1.1 THE PROBLEM

Although agriculture is the backbone of the economy of Assam, it remains overwhelmingly backward and traditional in most of the areas of the state. Except tea plantations, the annual crop cultivation, especially food crops, is carried out by the small peasant families who are living in the rural societies. But it is disappointing to note that they have been facing varieties of problems over which they have little control because of extreme lack of capital, technical know-how and other resources.

Being situated in the lower part of the Brahmaputra valley, the South Bank Region of the Kamrup District of the state also have been facing with similar problems of agricultural development as those found in the state as a whole. Excluding the Guwahati city, this region has to engage more than 70 per cent of the total workers in the agricultural activities of annual cropping and the majority of the people directly or indirectly depend on it for their livelihood. Some of the important problems constraining agricultural development and innovation in this region may be summarised in four categories as follows: (a) natural, (b) biological, (c) techno-economic and (d) socio-cultural.

The natural problems include flood, drought, soil erosion, and the biological problems are pests and diseases, unhealthy peasants and draught animals; while the problems, such as surplus manpower, insignificant use of inputs like improved seeds, fertilisers, pesticides and insecticides, modern implements, irrigation, finance, inadequate market facilities and price-incentives, adverse land policy and legislation, lack of
agricultural research and inefficient extension services are included in techno-economic problems. Among the multitude of socio-cultural problems, conservative outlook of the farmers, his fatalism, ignorance, illiteracy and antiquated organisation of agriculture are found to be of great importance.

In spite of the government's efforts to solve some of the natural and tech-economic problems, growth and development of agriculture in the region is not found to be satisfactory. Without the help and guidance of the government, agricultural development in the small peasant sector cannot be expected since the peasants are facing with manifold problems as outlined above.

From a cursory view on the region, it is observed that this predominantly agrarian region with immense potentialities for agricultural development has been remaining backward and overwhelmingly traditional. But the spatial distribution of the potentialities and constraints is not uniform throughout the region. There is spatial variation in it on the basis of the geographical-environmental conditions. A thorough investigation and an in-depth analysis of all the above aspects is, therefore, deemed to be necessary in order to find out the basic problems of the backwardness and traditionalism prevailing in the study region in the spatial-environmental perspective.

1.2 SIGNIFICANCE OF THE WORK

The study which analyses and highlights the important problems relating to the traditional type of small-scale family farming prevailing in the South Bank Region of Kamrup District is considered to be of great significance not only to the
academicians but also to the planners for formulating agricultural development strategy suitable for the region. A thorough geographical investigation made in this study both at macro and micro levels unfolds certain facts of the agricultural situation hitherto almost unknown and thus will be able to enrich the existing knowledge of agricultural geography of the region. Besides, the significance of the study lies in the fact that the study region within which the Guwahati City, the premier one of the whole of North-East India and the capital of Assam, is located, has been remaining most backward with majority of the people depending on disabled small-scale agriculture for their livelihood. In spite of such a deplorable condition of the region, no research work from the geographical-economic perspective has been carried out so far by anybody. Such considerations have prompted the author to take up this research work in this region to which he belongs.

1.3 OBJECTIVES

The main objectives of the study are:

(a) to analyse the influence of the natural, biological, techno-economic, and socio-cultural factors on the agricultural production of the region;

(b) to examine the extent to which the peasants have accepted the modern methods of agricultural production;

(c) to assess the pattern of agricultural performance in the region; and

(d) to suggest measures for solving the problems of agricultural development in the region on the basis of the findings of the study.
1.4 HYPOTHESES

In order to achieve the above objectives, the following hypotheses are proposed:

(1) Agricultural production in the South Bank Region of the Kamrup District is predominantly determined by the natural-environmental conditions.

(2) Spread and adoption of innovative measures in agricultural production are determined by the socio-economic background of the peasants and the effort made by the agricultural extension workers.

(3) Agricultural development in the region has so far been very much insignificant, because of the conservative socio-cultural outlook of majority of the peasants.

(4) The level of agricultural development varies spatially depending upon the traits of different peasant communities inhabiting in different ecological zones.

(5) The intensity of cropping in the region is determined by the pressure of population on the cultivable land.

(6) Small and uneconomic size of land holdings acts as a deterrent factor in the application of modern inputs.
1.5 METHODOLOGY

The study is made in the context of the South Bank Region of the Kamrup District except the Guwahati Circle which includes the area under Guwahati Municipal Corporation and nine adjacent villages as these areas are not relevant to the purpose of the study. In this study, the mouzas are selected as the primary spatial units of investigation and wherever data at the mouza level are not available, the revenue circles are considered as spatial units. The relevant secondary data are collected mainly from the Directorate of Economics and statistics, Department of Irrigation, Directorate of Land Records, Block Development Offices, and other Government Departments and agencies involved in agriculture and rural development. Land use and crop data for the period 1983-87 are collected from the Revenue circle and District Agriculture Office. On the other hand, population data are taken from the Census of India, 1971, as the 1981 Census could not be held in the state due to the Assam agitation on deportation of foreign nationals. The secondary data collected in this way have been processed by different quantitative methods and results are cartographically represented with maps and diagrams. The general land use and agricultural land use at the mouza level are shown by proportional pie diagrams and choropleth maps. The crop-combination method of Nelson has been used to find out the crop-combinations in different mouzas and these are shown in a choropleth map.

For finding out intensity of cropping and crop diversification in different mouzas, respective indices are used and results are shown in choropleth maps. In order to identify the factors responsible for increasing the intensity of cropping, correlation coefficients between intensity of
cropping, and each of such probable factors as irrigation, density of rural population, density of agricultural workers, scheduled caste and scheduled tribe population and immigrant population. The relative index of surplus farm-workers and the relative coefficient of overpopulation devised by R.K. Mukherji are used to study the problem of excess farm workers. Concentration of operational landholdings are shown by Lorenze Curve. For micro-level study, six villages representing the condition of agriculture performed by different communities of the region are selected. Here, factors affecting agriculture such as landholding structure, family structure, land use, irrigation, consumption expenditure of the peasant families, crop-marketing and sources of income are studied. Data and information from six representative villages are collected through a schedule. Villages are selected in such a way that they can represent three different ecological zones and different communities of the region. Then the landholding data of each household of all the villages are collected from the Revenue Department and households are classified into four categories, viz. household possessing landholding of less than 1 hectare size, 1 to 2 hectare-size, 2 to 4 hectare-size and above 4 hectare-size. After classification of the landholding, 20 per cent of the households are selected with proportional stratified random sampling from each of the size classes and data relating to landholding and agricultural activities are collected from each household. Then the data so collected are analysed to represent different ecological zones and dominant social groups.
1.6 ORGANISATION OF THE STUDY

The main format of the study has been divided into three main parts, viz. (1) introduction, (2) analysis of the problems and (3) synthesis. The first part consists of two chapters. The first chapter introduces the study covering the statement of the problem, significance, objectives, hypotheses and methodology of the study and also a brief review of relevant literature. The second chapter deals with the geographical background of the study region.

The second part embodies five chapters (from third to eighth chapter). The third chapter analyses the patterns of general and agricultural land use while the fourth one investigates the cropping intensity in the area. The analysis of the natural environmental problems affecting the production of agriculture is made in the fifth chapter. The sixth and the seventh chapter respectively includes the analysis of the techno-economic and socio-cultural problems that stand in the process of agricultural development in the region. A case study of six representative villages of the region is presented in the eighth chapter.

The third part is a synthesis consisting of the summary and the conclusion. It comprises the findings of the study and suggestions for improving the condition of
agriculture in the region.

1.7 LITERATURE REVIEW

Although agricultural geography is a distinct branch of geography, importance of formal study on this branch came into light only in the early part of this century. Among the founders of agricultural geography mention may be made of Baker (1926), Jonasson (1925-26), Valkenburg (1931-36), Jones (1928-30), Taylor (1930) and Whittlesey (1936) who devoted their works mainly to agricultural regionalisation in order to establish the broad spatial pattern.

Considerable improvement in the subject so far as application of scientific and systematic methods and in-depth study are concerned was made during the fifties. Reeds (1964) commented that many studies on agricultural geography had been superficial investigation of extensive areas. All the earlier works were not based on any conceptual models and theories. Only during the fifties and sixties, the works on theoretical geography by Bunge (1962), Buchanan (1959), Brookfield (1964), Harvey (1966), Reeds (1964) and Franklin (1969) contributed substantially towards conceptual approach in agricultural geography. These theoretical studies were based on large-scale farming of the developed countries. Earlier Von Thünen (1826) built a model on agricultural location which was based on the decline of economic rent or land rent with the distance from
the markets. His model came into focus since 1936 when Hoover used the framework of it as the basis for a normative model.

Problems of peasant farming were analysed by Weitz (1971). In order to extract productivity index for crops in England, M.G. Kendall (1939) devised the technique of Ranking Co-efficient by which he widened the scope of the application of quantitative methods in the study of agricultural geography. With the help of Kendall's technique, Henshall and King (1966) applied the method of factor analysis in the study of agriculture in Barbados. Boserup (1965) analysed the impact of population pressure on agrarian change and agricultural development. Besides these, Anderson, Brass, Levy and Morrison (1982) analysed the impact of new technology on agricultural development in developing countries. Mellor (1966) analysed the role of agriculture in economic development, nature of traditional agriculture and modernisation process of agriculture in underdeveloped countries.

In India, agricultural geographers attempted to analyse the agricultural aspects from different points of view. Among the prominent Indian geographers, Shefi (1984) attempted to find out the efficiency of agriculture in Uttar Pradesh. Shenoi (1975) discussed various aspects of agricultural development in India including techno-economic
problems. Agarwal and Bansil (1969) clearly discussed the economic problems which are directly related to Indian agriculture. Dhingra (1982) elaborated the problems of Indian agriculture and also the prospect of it. Bhatia (1967) tried to find out a method of determining agricultural efficiency. In his book, Singh (1976) made a detailed study of Indian agriculture and suggested various measures for modernisation of it. Singhvi (1969) analysed the process of adaptation of agrarian economy with the situation of ever increasing surplus labour and the consequences of growth of surplus manpower in agriculture. Shukla (1983) made an elaborate discussion on agricultural potentialities in the Siang District of Arunachal Pradesh. The study made by Gupta (1973) on agricultural marketing and pricing policy in Madhya Pradesh reveals that they have little influence over the agricultural production. Hopper (1968) holds the view that only dynamic research on agriculture can lead to the development of new techniques and inputs. The Irrigation Commission (1972:150) maintained that 'Irrigation encourages the farmer to adopt more scientific techniques. It enables him to sow the right type of strains at right time and to realise higher profits. It also permits him to go in for more intensive cropping which creates new opportunities for gainful employment'. Mukerjee and Lockwood (1971) observed that HYV of paddy can yield much higher in the rabi season in the paddy growing states if irrigation facilities
are provided. Gupta (1981) observed the decreasing trend of size of landholding in Madhya Pradesh. Das (1986) attempted to analyse the land tenure system and landholding structure in Assam. The result of his analysis shows that the present condition of agrarian structure in Assam is not conducive to the introduction of new technology in agriculture. Ghosh (1977) exhaustively examines the reasons which brought about the transformation of agriculture as well as economy of Punjab and concludes that the new HYV technology plays a crucial role in agricultural development of Punjab. Laxminarayan and Tyagi (1976) made an attempt to analyse the interstate variation of size of landholdings. Dagli (1974) outlines the profile of agricultural development in each state and union territory of India. Kummer, Agarwala, Kamath, Moore and Dornahue (1964) surveyed the recommended soil and crop management practices for the main crops sown in India in addition to discussing the botany of plant forms, plant functions and chemistry of agriculture.

Little works have been done so far in Assam on agricultural geography. In this respect the names of Goswami (1963), Mahanta and Neog (1968) and Das (1984) may be mentioned. Goswami studied various aspects of agriculture in Assam. Mahanta and Neog attempted to give some detailed information about agriculture and animal husbandry.

Besides, some research papers on problems relevant to agricultural geography are published in different journals. Prasad (1978) discussed the role of ground water for irrigation in Assam. Tahir (1975) analysed the physical basis of agricultural planning in the Brahmaputra Valley and correlated the cropping pattern with different ecological settings. Datta (1985) also studied the intensity of cropping in the Nagaon District with reference to different physical settings. Goswami and Saikia (1969) gave a detailed description of the problems of small farmers in Assam.

Although many books and articles relevant to this work have been published so far, micro-level study of agricultural geography is found to be negligible. It is, therefore, considered that a micro-level study on the various problems
encountered by the peasants would be very much helpful for preparing a scientific and effective plan for agricultural development. With this view in mind, the present topic has been selected for an indepth micro-level analysis.