CHAPTER-IX

SUMMARY AND CONCLUSION

The present work is an analysis of the socio-spatial variation of agricultural development in Darrang district and the existing pattern of agricultural development in the study area reveals different characteristics. The study highlights on many interesting features such as variation of agricultural pattern among different social groups and in different spatial units of blocks. The district is inhabited by people of several social groups comprising of indigenous Hindus, indigenous Muslims, Scheduled Tribes, Scheduled Caste, Muslims of immigrant origin, tea-garden labourers etc. Growth and development of agriculture is dependent to some extent on the attitude and behaviour of different social groups. Facilities of irrigation, transportation and communication etc. are also not equally distributed.

The study region is endowed with a rich variety of physiographic features and has immense potentialities for agricultural development, yet putting to human efforts tremendous barriers such as chars, water channels, water logged areas, wetlands, recurrence of floods in summer and prolonged drought condition with scarcity of water.

The analysis of physiography, climate, soil and settlement of different social groups in different physical settings of district reveals physio-ecological settings of agricultural development; such an analysis is highly necessary for future agricultural planning. The existing agriculture dependent on monsoon is not sufficient due to erratic and uncertain monsoon rainfall. The phenomenal growth of population has been creating a problem in the agricultural economy of the district. Because of the lack of
opportunities in the secondary and tertiary sectors, agriculture has to bear the burden of absorbing ever increasing surplus rural people.

The study of the distribution of settlement of the different social groups shows that the majority of the people settled in the built-up plain region. The village become cluster along with the increasing population, although there is no physical barrier for disperse settlement because all the plains are almost physically homogenous. In the low lying region or char areas, inhabited by the Muslims of immigrant origin, the settlement pattern is different from those of the built-up plain region. Here villages are located within the agricultural fields without following any lines of communication, resulting in scattered type of settlement.

For the development and modernization of agriculture, application of inputs and infrastructural facilities are very much essential. Irrigation in the district is necessary due to erratic and unpredictable rainfall. There are different sources of irrigation but the shallow tube well irrigation supplies water to more areas. Irrigation is required for watering various kinds of crops, especially the Boro and winter rice.

The first chapter of the thesis contains the statement of the problem, review of literature, objectives of the study, significance of the study besides methodology adopted and organization of the study.

The second chapter deals with the introduction of the study region. The physiography, climate, drainages and water bodies, soil, vegetation, animals and birds as well as the population structure of the district have been analyzed in this chapter. Besides, the historical background of the different social groups of the district has been presented here.
The third chapter describes the various physical and socio-economic factors affecting agriculture in the district of Darrang. Some of the physical and socio-economic factors discussed are topography, climate, flood, soil erosion, size of land holdings, labour force, land revenue system, mechanization and equipments, transportation facilities, marketing facilities etc.

Land use and cropping pattern have been discussed in chapter four. The scope for physical expansion of arable land in the district is very much limited. The total area of land not available for cultivation was only 17.88 percent of the total geographical area of the district in 1991. The general land use pattern has been changed due to rapid growth of population. The most dynamic change in land use is found in the areas of the immigrant dominated areas of the district. Such a dynamic change is caused by the rapid socio-economic changes that have taken place due to the fresh surge of immigrant origin Muslims. Least change in land use is found in most of the areas of the built-up mid plain region where the land has been settled by the indigenous farmers for a long time without having flood hazards and immigration. Land not available for cultivation is found in the southern most part covering the char areas of the district.

The changing pattern of agricultural land use is the result of the transfer of land from one kind of agricultural use to another in relation to space and time. The cropping pattern in the district various spatially. Rice is the most important crop in the district covering 60 percent of the total cropped area in 2010-11. Different varieties of cereals like rice, wheat, and maize, oilseeds like rape and mustard, sesamum and linseeds as well as vegetables like potato, brinjal, cabbage, cauliflower, tomato, cucumber, ridge gourd, bottle gourd, snake gourd, lady’s finger, bitter gourd etc. are grown in the district. Jute and mesta are the main fibre crops. Varieties of fruits like banana, coconut,
papaya, mango, orange, pineapple, guava; litchi, lemon etc. are also grown in the region. The percentage of the total cropped area and net sown area varies from block to block and social group to social group. It is found that the total cropped area is the highest in the Muslims of immigrant origin dominated areas. The intensity of cropping is the highest in the immigrant origin Muslims villages and lowest in the Scheduled Caste inhabited villages.

Chapter five is devoted to the discussion of innovation in agriculture. Several crucial aspects of agriculture like introduction of HYV crops, use of fertilizer, pesticides and insecticides, use of modern implements and mechanical tools etc. have discussed in detail in this chapter. These aspects have to be looked into, inorder to increase the productivity of agriculture in the district.

The production and productivity of major crops in Darrang district have been highlighted in chapter six. In this chapter, light has been thrown on changing productivity pattern and the role of social groups in this respect. Chapter seven discusses the role of different social groups on agricultural development. A glimpse on the attitude of the social groups towards agriculture is also reflected in this chapter. The whole of chapter eight has been devoted to the discussion of spatial variation of agricultural development in Darrang district.

Concentration and combination strength of different crops is the highest in the blocks where the immigrant origin Muslims people are concentrated. In the Dalgaon-Sialmari, Bechimari development blocks and the char areas of Pub-Mangaldai development blocks where majority of the immigrant origin Muslims have been inhabiting, the number of crops in combinations are 6,5 and 4 in 2010-11. The crops combination is a technique used to identify crop regions dominated by a combination of
more than one crop. From the analysis of crop combination in the indigenous Muslims dominated areas in the north western part of the district, it is seen that this part has 3 or 2 crop combinations. The number of crops in the crop combination has gradually decreased in the north western parts of the district, because the farmers are not interested to cultivate other crops except HYV rice.

Crop diversification simply means the raising of a number of diverse crops in an area. Two areas of crop diversification have been identified from the cropping pattern of the district. The immigrant origin Muslims dominated blocks of Bechimari and Dalgaon-Sialmari are the most crop diversified blocks of the district in 2010-11. Diversification is in fact, a reflection of interplay of the complex socio-economic and physical factors. All the factors are dynamic except physical factors, so under the influence of dynamic socio-economic factors, the crop diversification is gradually modified. The percentage change of crops, between the two periods 1991-2010-11 is high in the Bechimari and Dalgaon-Sialmari blocks and char areas of the district. The percentage change is negative in the Khairabari, Kalaigaon, Sipajhar and northern part of Pachim-Mangaldai development blocks as the spread of education created alternative easier sources of income.

In the district, different socio-economic condition has been influencing the different social groups and so crops are diversified in different blocks. On the basis of crop diversification indices scored by different blocks, the district is divided as follows-(i) Highly diversified development blocks, (ii) Moderate diversified development blocks and (ii) low diversified development blocks.

The study of the distribution of settlement of the different social groups shows that the majority of the people settled in the built-up region. The village becomes
cluster along with the increasing population, although there is no physical barrier for
disperse settlement because all the plains are almost physically homogenous. In the low
lying region or chars which are inhabited by the Muslims of immigrant origin, the
settlement pattern is different from those of the built-up plain region. Here villages are
located within the agricultural field without following any lines of communication,
resulting in scattered type of settlement. Even a village comprises a number of thatch
houses scattered over the open agricultural field without having any linkage between
one hut to the other.

The use of modern innovative tools and technology is indispensable to the
development of agriculture in the district. Irrigation is necessary because of erratic and
unpredictable rainfall. The highest percentage of irrigated area is found in the Dalgaon-
Sialmari development block (90.07 percent), while lowest is seen in the Khairabari
development block (13.63percent). In 2010-11, the average irrigated area was 69.15
percent of the total cropped area in the district. Different social groups have been using
different types of irrigation. In the development blocks of Bechimari, Dalgaon-Sialmari
and Pub-Mangaldai development blocks which are immigrant origin Muslims
dominated uses of pump sets, shallow tubewells, electric motors etc are found in large
scale. The Muslims of immigrant origin farmers are gradually using modernized
agricultural inputs more than the farmers of other social groups.

Agricultural technology to be total success requires its adoption by all the
farmers. Except a few, most of the farmers of all the social groups have been using the
age old technology of wooden ploughs and often traditional equipments in cultivation.
The Muslims of immigrant origin dominated blocks have been using higher number of
modern equipments than the indigenous farmers dominated blocks. The agriculture
department of the government has supplied some modern iron based equipments to the cultivators. Heavy machineries like tractors, power tillers, shallow tube well, pump sets, electric motor pump sets etc. are supplied to the farmers. The Muslims of immigrant origin received the highest number of modern equipments, particularly in the Bechimari, Dalgaon-Sialmari and Pub-Mangaldai development blocks.

It has been observed that agricultural innovation like HYV seed, chemical fertilizers, irrigation, plant protection measures are used by the farmers belonging to different social groups. The HYV seeds for winter rice have been used by the farmers all over the district. The Muslims of immigrant origin farmers have been using HYV seeds not only for winter rice but also for other varieties of crops like vegetables, pulses, jute, wheat etc. The agricultural department of the government of Assam, has been distributing HYV seeds of some crops among the farmers free of cost or at subsidized rates. The HYV rice like Ranjit, Bahadur, Aijung, Biplab, Masuri, Sufala etc. have become popular among the farmers of all the social groups now-a-days.

The use of fertilizer varies from different development block to block. The highest consumption of fertilizers per hectare of net sown area is recorded in the Muslims of immigrant origin development blocks. These development blocks are the major vegetable growing blocks. In the district, per hectare fertilizer use indicates that in 2010-11, the use of total NPK is 31440 tonnes and 210.55 kg per hectore crop land. The use of pesticides and insecticides is an important aspect of modern agriculture. These are required to save the crops in the field from the ravages of pests and diseases. In the district, the highest pesticides, insecticides and fungicides are used in the immigrant origin development blocks. In 2010, the pesticides and insecticides are used in 77.55 percent area of the total cropped area in the Dalgaon-Sialmari development
block, while chemical and bio-fertilizers are used in 60.34 percent area of the total cropped area in this block. Blockwise area under fertilizer use indicates that the percentage of area under fertilizer is the highest in Dalgaon-Sialmari development block which is 95.93 percent of the total cropped area followed by Bechimari development block (93.44 percent) and Pub-Mangaldai development block (83.31 percent). On the other hand, mainly Sali and Boro paddy are cultivated by the farmers of indigenous Hindu, Muslims, S.T., and S.C groups in the Kalaigaon, Khairabari and Sipajhar development blocks. They are not interested in the use of insecticides.

The average size of operational holdings in the district of Darrang is 0.78 hectares in 2010-11. The average size of holdings in Bechimari, Dalgaon-Sialmari and Pub-Mangaldai development blocks is relatively smaller as a result of the increasing number of agricultural population contributed mainly by the farmers of the immigrant Muslim origin. The operational holdings are fragmented and scattered. The village size of operational area is found 0.78 hectares in this study. In the whole district, 80 percent of the total land holdings is cultivated area. Out of the total area, 16.77 percent is Basti area which is an important component of land use in the rural areas where horticulture, pisciculture and vegetables are grown. The percentage of fallow land is very significant everywhere. This shows that the pressure of population on land is very much acute in rural areas. The average size of land per family is the highest in the indigenous Hindus, Muslims, and the S.T. living belts which have little difference with the lowest size of the immigrant origin Muslim living areas.

The analysis made in the foregoing chapters on socio spatial variations of agricultural development in the Darrang District is concluded with some important findings and suggestions as follows:-
Findings

1. The study reveals that there are various social groups inhabiting in the built-up and low lying areas of Darrang district. As a result of high growth of population, more agricultural density is observed. There is also increasing demand for food and grazing lands as uncultivated char lands, a part of forest lands, some wet lands etc. which remained uncultivated earlier are converted to agricultural land after the seventies of the last century.

2. Cropping pattern varies with the variation of physical settings at the micro as well as the dominant level and also as a result of differences in attitudes of the social groups of farmers living in different parts of the district.

3. The study also reveals that most of the farmers belonging to five different social groups have been gradually adopting various innovative measures for increasing the agricultural productivity. They have started using the HYV seeds particularly of rice and vegetables for which the production has increased considerably during the last twenty years. In 1995-96, the production of rice in the study area was 120067 tones whereas it has increased to 218409 tones in 2010-11.

4. Spatial variation in respect of crop-diversification and rotation of crops are found in the study area. Crop-diversification and rotation are more in the development blocks inhabited by the Muslims of immigrant origin.

5. The agricultural productivity and intensity of cropping are found to be closely related to the use of modern technologies. The study reveals that intensity of cropping in the study area during 2010-11 is 175.44.

6. There are a number of problems faced by the farmers in the study area. Irrigation is crucial for agriculture which is mainly supplied by shallow tube
wells and motor pump sets. But at present only 21.6 percent of agricultural land is under irrigation. Another problem faced by the farmers is the want of “cold storages” in the area.

7. In the district, a high pressure of population is responsible for land fragmentation resulting in very small percent of cultivated land. The share of household under different land holding sizes are as- the percentage of household is 21.12 in the size class of <0.5 hectares, 26.94 percent in the size class of 0.5-1 hectares, 30 percent in the size class of 1-2 hectares as well as 21.72 percent in the size class of 2-5 hectares.

8. Various factors like low level of literacy, religious beliefs, conservatism of the farmers etc. affect the agricultural activities in the district.

Suggestions

On the basis of the above findings, the following suggestions for the development of agriculture are put forward

1. Adequate arrangements should be made by the government to supply the HYV seeds, fertilizers, pesticides and insecticides, and modern implements to the poor farmers at subsidised rates well before the onset of the cropping seasons.

2. Slow rate productivity growth of crops may be largely attributed to lack of irrigation. Therefore, government should create more and more irrigation projects in the irrigationally backward areas. Irrigation tools like shallow tube wells and electric motor pumps sets should be provided free of costs or at subsidised rates, to the economically weaker section of farmers. The rural electrification should be extended and if possible the agricultural fields may be connected with electricity so that the farmers can use electric pumps sets for
irrigation. Further it will be of great help to the farmers if the government can provide electricity to the farmers at minimum charges.

3. The farmers of the district are attracted more towards the use of chemical fertilizers for increasing their agricultural productivity. Too much use of chemical fertilizers for longer period of time decreases the production capacity of the soil. Hence the farmers should be encouraged and properly trained to use the bio-fertilizers.

4. Certain drawbacks of the deep tube well irrigation have been observed in the study area. These are deposit of sand on the fields perhaps due to defective installation. Presence of iron in the water in Darrang district created problem of iron toxicity. These drawbacks can be remedied easily if the old borings are replaced by the new scientific ones.

5. HYV seeds are the first and basic component of new agricultural technology. But some of the HYV seeds which the farmers purchase from the agro shops are not of good quality. Therefore, better quality of HYV seeds should be made available to the farmers through government agencies as well as private dealers at affordable prices.

6. If some “cold storages” are set up in the local markets by the government, the farmers will be immensely benefitted from them, as they will be able to store up their green vegetables when the market price declines.

7. The farmers must be given proper training in agriculture at their own villages with proper field demonstration. Learning to cultivate the HYV seeds judiciously is very much essential.

8. Knowledge of scientific method of agriculture should be provided to the rural children from the school days onwards. Agriculture should be included as a
subject in the school curriculum. The course and curriculum should be framed in such a manner that the learners’ minds are automatically diverted to agriculture without any hesitation. If the educated youths can be motivated to take up agriculture as an occupation, then only the traditional method of agriculture can be transformed into most efficient modernized agriculture.

9. Development of transport and communication, linking with the market centres and the upgradation of village markets are very essential.

10. As the poor farmers at their own initiatives cannot improve much the traditional agriculture, it is the responsibility of the government to take various schemes for innovation in the cultivation of not only the food crops but also the commercial crops. The unique agro-climatic condition of the district permits growing of wide range of horticultural crops and pisciculture. Thus it is most important to take steps for transition from traditional to commercial horticulture and pisciculture.

As the region as a whole is overburden with too many people relying for their livelihood on the traditional practice of small scale agriculture, there is an imperative need to diversify and modernize the agriculture sector. The small scale agro-based industries should also be introduced to provide the rural youths, the facilities for alternative and more profitable occupations. Such a planning strategy would surely develop agriculture, horticulture, pisciculture and small scale industries in a sustainable way.
Fig- A.1 A scene of vegetable market at Balugaon under Dalgaon-Sialmari Development Block in Darrang District, Assam.

Fig- A.2 A scene of vegetable market at Bechimari under Bechimari Development Block.
Fig- A.3 Shallow tubewell being used for irrigating the boro paddy

Fig- A.4 A scene of irrigation through electric motor pump set.
Fig- A.5 A scene of beans cultivation

Fig- A.6 Tractor being used for ploughing land for vegetable cultivation