle, Darrang district, being situated in lower Brahmaputra Valley of Assam, is an outcome of long and continued settlement processes of various castes and communities that exhibits a significant variation in the pattern of agricultural practices. It is so because the behaviour of farming communities is conditioned not so much by the actual physical environment, but by the environment as perceived and understood by them. Therefore it is becoming increasingly difficult to ignore the agricultural behaviour of different farming caste and communities in a economically backward revenue circle like Sipajhar. The review of literature also enables to identify the key strength areas and relevance of the problem to be addressed.

Six key aims and objectives have been outlined to have an insight into the problem of agricultural practices among different communities of the study area. In accordance with the objectives, the five hypotheses have been proposed to be
tested. The relevant database required for investigation as per objectives and hypotheses are collected from both primary and secondary sources. In the study, base map wherein the 14 panchayat of the revenue circle are considered as spatial units of investigation is prepared with the help of cadastral map prepared by the Revenue Dept., Govt of Assam; Survey of India topographical map,78N/15 & 78N/16 (1:50000) and the satellite map prepared by Assam Remote Sensing Application Centre, Guwahati (ARSAC). To analyse the land use and land cover pattern Landsat MSS Satellite Image of 16\textsuperscript{th} Dec.,1977; Landsat TM Satellite Image of 18\textsuperscript{th} Nov.,1991 and IRS P6 LISS III Satellite Image, 24\textsuperscript{th} Nov., 2013 have been used.

The primary data have been collected through stratified random sampling technique on the basis of castes and communities and size of land holding. A well designed household survey schedule has been used for 23 sample villages so as to have representative picture of different castes and communities of the circle. The sampled caste-community villages of panchayats are selected from those villages wherein particular caste and community is found to be above 30\% of the total population. Moreover relevant secondary data on population and farming practices at panchayat level have been collected from the sources like Revenue Circle Office, Darrang; District Agriculture Office, Darrang; ADO Circle, Sipajhar; Census Hand Book of Assam & Darrang and Directorate of Economics and Statistics, Assam. The data so obtained have been tabulated and processed employing traditional and sophisticated statistical measures that include Locational Quotient, Index of Cropping Intensity, Crop Diversification Index of Gibb-Martin, Crop Productivity Index of Kendall, Composite Index of
Mechanisation, Co efficient of correlation and Regression for showing the degree and nature of relationship between variables and Z Score for agricultural development regions. The result of data analysis has been presented in the form of diagrams and choropleth maps by applying suitable cartographic techniques for giving a clear exposition of spatial pattern of desired variable. Finally the chapter 1 gives a brief overview of the organisation of the study.

Chapter 2 presents an overview of the case study area along with the district with respect to its physiography, drainage and water bodies, climate, soil and vegetation, historical and demographic background. The district of Darrang has its rich historical background of its own since the epic age. Likewise, the case study area of the district, Sipajhar revenue circle is also noted for its rich folk culture in the nation, popularly known as ‘Darangi Kala Kristi’ which exhibits rich cultural diversity of the area. This revenue circle of the south west Darrang district with diversity of farming castes and communities is provided with three sub physiographic units of the lower Brahmaputra valley-the active flood plain and char; the marshy and low lying area with low hills and the middle plain of the built up region.

Like any part of Assam, the climate of the study area is influenced by (a) South-west monsoon wind which blows from south-west in summer to the study area and (b) The north-east monsoon wind which blows in winter from north-east. The agricultural activities of the circle are closely tuned to summer and winter monsoon seasons of the area. The riverine char is composed new alluvium while the built up belt is of old alluvium and the south western part of the area is made up of laterite and black soil, intermingled with new alluvium.
Based on the type of soil and climate the area becomes favourable for the growth of Mixed Moist Deciduous, some evergreen species, grass land and scrub vegetation cover.

The chapter 3 examines the growth, distribution and social composition of population across the panchayats and villages of the circle. It is to be noted that Sipajhar region exhibits as an area of fusion of social groups leading to evolution of composite culture within it wherein wide variation of growth and densities of population is conspicuous. The circle has a total population of 122937 in 2011 which constitutes 13.5% and 0.40% of the total population of Darrang district and the state of Assam respectively. Although the population of the circle is increasing, the decadal growth rate is in declining trend, being 22.2% in 1991-2001 and 14.66% in 2001-2011. However, some panchayats like Sanowa, Bazanapathar, Dumunichowki, Maroi, Ganeshkuwari and Bordoulguri have registered unprecedented positive growth rate of population. Strikingly, the decadal growth of Sanowa (69.31%) during the last decade has been exceptionally high which is mostly inhabited by non indigenous Muslim community. The most striking feature of population growth at the village level is that the villages of char areas, namely Ganakbari, Barbari, Niz Salmara, Dhalpur No.1and Dhalpur No.2 village of Sanowa G.P. and Suktaguri No.2 of Bazanapathar G.P. register more than 100% population growth during last decade. This high growth rate can be attributed to sharp fall of death rate accompanied by steady decline of birth rates, inter char migration process due to soil erosion and to other socio cultural factors. In contrast, Byaspara gram panchayat recorded zero population growth rate during last decade. The negative
population growth rates have been recorded in the villages like Ghopa, Niz sipajhar, Dhokapara, Majarchuba, Rajapukhuri and Upper Kurua village during 2001-2011. Comparatively better medical facilities, literacy, rural urban migration and other socio cultural factors can be attributed to the significant decline of population growth rate in some units of the circle.

The distribution and density of population are not uniform throughout the circle. The built up area of the circle supports 77% of its total population while the char areas 22% of it. The low land area with low hills and hillocks possesses sparse population distribution which sustains 3% of total circle population. The Sipjhar panchayat having the biggest market centre of the circle, Sipajhar recorded the highest density of population (1013 persons/km²) among the panchayats while the Bazanapathar G.P., the biggest in terms of area, registers the lowest population density with 219 persons/km². As for the total population of the villages, it is noticed that most of the villages of Sanowa and Bazanapathar have possessed the highest total population than that of other G.P. of the Circle, being more than 4000 population. On the other hand the villages of Ganeshkuwari, Lokrai, Byaspara and Bordoulguri have recorded the population less than 3000.

The social composition of the circle comprises of 5 socially identifiable communities and 3 castes, namely indigenous non tribal Hindu, Indigenous Muslim, Nepali, Scheduled Tribe, non indigenous Muslim community and the three castes of indigenous non tribal Hindu community-Other Backward Class, High Caste and Scheduled Caste. It is noticed that 54% of total population belongs to indigenous non tribal Hindu community, 20% to indigenous Muslim,
23% to non indigenous Muslim, 1% to Scheduled Tribe and 2% to Nepali community. Out of the total population of indigenous non tribal Hindu community, 74% is composed of O.B.C., 18% of H.C. and 8% of S.C. social group.

Hazarikapara, Debananda, Kura, Ghorabandha, Lokrai, Garukhuti, Byaspara and Sipajhar G.P. have the highest concentration of indigenous non tribal Hindu community, as these Panchayats recorded the locational quotient of above 1.30. This community possesses three hierarchical orders known as castes-high caste (H.C.), other backward class (O.B.C.) and scheduled caste (S.C.). All the Brahmins, Ganak, Kayastha, Kalita and Keot belong to high caste social group. It is highly concentrated in Byaspara, Kura and Hazarikapara panchayat. Other backward class is the largest group of the total population which mainly comprises Yogi and Koch communities. By looking at locational Quotient it is found that they are mostly concentrated in Ghorabandha, Debananda, Lokrai, Garukhuti, and Sipajhar. The Scheduled Castes are usually found to be spreading across the circle. Of the panchayats, Maroi, Ganeshkuwari, Bazanapathar, Sipajhar, Hazarikapara and Kura witness the highest clustering of this social group.

The areas inhabited by indigenous Muslim community is exclusively located in built up belt of the circle alongside indigenous non tribal Hindu community. The Locational Quotient value clearly shows that high degree of concentration of this group is found in Dumunichowki, Bordoulguri and Maroi panchayat.
With 23% of total circle population, the non indigenous Muslim community ranks second next to indigenous non tribal Hindu community. Out of 14 panchayats, only Bazanapathar and Sanowa have sheltered the population of the entire community. These are the two panchayats wherein Sanowa (15.48%) and Bazanapathar (14.69%) recorded the highest percentage of total circle’s population and they respectively shared the population of non indigenous Muslim community at 81% and 70% of the total G.P. population.

The Nepali and Scheduled tribe (Bodo) community of Sipajhar circle is congregated in the physical unit of low lying areas with low hills. Bazanapathar and Ganeshkuwari are the only two panchayats wherein Nepali community is highly clustered. Though Bodo tribe is only 1.30% of total circle population, it is to be noted that 8.38% of district’s total S.T. population is registered in this circle. Out of the total S.T. population of the circle, 90% of it is concentrating in Ganeshkuwari followed by 7% in Dumunichowki and the rest is spread in other panchayats. From the aforesaid overview it can be visualised that different caste and communities of the circle are concentrated in different panchayats. Therefore any variable studied at panchayat level will obviously reflect the characteristics of the social group of the concerned panchayat.

The last section of 3rd chapter also gives a brief account of literacy rate of panchayats inhabited by different castes and communities. The literacy rate of the circle is not at all satisfactory in the context of state’s literacy. As per 2011 it is 63.15% in the circle as against 64.55% literacy rate in the district and 73.18% in the state. There is a wide range of spatial variation in literacy of the panchayats. For instance, literacy rates vary from 33% in Bazanapathar to 80%
in Ghorabandha and Hazarikapara G.P. it is also seen that there is high rate of literacy in the G.P. of built up belt while it is found desperately low in the G.P. of char areas. Poor transport and communication, lack of proper implementation of developmental schemes etc. can be attributed to low literacy rate in the circle.

In the 4th chapter land use and land cover change analysis of the study area have been presented after identifying nine major land use and land cover types by using remote sensing and GIS. The land use and land cover types are recognised as Mixed Moist Deciduous Forest, Agri-plantation/Settlement, Cropland (Kharif), Cropland (Rabi), Swampy Area, Grass Land, Scrub forest, Water Body and Sandy Area. It is noticed that there is a spatio temporal variation in various categories of land cover type of the circle. Mixed Moist Deciduous Forest is found to be highly clustering in the belt of low hills and hillocks located to the south western part of the circle. The geographical area of this land cover type has been steadily decreasing since 1977. It is recorded that there has been loss of 2.65 km² of forest coverage during 1977-1991 and 0.29 km² during 1991-2013 due to increasing population pressure on the land.

The land cover type of agri plantation and settlement recorded the highest positive net change with 7.82% during 1977-1991 and 4.46% during 1991-2013. High growth of population and consequent pressure on cultivable land and grazing ground have affected the expansion of this land cover type over the years.

It is noticed that 19.23 sq.km area of kharif crop and 3.55 sq.km area of rabi crop were reduced during 1977-1991 while 12.27 sq.km area of kharif crop and 3.8 sq. km area of rabi crop were added to cultivable land during 1991-2013.
The area under swamp experienced a positive net change since 1977. On the other hand the area under scrub forest shows that a negative net change has been registered since 1977 to 2013. Also there has been a trend of negative net change in grass land from 1991 to 2013. As for the sandy area of the circle, it is found that there is positive net change during 1977-1991 while it recorded negative net change during 1991-2013. It is a matter of concern that over the last 36 years there has been steady decrease of water body area due to drying up of various braided channels of the river Brahmaputra. it is noticed that an area of 3 sq. km and 3.38 sq km were decreased during 1977-1991 and 1991-2013. At present the bed of dried up channels have been occupied by crop farming and new settlement of char dwellers.

It is observed that there is a spatio temporal variation in the change of land use and land cover type of the area. It is quite clear that several new agri-plantation and settlement areas are coming up mostly in southern and western part of the circle. The impact of this process has been experienced in the declining proportions of area under moist mixed deciduous forest, grass land, scrub forest and sand.

The Chapter 5 deals with the occupational composition and the trend of peasant participation in agricultural practices of Sipajhar circle. According to the definition of worker, the average participation rate for Sipajhar revenue circle is 37.29% as against the district’s average of 34.98% and the state’s of 38.14%. In the Sipajhar revenue circle out of the total population 27.45% is main worker and 9.83% is marginal worker as per 2011 census. This indicates that 62.71% of the
total population of the circle is economically dependent on the 37.29% working population.

Distribution of total workers across the panchayats shows that out of total working population of the circle, Bazanapathar and Sanowa G.P. with 14.83% and 14.37% respectively registered the highest percentage of economically active section of population. Among all the panchayats, Byaspara G.P. has the lowest percentage of working population. Again Bazanapathar and Sanowa G.P. have the highest proportion of main workers followed by Lokrai, Ganeshkuwari, and Bordoulguri panchayat while Byaspara with 2.60% of total workers recorded the lowest proportion of it.

With 16.60% main cultivator to the total population the Sipajhar revenue circle occupies a remarkable position in the district as against district’s average of 12% and the state’s of 10%. Out of the total main cultivators of the circle, the proportion of this occupation varies from 1.57% in Ghorabandha to 22.88% in Bazanapathar and 18.80% in Sanowa. The proportion of total population engaged in the occupation of main agricultural labourer is found to be nominal at 2.18% in the circle as against the state and district average of 3% and 5% respectively. It varies from 0.78% in Kuruwa to 27.02% in Bazanapathar. The proportion of workers to the total population engaged in household industry is quite nominal with 0.60% in the circle. With a proportion of 22.65% of the total household industry workers Ganeshkuwari G.P. tops the list and the least proportion is recorded at 2% in Bordoulguri panchayat. The circle accounts for 8.05% of total population in the occupation of other services.
The fact that the proportion of main cultivators to total working population has been declined from 45% to 44% during last decade strongly hints at shifting of some cultivators to other avenues. Not only the proportion of main cultivators, but also the proportion of marginal cultivators to total workers has been reduced from 10.83% in 2001 to 9.84% in 2011. It is noticed that the least proportion (14.7%) of total workers in the age group of 15-36 years is engaged in agriculture while 60.5% of total workers under the age group of above 60 years is working as cultivators followed by 43.36% of total workers between 36-60 years of age. Out of the total main cultivators, 50.38% of it is in the age group of 36-60 years, 25.19% is in above 60 years of age and 24% is in 15-36 years of age. Therefore nowadays it has become a matter of great concern as to why the young age group is not inclined to farming occupation. It can be visualised that there is an upsetting declining trend in the participation of agricultural activities among young age group of different castes and communities, especially among the communities of built up region of the study area.

The chapter 6 presents the analysis of the cropping pattern and its growth and development in different community concentration areas–panchayats and caste-community villages of the study region. Here the cropping pattern explains that largest share of net sown area is under winter paddy or sali cultivation. Nizsipajhar of Debananda and Hatimuria of Garukhuti G.P. inhabited by O.B.C. have the highest percentage area under winter paddy cultivation. With respect to boro paddy cultivation the Hatimuria village of O.B.C. itself ranks first in terms of area devoted to it. ahu paddy is basically found to be growing in the villages of char area settled by non indigenous Muslim and of built up areas inhabited by
indigenous Muslim community. There is a indigenous variety of winter rice, known as *bao* paddy is still practised in some villages of the circle, but its areas of cultivation is gradually declining. The Bijulibari village of S.C. is seen to be devoting highest percentage to this variety.

Maize cultivation is becoming popular among the non indigenous Muslim community of the *char* area. Also it is grown by the villages of indigenous Muslim community nearby *char* areas. Among the cash crops jute and sugarcane are the important crops. Jute is mainly raised by the H.C. (*kalita*) O.B.C. and non indigenous Muslim community while sugarcane is by the villages like Phuhuratali, Badiasisa and Patgirichuba. The villages of non indigenous Muslim in *char* constitute the largest share of total cropped area in vegetable cultivation. Orchard farming or agriplantation is widely practised in the circle. Indigenous non tribal Hindu community and scheduled tribe raise orchard of beetle nut and leaf, coconut and fruit trees attached to their homestead.

The land system and land ownership pattern of this chapter examines that there are different categories of land tenurial arrangement in the circle comprising the agricultural landless labour, share cropping tenant, leasehold tenant and the land owning farmer (the farmer proper). As per land holding size farm families are classified as marginal or landless, small farmer, medium and big farmer.

The study of crop combination is carried out at the level of panchayat and community village. Sanowa and Bazanapathar G.P. have registered first ranking crops and the farming communities of these two G.P. are engaged in multiple cropping. Lokrai, Ganeshkuwari and Bordoulguri have possessed the double
cropping combination and the rest has been identified as mono cropped area. Crop combination analysis is also carried at caste-community village selected by 23 sample villages. The result shows that multiple cropping (more than 7 crops) community villages are found in char area and three or four crop combination are in low lying area with low hills and built up areas. So it can be assumed that built up areas are marked by mostly mono crop or three crop combination.

Crop diversification is a concept which is opposite to crop specialisation and pattern of crop diversification is inquired into across the panchayats and the caste-community villages. It reveals that Ghorabandha recorded a least diversification of crop while Lokrai, Sipajhar, Byaspara, Bordoulguri, Kuruwa, Ganeshkuwari and Dumunichowki registered low medium diversified crop area; Hazarikapara, Debananda and Maroi are assigned to high medium diversified crop area and Sanowa, Bazanapathar and Garukhuti G.P. are identified as the highly diversified crop area in the circle. Also the caste- community villages of the study area reveal that there is spatial variation of diversification of crop in those community concentration area. Non indigenous Muslim community and indigenous Muslim community are found to be in the greatly diversified crop area while O.B.C., H.C. and S.C. are in moderately diversified area and S.T. and Nepali community concentrated areas are designated as the least diversified crop area.

Pattern of crop concentration is also carried out to ascertain the areas where a particular crop grows well even with the help of minimum inputs and thus has great significance for agricultural development and planning. For that purpose six principal crops, namely winter paddy, spring paddy, maize, mustard,
jute and rabi crops have been selected to find out their respective concentration index at the level of panchayat. High concentration of winter paddy is reported in the G.P. of Ghorabandha, Lokrai, Byaspara, Bordoulguri, Ganeshkuwari and Dumunichowki while *boro* or spring paddy is found to be concentrated in Sanowa, Garukhuti and Maroi panchayat. Sanowa and Bazanapathar G.P. has possessed the highest concentration of maize and jute crop while Sipajhar, Bazanapathar and Ganeshkuwari G.P. recorded the highest concentration of mustard crop.

There has been a spatio-temporal variation of cropping intensity in gram panchayats of the circle. it is noticed that Sanowa and Hazarikapara G.P. registered the highest cropping intensity with a highest positive change from 2001-2012 followed by Debananda, Bazanapathar, Garukhuti and Kuruwa. On the other hand during last decade the gram panchayats having a negative change in cropping intensity are identified in Lokrai, Byaspara, Bordoulguri, Ganeshkuwari, and Dumunichowki panchayat.

The level of farm mechanization or modernisation in the Sipajhar revenue circle varies significantly from one G.P. to other. This is quite evident from the range of the composite index values of farm mechanization that varies from 2.75% to 14.46%. Among all the gram panchayats, Sanowa registers the highest degree of farm mechanization followed by Bazanapathar and Garukhuti. In these three gram panchayats the proportion of input of farm machinery is comparatively higher than that of other G.P. It is observed that Sanowa, Bazanapathar and Garukhuti G.P. have been pioneer in adopting various means of agriculture modernization while Byaspara is found to be possessing least level
of mechanization. Of all the castes and communities non indigenous Muslim community ranks first in the level of farm mechanization in agriculture. Next to this community is indigenous Muslim community followed by O.B.C., H.C., S.C., S.T. and Nepali community. The different communities of the circle have also introduced some improved method of farming practices like system of rice intensification, integrated pest management, double planting, line sowing, multiple cropping and integrated farming system.

Level of crop productivity by using Kendell’s productivity method was investigated in panchayat and caste-community villages of the circle. The composite scores of the G.P. and villages have been grouped into high, high medium, medium and low productivity regions. The high crop productivity is found in Bazanapathar, Sanowa and Garukhuti G.P. which mostly stretch over char and the transitional belt between char and built up area. Hazarikapara, Lokrai, Bordoulguri, Kuruwa and Sipajhar G.P. is categorized into high medium productivity zone. Medium productivity is noticed in Debananda, Ghorabandha, Maroi and Ganeshkuwari panchayat while low productivity recorded by the G.P. of Byaspara and Dumunichowki.

An investigation has been made to find out the relationship between the agricultural input (X) and its total output (Y) in the study area. For that purpose average expenditure incurred by farmers of each caste-community village and total output or income earned by them are taken into consideration. After finding out the degree of relationship between the two variables scatter diagram is drawn and fitted with a regression line. The coefficient of determination is derived to find the explained variance of average annual agriculture income by the change
of average agriculture expenditure. Finally the residual \((Y-Y_c)\) values are derived out from original and estimated value to show the nature and intensity of operation of the factors in determining agricultural output \((Y)\) other than the independent variable \((X)\) like agricultural output.

The study of periodic markets, morphology of market and marketing channels is also accomplished to know the idea about economic and social status; needs and aspiration of people; problems and potentialities of surrounding areas. Thus the rural markets cover wide range of functions from the point of production to the point of consumption in the study area.

Finally the chapter 5 puts forward the delineation of the study area into three agricultural development regions by finding out Z scores of the variables. All the aforesaid variables, namely cropping intensity \((x_1)\), physiological density \((x_2)\), crop diversification index \((x_3)\), composite index of modernisation \((x_4)\), percentage of High Yielding Variety \((x_5)\) and Productivity index \((x_6)\) are chosen for data matrix to calculate the Z score of each criterion for each panchayat. After processing the data, some positive and negative z score values are derived and they are summed up to prepare composite indices which are classed into low, medium and high agricultural development regions. The study reveals the fact that as many as eight gram panchayats, namely Ghorabandha, Lokrai, Byaspara, Bordoulguri, Maroi, Kuruwa, Ganeshkuwari and Dumunchowki possess low level overall agricultural development. Hazarikapara, Debananda and Sipajhar gram panchayats are characterised by medium level while remaining Sanowa, Bazarapathar and Garukhuti gram panchayats recorded as high agricultural development region.
In the 7th chapter the problems come across by the farmers and the strategies suggested for the solution of them are discussed in detail. The problems faced by the farming communities of the Sipajhar revenue circle are classified into i) Natural constraint-vagaries of monsoon and flood damage ii) technological constraints-deficiency in crop varieties, inputs (seed, fertilizer, farm power, irrigation credit) and iii) Management and other constraints- lack of inter and intra departmental linkage, smallness of holding, ageing group of farmers and lack of crop damage surveillance and market facilities.

For the solution of the problems some suggestions are made in this chapter itself. Some structural and non structural (administrative) measures of immediate, short term and long term solution of flood are mooted. Besides, the means to be adopted before, during and after flood disaster takes place are also put forward. Restructuring of cropping pattern, infrastructural development, measures of plant protection and ameliorating present conditions of small and marginal farmers are suggested for eliminating the constraints of farmers. Finally this chapter presents a SWOT (Strength Weakness Opportunity Threat) analysis for obtaining greater insights into the agricultural sector of the study area.

8.2 Conclusion

Agricultural practices of Sipajhar revenue circle, Darrang district being situated in lower Brahmaputra valley of Assam put up a pattern of variation in different caste- community concentration areas of it. It is obvious that the behaviour of farming castes and communities whose decisions about input use, selection of cropping pattern and crop sequence are basically conditioned by the
environment as perceived by them. As their decision making process with respect to agricultural practices in the field is much influenced by the socio cultural background of the farmers. Thus the study of agricultural practices among different castes and communities has currently gained importance for planning and development to focus on micro region like revenue circle. This project, therefore, set out to determine the cropping pattern, its growth and development, the constraints of farming and its measures of solution in different caste- community concentration areas. After making a comparative study it has clearly demonstrated that the peasantry belonging to different caste- community concentration areas of the circle exhibits a spatial diversification in agricultural behaviour. Thus the main conclusions emerging from the discussion of the foregoing chapters can be summarised in the following points.

1) It was observed that Sipajhar revenue circle occupies 21.11% of the total district area. The climate of the circle is of humid sub tropical with warm humid summer and cool dry winter, with an average annual rainfall of 994mm. The circle is provided with three sub physiographic units of the lower Brahmaputra valley – the active flood plain and char; the marshy and low lying area with low hills and the middle plain of the built up region.

The active flood plain and char refers to the riverine zone of the river Brahmaputra wherein numerous chars (strip of sand bars) of new alluvium are formed due to frequent shifting courses of the tributaries at their confluence with river Brahmaputra. This zone is mostly inhabited by non indigenous Muslim community. The marshy and low lying area with
low hills of south western part of the circle is formed by the shallow pool of the river Nangi and Barnadi and this zone is dotted with some low hills and hillocks wherein Nepali and Scheduled tribe (Bodo) social group is found to be concentrating along with others. To the north of these two units, there lies the middle plain of the built up zone of old alluvium soil. This belt is mostly occupied by the indigenous non tribal Hindu and indigenous Muslim communities. Based on soil and climate the area supports mixed moist deciduous, grassland and scrub vegetation.

The study area accounts for 13.5% (122937) of the total population of Darrang district. Although the population of the circle is increasing, the decadal growth rate is in declining trend, being 22.2% in 1991-2001 and 14.66% in 2001-2011 decade. There is a wide variation in the growth, density and distribution of population within the study area. At panchayat level it is seen that Sanowa G.P. with 69.3% recorded the strikingly highest decadal growth rate during 2001-2011 as against the circle average of 14.66% and the district average of 19.5%. Barring Sanowa, panchayats like Bazanapathar, Dumunichowki, Maroi, Ganeshkuwari and Bordoulguri have the growth rates ranging between 9.27% and 14.14%. In contrast, Kuruwa (2.80%), and Debananda (4.78%) have witnessed low population growth rates while Byaspara gram panchayat recorded zero population growth rate during last decade. While at village level some villages of the char belt like Ganakbari, Barbari, Niz Salma, Dhalpur No.1 and Dhalpur No.2 village of Sanowa and Sukaguri No.2 (103%) of Bazanapathar G.P. have registered exceptionally high growth rate, being
more than 100% during last decade. Unlike Char areas, the villages of built up and low land with low hilly area recorded low growth rate. Even some villages of the built up belt such as Ghopa of Bordoulguri, Niz Sipajhar of Debananda, Duaripara and Dhokapara of Byas Para, Majarchuba and Rajapukhuri Garukhuti, Upper kuruwa of Kuruwa panchayat registered negative growth rate during last decade. The negative growth rate of population can be attributed to rural to urban migration, better education and health promo etc. while positive population growth rate is caused by shifting of population from one char to other due to bank erosion, high birth and declining death rate and other social factors.

2) With 149.96 sq.km the built up belt supports 75% of the circle’s total population, the char area with 93.82 sq. km. have sheltered 22% of the total population of it while the marshy and low lying area with low hills zone having 46.49 sq km. accounts for 3% of total population.

Sipajhar gram panchayat is the most densely populated G.P. with 1013 persons per sq. km. as per 2011 census. This is due to high concentration of people for availing services of commercially growing Sipajhar market centre. In terms of densities, Sipajhar G.P. is followed by Hazarikapara (893), Byaspara (854), Debananda (739) and Bordoulguri (716) while the Bazanapathar G.P. records the lowest density of population, being 219 persons per sq.km.

3) There are 5 socially identifiable communities in the circle, namely indigenous non tribal Hindu (INTH), indigenous Muslim (IM), non indigenous Muslim (NIM), Nepali and Scheduled Tribe (ST) and 3 castes
of indigenous non tribal Hindu community such as high caste (HC), other backward class (OBC) and scheduled caste (SC). The INTH accounts for 54%, NIM 23%, IM 20%, ST (Bodo) 1% and Nepali 2% of total circle population. Out of the total population (66358) of INTH, 74% is composed of O.B.C., 18% H.C. and 8% of S.C. Linguistically the people belong to Assamese, Bengali, Bodo and Nepali. By religion 60.4% population belongs to Hinduism, 39.4% to Muslim and Below 1% to Christianity.

4) The INTH community is highly concentrated in Hazarikapara, Debananda, Kuruwa, Ghorabandha, Lokrai, Garukhuti, Byaspara and Sipajhar. High caste social group is highly concentrated in Kuruwa and Hazarikapara. O.B.C. constitutes 40% of the total population and 74% of the INTH community of the circle. The relative concentration of O.B.C. is the highest in Ghorabandha, Lokrai, Debananda, Garukhuti and Sipajhar. The proportion of SC population in the circle is 4.33% of its total population. Maroi, Ganeshkuwari, Kuruwa, Sipajhar, Hazarikapara and Bazanapathar possess the highest proportion of total SC population.

The IM community is mostly clustered in Dumunichowki and Bordoulguri panchayat followed by Maroi, Sanowa and Sipajhar. Sanowa and Bazanapathar G.P. have accommodated the entire NIM community. Of these two, Bazanapathar and Sanowa G.P. shelter 52% and 48% of total NIM population respectively.

Bazanapathar and Ganeshkuwari are the two panchayats that have share of 55% and 45% of the total circle’s Nepali population. The ST
(Bodo) population of present Darrang district is reduced to as low as 1.30% of its total population after creation of Udalguri district. Sipajhar circle accounts for only 0.1% ST of the district total population, but with 8.38% of the district’s total ST population it (Sipajhar circle) ranks 4th position in sharing ST population among the sixth revenue circles of the district. The Ganeshkuwari G.P. registers the highest concentration of ST population followed by Dumunichowki panchayat. One of the most significant findings to emerge from this study is that different castes and communities tend to select different physical settings for their habitation.

5) As per 2011, the literacy rate is 63.15% in the circle as against 64.55% literacy rate in the district and 73.18% in the state. Literacy rates vary from 33% in Bazanapathar to 80% in Ghorabandha and Hazarikapara G.P. It is found that there is high rate of literacy in the panchayats of built up belt while it is found desperately low in the areas of char.

6) The study area is distinguished with 9 classes of land cover types - Mixed Moist Deciduous Forest, Agri-plantation and Settlement, Cropland (Kharif), Cropland (Rabi), Swampy Area, Grass Land, Scrub forest Water Body and Sandy Area. It is found that almost 3sq. km. of area of mixed moist deciduous forest has been gradually decreased since 1977. This study has found that 12.27 sq. km. of kharif crop and 3.8 sq. km. of rabi crop area are added to the cultivable land during 1991-2013. Swamy area is marginally increased by 0.47% while grass land and scrub forest recorded a negative net change at -1.67% and -4.8% respectively during 1991-2013. The sandy area of the circle also experienced negative net
change, being -2.56% during same period. Water body area also has recorded negative net change by -1.13% during 1991-2013. It has been so due to drying up of braided channels of the river Brahmaputra. These dried up channel beds have been occupied by crop farming and new settlement of char dwellers.

7) The findings suggest that the average participation rate for Sipajhar revenue circle is 37.29% as against 34.98% of the district and 38.14% of the state. This shows that 62.71% of the total population of the circle is economically dependent on the 37.29% of working population. At the panchayat level, Bazanapathar and Sanowa G.P. registered the highest the highest percent of economically active population, being 14.83% and 14.37% respectively. On the other hand among all the panchayats, Byaspara having 2.35% of working population shows lowest proportion of working population. It was also shown that Sipajhar revenue circle has possessed 16.60% main cultivators to the total population. The working force of it comprises 91.66% in male and 8.34% in female section. The proportion of main cultivator varies from 1.5% in Ghorabandha to 22.88% in Bazanapathar. Agricultural labourer is found to be nominal at 2.18% in the circle. Among the panchayat it varies from 0.78% in Kuruwa to 27.02% in Bazanapathar. The household industry workers is quite nominal at 0.60% in the circle as against district’s average of 0.49% and state’s average of 0.77%. With a proportion of 22.65% of total circle’s household industry workers Ganeshkuwari tops the list, as a number of brick industries have been put up in this G.P. recently. The least
proportion under the household industry workers is recorded by Bordoulguri G.P. (2%). The proportion of other service workers is 8.05% in the circle which is close to district’s average 8.93%, but much below the state’s average 14%. The Sipajhar G.P. with 15.24% have reported the highest percentage of workers in other services sector followed by Bordoulguri, Ghorabandha, Dumunichowki and Lokrai wherein presence of some growing market centres are noticed.

8) Out of total working population, 70% has been engaged in agricultural sector. The results of this investigation show that the proportion of main cultivators to total workers has marginally declined from 45% in 2001 to 44% in 2011 which hinting at shifting of some workers to other avenues. Also during the last decade a striking feature is obvious that negative growth rate of main cultivators is recorded by as many as seven panchayat in the circle, namely Ghorabandha, Kuruwa, Byaspara, Sipajhar, Ganeshkuwari, Lokrai and Maroi. Therefore the relevance of 2nd hypothesis is clearly supported by these current findings that community wise participation in different agricultural activities has been declining in some community concentration areas of the circle in recent years. It has also been derived that the proportion of marginal cultivator to total working population is gradually declining while main and marginal agricultural labourers have been increased. This study has shown that the abrupt rise of agricultural labourer in the circle has been caused by the increase of workers under MGNREGA scheme.
9) The INTH community comprising O.B.C., H.C. and S.C. accounts for 41% of the total working population of the circle while O.B.C. constitutes 36%, H.C. 34% and S.C. 30% of the total INTH community. There is a decline of marginal cultivator in O.B.C., of marginal cultivator and marginal agriculture labour in S.C and of main agriculture labour and marginal cultivator in H.C. It has been found that among all the castes and communities, IM and NIM community have registered no decline of workers in any sub categories of the agricultural occupation. In contrast, Nepali and S.T.(Bodo) have registered a decline in some sub categories of agricultural occupation during 2001-2011.

10) The findings of the study of 23 sample villages reveals that the workers of young age group (15-36 years) has been engaged in different proportion at different occupation. Out of total population of this age group in the circle 17.2% has been employed in Private Sector Company, 14.73% in agriculture and 11.01% in business sector. on the other hand of the total population between 36-60 years of age, 43.36% is in agriculture, 3.32% in business and 2.43% in private sector while 60.49% of the total population belonging to above 60 years of age is exclusively engaged in agricultural occupation. Therefore it can be visualised that these findings have supported the validation of 2\textsuperscript{nd} hypothesis.

11) The results of this investigation show that IM of Satkhali, Ruparikash, Pakabangipara, Choto athiabari and NIM of Dhalpur2, Dhalpur3 and Phuhurateli are basically involved in ahu paddy cultivation. The NIM community of char area and O.B.C. and IM of nearby char grow spring
or *boro* paddy cultivation. Nowadays *Bodo* and Nepali community are inclined to this practice. All the major castes and communities grow *sali* or winter paddy with exception of NIM community of riverine *char* belt. The highest share of crop area of an indigenous rice variety, known as *bao* is practised by the S.C. village, Bijulibari No.1. Maize cultivation is becoming popular among the non indigenous Muslim community of the *char* area. Also it is grown by the villages of indigenous Muslim community nearby *char* areas. Among the cash crops jute and sugarcane are the important crops. Jute is mainly raised by the H.C. (*kalita*) O.B.C. and non indigenous Muslim community while sugarcane is by the villages like Phuluratali (NIM), Badiasisa (IM) and Patgirichuba (HC). The villages of non indigenous Muslim in *char* constitute the largest share of total cropped area in vegetable cultivation. Orchard farming or agriplantation is widely practised in the circle. Indigenous non tribal Hindu community and scheduled tribe raise orchard of beetle nut and leaf, coconut and fruit trees attached to their homestead.

12) In the rural landscape of the circle this research has shown a four-tier structure characterizing the rural organization, comprising the agricultural landless labour, share cropping tenant, leasehold tenant and finally the land owning peasant (the farmer proper). These are the different categories of land tenurial arrangement belonging to the different classes of an agricultural society.

In Sipajhar revenue circle, 8.46% of the total farm families has leased out their land to either share cropping tenant or lease hold tenants.
Among different caste and communities of the circle the high caste social group recorded the highest percentage (67%) of families leasing out land. In contrast the scheduled caste group (4%) of the area is found to register the lowest percentage of families leasing out their land. No families of Nepali and non indigenous Muslim are seen to lease out there land for cultivation. It has been found that the families having a considerable size of land in possession, shortage of family labour and sound economic status are generally seen to have leased out their land to share crop tenant.

The share crop tenant of the Sipajhar circle accounts for 27.27% of the total farm families residing in it. They are basically landless and marginal farmers carrying out the farming practices of subsistence type. Other backward class (31%) has the highest percentage of share crop tenant followed by indigenous Muslim community (20%), scheduled tribe (15%) and non indigenous Muslim (14%) while Nepali community (3%) recorded the lowest percentage in this regard.

The lease hold tenants are found to be 1.88% of the total farm families in the circle, of which Other Backward Class (33%) and indigenous Muslim (33%) have possessed the highest percentage of lease hold tenant. There is no lease hold tenant among the families of scheduled tribe, Nepali and non indigenous Muslim. Finally it can be estimated that the proper farmer who can carry out farming practices on their assured possession of land comprises 63% of the total farm families in the Sipajhar revenue circle. The study shows that 22.91% of the total farm families of the circle are sub marginal or landless and 36.40% of farm
families constitutes marginal holding in the circle. Bazanapathar G.P. has the highest proportion both in landless and marginal category. Small land holdings accounts for 34.78% in the study area. Small land holdings accounts for 34.78% of the total farm households of the study area wherein Sanowa gram panchayat has the highest share of percentage in this class of land holding. The 5.9% of the total farm families in the circle represents the medium and big landholding. Regarding such farm families Maroi gram panchayat has the highest proportion.

13) It has been found that out of 14 panchayats, only Sanowa and Bazanapathar G.P. have registered first ranking crops and these two panchayats has emerged to be multiple crop unit with ahu, boro, mustard, maize, potato, jute, kharif and rabi crops as the first and second ranking crops. At the level of caste-community village, Ghopa, Kabeichuba, Pithakhowa and Byaspara recorded as mono crop area; Khetmodar, Chamuapara and Chotoathiabari as double crop; Kuwarigaon, Baman pathar, Pakabangi para, Badiasisa, Bijulibari and Niz sipajhar as three crops; Narikali and Hatimuria as four crops and Dhalpur 2, Dhalpur 3 and Phuhuratali village regarded as seven to eight crop combination.

    The finding of study reveals that riverine char and those areas having transitional physical setting with it provide a scope for raising multiple type of cropping pattern.

14) Crop diversification reveals that Ghorabandha recorded a least diversification of crop while Lokrai, Sipajhar, Byaspara, Bordoulguri, Kuruwa, Ganeshkuwari and Dumunichowki registered low medium
diversified crop area; Hazarikapara, Debananda and Maroi are assigned to high medium diversified crop area and Sanowa, Bazanapathar and Garukhuti G.P. are identified as the highly diversified crop area in the circle. Non indigenous Muslim community and indigenous Muslim community are found to be in the greatly diversified crop area while O.B.C., H.C. and S.C. are in moderately diversified area and S.T. and Nepali community concentrated areas are designated as the least diversified crop area.

High concentration of winter paddy is reported in the G.P. of Ghorabandha, Lokrai, Byaspara, Bordoulguri, Ganeshkuwari and Dumunichowki while boro or spring paddy is found to be concentrated in Sanowa, Garukhuti and Maroi panchayat. Sanowa and Bazanapathar G.P. has possessed the highest concentration of maize and jute crop while Sipajhar, Bazanapathar and Ganeshkuwari G.P. recorded the highest concentration of mustard crop. The Sanowa, Bazanapathar and Garukhuti G.P. rank the highest concentrated areas of rabi crop cultivation.

Sanowa and Hazarikapara G.P. registered the highest cropping intensity with a highest positive change from 2001-2012 followed by Debananda, Bazanapathar, Garukhuti and Kuruwa. On the other hand during last decade the gram panchayats having a negative change in cropping intensity are identified in Lokrai, Byaspara, Bordoulguri, Ganeshkuwari, and Dumunichowki panchayat.

15) Of all the panchayat, Sanowa (14.46%) accounts for the highest level of farm mechanisation followed by Bazanapathar (13.36%) and Garukhuti
(11.78%) while Byaspara G.P. (2.75%) is found to be possessing lowest level of farm mechanisation. The finding of this study at caste community village suggest that NIM community ranks first in the level of farm mechanisation among all the castes and community. Next to that community, O.B.C., H.C., S.C., S.T. and Nepali have been ranked as per level of modernisation in agriculture.

16) The pattern of agricultural productivity of Sipajhar revenue circle has resulted in four types of regions-Region of high productivity, high medium productivity, medium productivity and low productivity. The **high productivity zone** comprises Bazanapathar, Sanowa and Garukhuti stretching over the *char* and transitional area between *char* and built up belt. This belt is mostly inhabited by NIM, IM and O.B.C. Hazarikapara, Lokrai, Bordoulguri, Kuruwa and Sipajhar fall into **high medium productivity zone** which belong to INTH and IM community. **Medium productivity** is recorded by Debananda, Ghorabandha, Maroi and Ganeshkuwari G.P. wherein there is high concentration of INTH, Nepali and S.T. (Bodo). Byaspara and Dumnichowki G.P. registered the **low level of agricultural productivity** which is mostly occupied by H.C. *(ganak)* and IM community. Thus this finding proves the 1st hypothesis that “different caste and community concentration areas reflect the variation of agricultural growth and development”.

This study leads to the finding that out of all the castes and communities, NIM community is credited with highest level of agricultural productivity; O.B.C. and H.C., Nepali and IM are assigned to
medium category of productivity while S.C. and S.T. (Bodo) are recognised as the community belonging to low productivity area. This clearly validates the 3rd hypothesis that agriculture behaviour of farming communities in micro level area is conditioned by the environment as perceived by them, because the farming culture traditionally engrained in their mode of life actually motivate them to keep their farming going with a progressive manner.

17) The most obvious finding to emerge from the study of the relationship between agricultural expenditure and agricultural output is that Rs 1.00 change in expenditure by and large causes an increase of Rs. 9.75 in the agricultural income. Thus this finding substantiates the 4th hypothesis proposed on the assumption that there is a positive relationship between the availability of agricultural input and its total output.

18) The study of market morphology reveals that Sipajhar, Bordoulguri and Ruparikash are the important market centres having larger hinterland. Bordoulguri in the east and Dumunichowki in the west of the circle are providing services to the villages lying towards east and west. Pakabangipara, Ghopa, Satmadar, Hazarikapara, Kabeichuba, Chotoathiabari, Dakhin chuburi are the villages mainly served by the centre of Bordoulguri while Dumunichowki, Badiasisa, Patgirichuba, Khas sonapur, Singimari, Narikali, Salpam, etc. by the market center of Dumunichowki. Sipajhar being located at the center of the circle and also the largest service centre of the region possesses highest percentage of threshold population in the region offering services to entire

19) The investigation of entire cropping pattern and its growth and development results in delineation of the study area into three agricultural development based on the Z scores of the variables. These are – Low agricultural development region, Moderate agricultural development region and High agricultural development region. The study reveals the fact that as many as eight gram panchayats, namely Ghorabandha, Lokrai, Byaspara, Bordoulguri, Maroi, Kuruwa, Ganeshkuwari and Dumunichowki possess low level overall agricultural development. Hazarikapara, Debananda and Sipajhar gram panchayats are characterised by medium level while remaining Sanowa, Bazanapathar and Garukhuti gram panchayats recorded as high agricultural development region. High crop diversification, high crop productivity and comparatively high mechanisation places these three panchayats in high agricultural development region. Thus the 5th hypothesis saying that socio cultural circumstances determine the degree of farming progressiveness in community concentration areas of the region can be ratified by looking into the pattern of agricultural development as observed from the Z score analysis.
20) The study has found that the problems come across by the farming communities can be of three categories- i) Natural constraint-vagaries of monsoon and flood damage ii) Technological constraints- deficiency in crop varieties, inputs (seed, fertilizer, farm power, irrigation credit) and iii) Management and other constraints- lack of inter and intra departmental linkage, smallness of holding, ageing group of farmers and lack of crop damage surveillance and market facilities.

Some structural and non structural (administrative) measures of immediate, short term and long term solution of flood are mooted. Besides, the means to be adopted before, during and after flood disaster takes place are also put forward. Restructuring of cropping pattern, infrastructural development, measures of plant protection and ameliorating present conditions of small and marginal farmers are suggested for eliminating the constraints of farmers. Finally the findings of the study suggest a SWOT (Strength Weakness Opportunity Threat) analysis to have greater insights into the agricultural sector of the study area.

8.3 Suggestions

These findings attempt to offer the following suggestions in addition to those put forward in sixth chapter to execute spectacular development in agricultural practices of the study area.

1) By looking into the cropping pattern, land use pattern, physical settings and distribution of different castes and communities, the entire study area can be planned to delineate into four agricultural planning belts - a)
Middle Plain of Built Up Zone comprising the panchayats, namely Maroi, Bordoulguri, Byaspara, Sipajhar, Lokrai and Ghorabandha. b) The Low lying Area with Low Hills including Ganeshkuwari, west Bazanapathar and Dumuchhowki panchayat. c) Transitional Belt (between Char and Built Up zone) consisting of Kuruwa, Hazarikapara, Debananda and Garukhuti panchayat and d) Char Belt comprising east Bazanapathar and Sanowa panchayat. Based on these four belts, the community based agricultural planning should be designed, implemented and managed so as to strengthen the agricultural economy of the study area. Then only the benefits of the schemes of development must reach in full measure to the peasant communities for whom they are meant.

2) The study area being composed diverse castes and communities, it traditionally possesses some distinguished agricultural and its allied practices among different social groups which obviously bear great potentialities for sustainable economic growth. Therefore it is essential to identify those castes and communities with their own traditional practices. For instance, the indigenous Muslim community is characterized by growing of paddy and oil seeds, rearing of poultry, cattle and buffalo; the non indigenous Muslim by growing of vegetables, maize, ahu paddy, fishing, rearing of poultry; the Other Backward Class by raising of indigenous rice variety, bamboo craft, silk rearing, beetle nut and leaf growing, cattle rearing and weaving; Scheduled Caste by pottery, gold smithy and fishing; Nepali by growing of arum, ginger and rearing of cattle and buffalo for dairy product and Scheduled Tribe (bodo) by
piggery, orchard of beetle nut and leaf, bamboo craft and weaving. Therefore there should be separate planning strategy for different castes and communities of the circle. This process empowers local communities to voice their opinion and strengthen skills and confidence to participate in development incentives. Therefore local planning should fit into the regional planning network retaining its individuality.

3) Growth and dispersal of agro based and small scale industries to rural areas help reducing the strain upon rural unemployment. A vital influence of such industrial decentralisation is the improvement of the amenities of life and culture in the form of social infrastructure in the rural areas to make the environment attractive for the people to stay and make their way of life in the rural areas rather than migrate to large cities.

4) It is imperative that for healthy and sustained agricultural development the present educational systems are to be involved and tuned to agricultural activity, as the basic economic infrastructure of the nation is based on agriculture. Students must be initiated to some agricultural activity in their educational institution. Such initiation will remove their present aversion to manual labour and enable them to experience great joy of learning by doing process.

5) Farmers usually are suspicious of those elite technical advisers who lack intimate knowledge of village life, tradition and customs. Unless there is mutual confidence between the extension officers and farmers it will be difficult to initiate and implement development programmes in farm operations. The gap between the attitude of the extension agents and
farmers must be removed or narrowed down. The farming communities should avail their training on agriculture and its allied activities at their own villages with proper field demonstration. For this there should be strong coordination between extension agents, credit institutions and farmers and the department of State Rural Development (SRD) has a major role to play in this regard.

6) As cooperative movement in Assam is not a great success, for overcoming the drawbacks of uneconomic holdings there should be vertical expansion of land through sustainable integrated farming instead of horizontal expansion and yet without proper marketing it will bound to fail. Therefore establishment of regulated markets for the major crops of the circle and proper functioning of such markets can remove the mal practices of middle man in the marketing process. Some secondary markets may be organised among a group of community villages. Such secondary markets will have direct link with producers through their own agencies. So as to expedite this process the first and foremost step is to develop transportation and communication infrastructure in the rural areas of the study area.

The current study has carried out a comparative study of agricultural practices among different castes and communities living in different community concentration areas with varied geo environmental settings. This study obviously has important implication for getting an in-depth understanding of agricultural scenario and for planning and development of a backward area like Sipajhar revenue circle of Darrang district, Assam. However the most important limitation lies in the fact that the project has not completely explored the fields of allied
agricultural activities like dairy farming, rearing of poultry and piggery, pisciculture, beetle nut and leaf farming, silk rearing, bamboo craft, pottery etc., because all these hold the identity of Sipajhar revenue circle. Therefore it is recommended that further research be undertaken in the following areas of the study area: