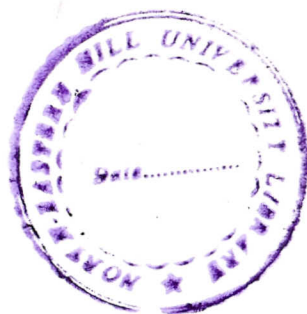


AGRICULTURAL LAND USE AND PRODUCTIVITY PATTERN OF LOWER BRAHMAPUTRA VALLEY

(1970-71 and 1994-95)

ABSTRACT



BY

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SUBMITTED IN THE PARTIAL FULFILMENT
OF THE REQUIREMENT OF THE DEGREE OF
DOCTOR OF PHILOSOPHY IN GEOGRAPHY

OF THE
NORTH EASTERN HILL UNIVERSITY

SHILLONG

2000

Introduction:

Agriculture is the backbone of human civilisation as well as development. It is an extensive form of human occupation and more than half of the world's population depends on it for their livelihood. Agriculture Geography deals with the spatial organisation of crops and their concentration. It provides an interesting field in which geographers can play a vital role for the development of society.

Agriculture is the most dominant sector of the Indian economy and the crop production occupies the most important place. The agriculture sector was mostly neglected during the British Colonial Rule. After independence, the agricultural sector became important sector and Government emphasised upon it through five-year plans to increase food production on a priority basis, to feed the over growing population.

land, the growing demand for food and fibre, and the increasing pressure on the agricultural sector. Development of agricultural sector without structural changes is a difficult task. This difficulty is highly prevalent in the countries with high population pressure on land like India, which results in regional imbalances or regional disparity due to the imbalance of food production and population growth. The macro level studies or macro-economic magnitudes and approaches do not provide proper insights in relation to the problems of agricultural development. Therefore, proper planning should be extended at micro-level units.

Agriculture is the primary source of livelihood for the majority of the people in the rural areas of Assam. This sector is most important to the state economy, as it alone contributes more than half of the total state's income. It acts as the main absorber of the working force. In fact, the average yield of cereals and non-cereals in the study region is much lower as compared to other states. The existing agricultural potentiality is highly under-utilised and has immense scope to improve it.

In last few decades, the agricultural sector has undergone a drastic transformation. The transformation scenario has jumped from subsistence agriculture to a modern and technologically advanced counterpart in many areas, caused by increasing demands of food in order to eradicate the problem of hunger, under nutrition and mal-nutrition. Further, the tremendous population pressure on arable land, the growing demand for food and agricultural raw material are the present day problems. Human beings have already reached the frontier of arable land at maximum limit. So, the production as well as productivity can only be raised through the intensification of land use, multiplication and diversification of crops by adopting latest technical know-how.

The scientific and systematic studies related to agricultural geography have originated very recently, that is, during the second half of the present century and taken the momentum of the real work of this particular branch of geography. During the inter-war period, O.E. Baker, Olaf Jonasson, Clarence F. Jones, Samuel Van Valkenburg and Griffith Taylor, carried out pioneer work in agricultural

regionalisation. The recent method and approach of agricultural geography have been benefited because of 'Quantitative Revolution' of fifties and it opened a new era of research possibilities. One of the most important approaches, that is, model building towards the study of agricultural activities, was initiated by the German scholar J.H. Von Thunen during early 1826. This was the first attempt to explain the agricultural land use pattern in economic term, based on the concept of economic rent. This model could draw attention to some of the scholar's like- Hoover, Losch and Dunn. Leontief and developed a model called as 'Input-Output', a method of analysing natural economics. Chatterjee (1962) suggested certain measures to plan the agricultural sector in North-east India, taking into consideration of geographical diversity.

The information related to agricultural development and studies have reflected that the crop output and the productivity growth in Assam, over past years is not satisfactory. The works in the field of agricultural geography in Assam are still at a very initial stage. Though various works are being carried out, most of the studies are partially or fully dealt with only at micro level to understand the problems in the rural areas. Saha (1975) carried out the first study on agricultural development in Assam between 1950-51 and 1973-74.

Das (1984), presented a structural analysis of the peasant agriculture in Assam and discussed in detail about the spatial as well as temporal patterns of peasant agriculture in Assam and the complex process related with it from the structural point

of view. Besides, an ecological oriented study was also carried out by Taher (1975). Further, the inverse relationship between farm size and agricultural productivity also acquired some significant, as it could provide some rationale view for the argument that small farms are superior to the large ones, on purely economic grounds.

Statement of the Problem:

The agricultural sector in Assam in general and Lower Brahmaputra Valley in particular, experiences various problems, that is, the cultivable land is highly limited because of physisographic conditions, subsequently effecting the intensity of cropping pattern as well as the yield pattern. The agricultural yield pattern is not only affected by monsoons, flood and drought, but also by the technological and socio-economic factors. Therefore, the agricultural growth is very low. Hence, the farmers are victimised by various ill-effects like- poverty, leading to indebtedness and illiteracy.

In fact, the agro-ecological conditions and the size of land holdings are an important base for the agricultural production processes, as the agro-ecological conditions have a direct bearing upon the agricultural productivity. Moreover, the size of land occupancy plays an important role on the agricultural crop yield, as land as a resource is being utilised by the farmers for the production processes.

In spite of the efforts being undertaken by the Government during the five-year plans since independence, the agricultural production/productivity is still not in a

position to cope up with the increasing demand. This may be contributed by the traditional method of agricultural production. Moreover, various constraints like socio-economic, technological and natural calamities have handicapped the agricultural sector in Assam. This sector needs a radical change in production. To maximise the productivity pattern, there must be optimum utilisation of soil with viable technology and scientific method of production.

The present study examines the agricultural land use and productivity pattern in Lower Brahmaputra Valley in particular and in Assam in general. There is a lack of proper agricultural land use management, hence it is lagging behind, accordingly reflected upon the productivity pattern. The Lower Brahmaputra Valley, with an almost uniform topography, dominated by flood plain and alluvial soil as well as flood prone area, needs to be studied diligently to acquire correct information for the proper management and the development of the area, in relation to land use and productivity pattern. There are numerous constraints to land use management. Due to limited size of land holdings by the individual farmers, an effective land use is not possible. The problem of land use management is primarily with the indigenous farmers. The farmer does not take much interest in agricultural activities due to its traditional and cultural system. Normally, the indigenous farmers cultivate one crop in a year. But if we look at the farms owned by the migrants, the agricultural fields are multi-cropped in an agricultural year. Accordingly, the production pattern shows a different picture, as

compared to the land owned by the indigenous farmers. Therefore, the agricultural production/productivity pattern is comparatively low.

There are certain factors responsible for the low productivity and improper agricultural management. These factors are- the uncertain monsoon rains on which the farmers mostly rely for their seasonal crops, heavy rains which causes floods and damages to the standing crops. There is a lack of irrigation facilities, which in turn, does not encourage multi-cropping. Fragmented land holdings do not support mechanisation and improvement of land. Still, within these limiting factors, there is scope to improve the existing land use as well as production/productivity pattern in the Lower Brahmaputra Valley.

Objectives:

There are very few studies carried out relating to agricultural land use and productivity so far in the North Eastern region of India. The land use and the land holding system are very different here, from the rest of the country. Therefore, the present study has been undertaken based on the following principal objectives:

- (1) To study the agricultural land use and cropping pattern in relation to the agro-ecological parameters of the study region.
- (2) To examine the nature and extent of unequal distribution of land holding pattern among various segments.

- (3) To examine the role of institutional parameters governing the agricultural land use and productivity of the study region.
- (4) To examine the inclined factors closely related to the agricultural productivity according to agro-climatic conditions.
- (5) To examine the specific relationship, as it exists between the agricultural land use and the productivity behaviour.
- (6) To develop insights for an alternative plan for the agricultural land use, with a view to increase productivity without disturbing the existing agro-ecological conditions.

Hypotheses:

The study is concerned mainly with the changing pattern of agricultural land use and productivity pattern in the Lower Brahmaputra Valley of Assam (1970-71 and 1994-95). The following hypotheses are proposed and tested in the present study:

- (1) In the Lower Brahmaputra Valley, the farm size and agricultural productivity will show an inverse relationship.
- (2) In the Lower Brahmaputra Valley, the Agricultural Land Use is Food Crop Based, Results low level Commercialisation of Agriculture.
- (3) The level of agricultural productivity will vary along with the nature of environmental constraints, stringent environmental constraints will lead to lower productivity and vice-versa.

Identity of the Study Region:

The present Study confines to the Lower Brahmaputra Valley of Assam, which is one of the flood plain regions. It includes seven plain districts viz., Goalpara, Dhuburi, Kokrajhar, Bongaigaon, Nalbari, Barpeta and Kamrup. The mighty river Brahmaputra and innumerable tributaries criss-cross the study region.

The study area extends from 25°28' to 26°54' North Latitude and 89°42' to 92°11' East Meridian. Bhutan lies to the North, on the East it is surrounded by Darrang and Morigaon districts, on the South by the state of Meghalaya and Bangladesh and the state of West Bengal on the western part of the study region.

The total geographical area of Lower Brahmaputra Valley is 20,148 km², accounting for about 25.6 percent to the total area of the state. The total population of the study region was 80,10,915 persons, inhabiting 35.74 percent to the total population of Assam according to the 1991 census. During the period between 1971 to 1991, the decadal growth rate of population, in the Valley, increased to 58.59 percent as against the state growth rate of 52.44 percent, which is much higher.

Data Base:

I. Secondary Data Source:

: District Statistical Hand Book, Assam,

: Agricultural Statistics of India,

- Method : Department of Agriculture, Government of Assam,
- Source : Agriculture Situation of India, Ministry of Agriculture, Government of India,
- State's : Basic Statistics of North-East India, NEC, Shillong,
- agricult : Agricultural Censuses of India,
- level : Un-published Government Records and Reports on Agriculture,
- and : Books, Magazines, Brochures as well as private publications.

II. Primary Data Source:

For primary information, personal observation of the agricultural situation, interviewed through prepared scheduled questionnaires for village as well as household levels. 160 (One Hundred and Sixty) farms have been taken into consideration with varying operational holding size and 40 (forty) families from four districts. On the basis of the agro-ecological conditions, 14 farm families from foothill zone, 66 from flood plain and 80 from the alluvial soil zone have been selected from the Lower Brahmaputra Valley for the purpose.

The field survey is being carried out with comprehensive questionnaires surveyed from house to house in the selected 160 farm families. Information collected, then tabulated according to agro-ecological conditions and land holding sizes. The classification of land holding size is being made, as prescribed by the Directorate of Economics and Statistics.

Methodology:

Though Assam in general is rich in various mineral and other resources but the state's economy is primarily based on agriculture. Assam is one of the best agricultural regions of our country but the agricultural sector is still at subsistence level and the farmers are economically poor.

Despite the existence of an Agricultural University on operation in the state and a number of research work, planned programmes and schemes being undertaken, still there is a gap between the farmers and the agricultural reformers. Therefore, it is important to have an analytical view of the very structure of the whole system, before taking any kind of innovative measures.

The systematic methodology is the ultimate source of research, as it has a direct bearing upon the research findings. In respect of agricultural and social research, it is imperative to have an essential standard procedure, which is designed for a particular practice.

Keeping this in view and to achieve the objectives, the present work has been completed through survey, direct observation, collection of secondary information from books, district headquarters and other reliable sources, besides planned outlays, and has been designed within the agro-ecology and socio-economical framework. The present study is being divided into four distinct parts. The part-one includes Chapter-

II, discusses the agro-ecological settings i.e. geology, physiography, drainage system, soils, climate and agro-climatic conditions of the study area, which influences the existing agricultural system.

The part two contains Chapter-III and IV, deals with the existing land tenure and land holding pattern including land reform policies undertaken from time to time. Land use and cropping patterns are the principal institutional factors affecting agriculture in the study region.

Part three includes Chapter-V, which is concerned with the existing agricultural productivity (based on secondary source of data) and the determinants affecting agricultural productivity and also discusses the various infra-structural needs for the over all agricultural development of the Lower Brahmaputra Valley region.

Finally, part four comprises of Chapter-VI and VII, which deals with the agricultural productivity pattern according to agro-ecological conditions and the relationship between various production functions along with agricultural production. Here an attempt is being made to discuss the debated issues of the inverse relationship between agricultural productivity behaviour according to farm size and agro-ecological zones separately in Lower Brahmaputra Valley region.

Chapter Scheme:

The present research work relating to the agricultural land use and the productivity pattern in Lower Brahmaputra Valley. The chapter scheme of present study is being designed as follows:

The Chapter-One is the introductory chapter and it's starts with the statement of the problem associated with the objectives as well as the hypotheses, which were tested in the course of the study. It also incorporates the relevant literature survey at the international, national, regional and state levels. The identity of the study region along with the geographical location and area with demographic characteristics has also been discussed. The sources of data and information relating to the work have also been incorporated and finally a methodology adopted in the present research has been consolidated.

The Chapter-Second deals with the agricultural environmental framework, begins with the assessment of the physiographic background along with the geology, relief features, soils, drainage system of the study region. The climatic factors on agricultural operations are the implicit phenomena within the agro-climatic conditions, prevailing over the Lower Brahmaputra Valley have also been incorporated. A brief elaboration of agro-ecological condition also thrust on.

The Chapter-Third emphasised the existing land tenure system. The land reform measures have been taken into consideration since independence. The present land holding pattern including caste based have also been incorporated in relation to the region, as well as its district wise pattern in the study region.

The Chapter-Fourth discusses the existing general land use pattern along with its changing pattern over last twenty-two years in Assam. The general land use pattern in the Lower Brahmaputra Valley also incorporated along with its changing pattern since 1970-71 to 1995-96. Further the cropping pattern along with its changing pattern is also discussed in brief in Assam as well as in Lower Brahmaputra Valley.

The Chapter-Fifth is concerned with the agricultural production/productivity. The entire chapter is based on secondary sources of data collected from the Department of Agriculture, Government of Assam. This particular chapter is restricted to the yield pattern of various crops as well as its changing pattern over the last twenty-five years, not only in Assam but also in Lower Brahmaputra Valley. Here, an emphasis is laid upon the determinants of agricultural production too.

The Chapter-Sixth deals with the production processes according to agro-ecological conditions and attempt has also been made to establish an inter-relationship between the production along with its production functions on an agro-ecological basis in Lower Brahmaputra Valley. The entire chapter is based on primary information, as

it was collected from 160 farm families during field survey. It also incorporates the inter-relationships between production along with its production functions like-labour, non-land capital and animal power.

The Chapter-Seventh is concerned with the farm size attributes. This chapter is also based on essentially primary data. In this particular chapter thrust on agricultural production/productivity, general land use, cropping pattern, cropping intensity, as well as input structure according to farm size. Here, an attempt is being made to create an inter-relationship between production along with its production functions according to standard land holding sizes, as prescribed by the Directorate of Economics and Statistics, Government of India.

The Chapter-Eight (last chapter) is essentially restricted to the summary and conclusions of the overall work with certain recommendations.

Summary:

The agricultural system of Assam in general and Lower Brahmaputra Valley in particular, is found to be experiencing various problems and the system seem to be highly sympathetic in nature, where the farmers are considering it as the way of life instead of livelihood.

The study region is enriched with less diversified physiographic features, and thus provides a high level potentiality for agricultural development. On the other hand, the region is suffering from natural calamities like floods and droughts, as the farmer depends solely on monsoons.

The study region is very fortunate to have a very high concentration of either new or old alluvial soils. The land use pattern is characterised with a high percentage devoted to cereal crops, especially rice hectareage, with a low average yield and also low intensity of cropping. More than 82 percent of the total cropped area is occupied by food grains and rice alone occupied 79.03 percent to the total cropped area in Assam during 1995-96. The Lower Brahmaputra Valley occupies 74.17 by cereals with 69.27 rice hectareage.

The existing land tenure system is the result of the past, the maximum population pressure on arable land resulting in fragmentation of land holdings. The law of inheritance ensures equal distribution of land among the sons, which leads for further fragmentation of land holdings. The small land holdings are highly uneconomic in nature and stands as a barrier for the implementation of modern and advanced technology in the field of agriculture.

Though various land reform measures have been undertaken since independence in order to diversify the land ownership, but more is to be done in this



sector. The rural settlement of the valley is surrounded by innumerable operational holdings with varying shapes and sizes. The average farm size is recorded 1.27 hectare in 1992-93 in Assam and 1.12 hectare in Lower Brahmaputra Valley. This low average farm size is the result of high population pressure on arable land that leads for further fragmentation. The small farms are economically not viable for the introduction of modern technology.

The economy of Assam is essentially based on agriculture and is fortunate to have about 35.41 percent of the net sown area during 1992-93, with about 14.65 percent of doubled-cropped area. This is mainly due to the high population pressure on land that compels the farmers to utilise the soil intensively. In Lower Brahmaputra Valley, the net sown area is occupied with 45.67 percent of the total area during 1992-93, with 21.54 percent of double-cropped area. The forest cover is depleting over the years because of high population pressure on land, leading for the depletion of forest cover, as it required for settlement as well as other requirements, thus leaving very limited scope for the further expansion of the land under plough. Expansion may be possible only at the cost of forest cover, which is 26.50 percent, or barren land of 7.10 percent.

The small farmers in the study region are almost untouched by modern and advanced methods of agriculture. Consequently, farmers are adversely affected by natural calamities. The entire region is chronically flood affected, causing heavy loss

of life and property as well as extensive damage to standing crops every year. Drought is also another significant calamity, as the irrigation facility in the valley region is extremely insignificant and the farmers rely on monsoon for overall system. Basically, summer drought affects agriculture very seriously, as more than 75 percent of rain is concentrated during the kharif crop season.

In the absence of modern and advanced technology, the ultimate utilisation of the potentialities of soil cannot be achieved, since the farmers practice the agricultural operations with the help of man and animal power alone, through the traditional method. The consumption of fertiliser per hectare of land in the study region is also very low. The artificial supply of water into the agricultural field in the valley is also low, as rainfall is very low during winter season. Further, the introduction of HYV seeds in the field of agricultural is too limited. Its introduction may give marvellous yield, if water is provided at required level.

The agricultural production system is based on infrastructure and the factors of production, i.e. land, labour, non-land capital and animal. The agricultural system can be modernised as soon as all the factors of production functions are inter-linked in a balanced nature.

It is fact that a big share of family labour is employed in agricultural practices in the study area, where flood plain areas have the highest intensity of family labour.

In such, the farmer wants to engage the entire family members into the farming system, i.e. production-surplus. As a result, the farmers are cultivating their lands at the subsistence level; to fulfil their family needs only. The existing mode of production with a high share of family labour stands as a fundamental constraint upon the economic development of the farmers and is an important characteristic of agriculture in Assam. The radical transformation of this system is possible only when a farmer is made free from the obligation of employing family labour. In the foothill zone, where the ratio of hired labour with family labour is recorded as the highest (i.e. 90 percent).

The marginal product of non-land capital investment is recorded as very high in the flood plain and alluvial soil areas. It means that there is a need of changing the agricultural operation system from labour intensive to non-land capital extensive. It reflects that the productivity or average yield of the crops can only be raised through using the packages of green revolution technology. This would be helpful to raise labour productivity and also increase the marginal productivity of labour. The animal productivity is low, however the marginal productivity is significantly high in this area.

The marginal productivity is significantly high in respect of animal input in flood plain and alluvial soil areas. However, the animal input is low in this area and the seasonal flood conditions, lowers the productivity level.

The marginal productivity of farm in money term, which is the conversion of average yield, considering market price. In Lower Brahmaputra Valley, the land productivity is assessed at Rs. 8,534.00 per hectare and it varies from Rs. 23,000.00 per hectare in the small marginal size farms to Rs. 5,743.00 per hectare in very large farm sizes. It reveals that there is a gradual decrease in production from marginal to large farm sizes.

There is a recorded variation in average productivity in different agro-ecological zones. Productivity was recorded as very high with an average of Rs. 9,526.00 per hectare in the flood plains, followed by Rs. 8,929.00 per hectare in the alluvial soil areas. But in the foothill areas of Lower Brahmaputra Valley it was the lowest. There is another peculiar characteristic of distributional pattern, that is, there is a decrease of land productivity by sizes, in all-different agro-ecological conditions, however, the decreasing tendency is faster in flood plain areas.

Labour productivity is the most important measurement for agricultural activities in the area, because labour is the diminishing production factor here. In general, labour productivity is recorded at Rs. 4,399.00 per worker in the Lower Brahmaputra Valley. Employment of labour force per hectare in high and very high sizes of land holding are less. Labour productivity figures are recorded as very high in the high and very high sizes of land holdings, that is, more than Rs. 6,000.00 per

worker. On the contrary, there is intensive employment of labour in marginal sizes, though land productivity is high but labour productivity is recorded very low even less than Rs. 2,000.00 per worker in semi-marginal sizes of land holdings.

The highest level of labour productivity in all small size of holdings is Rs. 4,626.00 per worker, while the trend tends to increase productivity is almost similar in all agro-ecological conditions. In the foothill areas, the average productivity is recorded at Rs. 3317.00 per worker, while it decreases at large and very large sizes of land holdings.

The increase of capital productivity in rupees is evident, while investing Rs. 100.00, the turnover is Rs. 10,980.00 per hectare in Lower Brahmaputra Valley. Surprisingly, it tends to decrease as the holding size of farm increases. This result does not tally with the general results and it reflects that the capital productivity increases, as the sizes of land holding increases, but it diminishes in high and very high sizes of land holdings, in each and every agro-ecological zone. This may be because of the declining of land productivity in the high and very high sizes, but not because of less investment of capital in the region. The capital productivity is recorded as slightly higher in the flood plains, that is, Rs. 13,628.00 per Rs.100 of investment and is very low in the foot hill areas, i.e., Rs. 5,773.00 per Rs100.00 investment.

The animal input is an equally important factor for the agricultural production system and its productivity is recorded as essentially higher, which is Rs. 5,080.00 per pair of draught animal in the Lower Brahmaputra Valley and its trend increases as the land holding sizes increases. In the high and very high land holding sizes, animal productivity is recorded at more than Rs. 7,000.00 per pair of draught animal, where in marginal size it is only Rs. 115 per pair of draught animal. The average figure of animal productivity shows that the productivity of animals is higher in the alluvial soil areas and it gradually increases with an increase of land holding size.

If the productivity of all these four factors are compared, then the physical factors of land is still found to have control over the agricultural operation, where land productivity is recorded comparatively higher than other inputs. There is a sufficient scope for the investment of non-land capital in agricultural practices, since capital productivity is highest. The unlimited supply of labour in the agricultural production processes, which lowering the labour productivity. Higher productivity can be achieved by substituting modern technology and investment of more non-land capital in the Lower Brahmaputra Valley.

Recommendations:

The detailed study of the agricultural land use and production/productivity pattern in Assam in general and Lower Brahmaputra Valley in particular, leads one to conclude the present work with following recommendations:

Since the scope for further expansion of arable land is highly limited, therefore an emphasis is to be laid on the intensive use of land resources at their maximum level, in order to achieve the goal of higher production/productivity in the agricultural sector.

The agricultural landscape is characterised with scattered innumerable small agricultural holdings of varying shapes and sizes, surrounded by rural settlements. The small-scattered agricultural holdings are not economically viable; therefore the consolidation of fragmented, small, innumerable holdings is a must, by creating village co-operative land management society. Certain steps are to be undertaken in stages like: - further fragmentation of land holdings should be restricted, individual cultivators should not pose any agricultural land other than 'Bari', but it is to be considered as the village common property.

The agricultural land use is characterised with extra-ordinarily high rice hectareage, showing a low-level commercialisation of agricultural sector. The commercialisation of agricultural sector is a must in order to raise the living standard, by taking into account the market price/economy, so as to make agriculture economically viable, by considering it as livelihood to satisfy the over growing demands.

The cropping intensity over the last twenty-five years is found to be increasing but at a slow pace, as it is due to the high population pressure on arable land. The cropping intensity is therefore to be increased through the application of modern package technology (Green Revolution Technology). The transformation of traditional farming technology, supported by required infra-structural necessities is an urgent need. The cropping intensity should increase, by choosing well-equipped scientific method of agriculture instead of population pressure on land.

It is revealed that since 1970-71 to 1994-95, there is a slow growth in agricultural productivity and yield pattern in Assam in general and in Lower Brahmaputra Valley in particular. Therefore, emphasis should be on both yield and agricultural productivity, through the means of inter-crop-culture, crop rotation and crop diversification. Agricultural productivity can also be raised by human engagement through a wide variety of ways. For instance: - intensification of cropping, increased use of manure/fertilisers, improved/HYV seeds, proper control of pests and diseases and the identification of more profitable crops as well as practices, depending upon the market price/economy.

Essentially the study region is a flood prone area and experiences flood every year. Therefore, flood control is a must and measures must be undertaken by the Government. In the flood prone areas during the pre-flood season, the early-matured crop should be sown in order to harvest it before the onset of flood. On the other hand,

during the post-flood period, suitable crops should be grown depending upon the soil characteristics as well as the climatic conditions. Therefore, the Government and allied agencies should take the initiative to distribute good quality seeds to the farmers of the flood prone areas, at a subsidised rate.

Besides floods, droughts are another determinant in agricultural operation. In the study region the facility to supply water into the agricultural field is quite negligible. Therefore, the Government should take measures and initiatives to regulate water management programme (Water Supply Scheme), into the agricultural field, as its requirement is undeniable. By considering floods and droughts as the constraints to agricultural productivity during the growth period, emerged uncertainty to the standing crops at desired level, therefore Government should undertake certain plan to insure the standing crop to assure the certainty of assumed agricultural return.

Crop protection is also another aspect of agricultural system, but it is beyond the capacity of the farmers in the study region. Therefore, the Government should make viable schemes for the adequate and regular supply of herbicides, pesticides and insecticides at a subsidised rate, by which the poor farmers would be capable for the procurement of these required crop protection chemicals. Moreover, the Government and allied agencies should extend a proper agricultural credit system to the farmers for higher proportionate investment for better/ higher returns.

The development of the tertiary sector is essential, as the level of industrialisation is insignificant in the Lower Brahmaputra Valley region. The agricultural sector is characterised with undue pressure and over-population. Therefore, there is the need for the extra-man-power or human resources, to be engaged in the tertiary sector, by opening up of new small scale and cottage industries in the rural areas. Moreover, the agriculture sector is considered, as a way of life, as such, there is an urgent need to transform this sector into an economically viable industrial sector, which can engage surplus manpower into it.

On the basis of the above-mentioned synthesis, one can conclude with a common statement that the agricultural sector basically consists of small farmers. They are unable to support the over growing demands of their requirements in the days to come; therefore, there is a need for radical change in the agricultural sector.

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