1. The Economy of Assam — A Profile:

The State of Assam is endowed with fertile soil, adequate rainfall and favourable climate for the growth of agricultural crops. A vast majority of workers (about 77\%) were engaged in agricultural and allied pursuits contributing as much as 50\% to the State income in 1976-77.

The growth of population is abnormally high mainly due to heavy influx of immigrants from outside the State. Tardy growth of industrial development despite huge potentialities, high growth rate of population and absence of diversification in the agricultural sector have made the economic growth sluggish in the State.

The land-use pattern of Assam highlights an extremely limited expansion of arable land. The culturable land (culturable waste land, other fallow lands permanent pastures and grazing lands, and land under miscellaneous tree crops) was only 6.36 lakh hectares accounting for only 10.8\% of the total geographical area in 1976-77. The area
under forest has declined considerably particularly in recent years due to wanton felling of trees and illegal occupation of forest land. The total area available for cultivation was only 33.8% of the total geographical area of the State in 1977-78. Hence, for increasing the level of production in the State, reliance has to be placed on the intensive use of agricultural inputs and exploitation of the existing arable land in the best possible way in the future.

Regarding cropping pattern, it has been found that about 74% of the total cropped area was occupied by the food-grains, and among the food-grains, rice cultivation was predominant occupying about 68% of the total cropped area in 1976-77. Wheat, the newly introduced crop in the State is gaining importance in recent years. Jute, sugarcane and rape and mustard are the principal cash crops grown in the State.

Land holding pattern is uneven and unjust from the economic and social point of view. About 60% of the total operational holdings had less than one hectare of land according to the 1976-77 census. Apart from that, continuous sub-division and fragmentation of land due to high pressure of population further worsens the situation.

The productivity (yield kg per hectare) of some of the important crops of the State is low as compared to some other States of the country and that of India.
2. Growth Rates of Agriculture:

Both linear and compound growth rates have been worked out for area, production and productivity of agricultural crops for the period 1960-61 to 1978-79. The compound growth rates have been compared with that of All-India in order to measure the levels of productivity in the State.

During 1960-61 to 1978-79, the area increased at an annual compound growth rate of 1.86% for food-grains, 1.26% for non-food-grains and 1.73% for all crops in Assam. The corresponding growth rates for All-India were 0.48%, 0.71% and 0.55% per annum. As for production the annual compound growth rates were 2.13% for food-grains 1.96% for non-food-grains and 2.06% for all crops which were lower than that of All-India compound growth rates of production i.e. 2.56%, 2.23% and 2.45% per annum for food-grains, non-food-grains, and all crops respectively. In respect of productivity, the annual compound growth rates were 0.51% for food-grains, 1.03% for non-food-grains and 0.72% for all crops. The corresponding annual growth rates were 1.65%, 0.94% and 1.40% respectively for All-India.

Thus the growth rates of agricultural production and productivity in the State are not satisfactory as compared to the growth rates recorded in All-India.

3. Agricultural Growth Rates Vs. Population Growth Rate:

While the population of Assam grew at a compound rate of 3.05% per annum during 1961-1971 census, crop production
increased only at compound growth rate of 2.06% per annum during the period from 1960-61 to 1978-79.

The gap between growth of food and population necessitates an intensive use of resource inputs in agriculture for raising agricultural production on the one hand and restriction on the growth of population on the other.

4. Allocation of Additional Production between Area and Productivity:

From the linear growth rates, an attempt has been made to find out the relative contributions of (a) area and (b) productivity to total output. It has been found that the contribution of productivity to incremental production of non-food-grains is higher while that of area is dominant in the case of food-grains production. In the case of all crops, it is area which continues to play a significant role in the growth of production despite planned efforts. Productivity has not made any significant impact on the growth of crop production in the State. The area under cultivation has been the dominating factor in the growth of agricultural production.

5. Trends and Growth Rates of Area, Production and Productivity of the Selected Crops:

The study of trends in area of the selected crops reveals that except jute, the area under rice (paddy), sugarcane, rape and mustard and potato increased at varying proportions for
the period 1951-52 to 1977-78. Among others, weather is found to be the most important exogenous variable explaining the fluctuation of area under cultivation. The annual compound growth rates of area under rice were 1.48%, 1.29% for rape and mustard, -0.24% for jute, 2.24% for sugarcane and 1.64% for potato.

Despite annual fluctuations, the production of all the major crops increased except jute which registered a decreasing trend in production during the period under investigation. The annual compound growth rates of production were 1.53%, 1.33%, -0.07%, 1.41% and 3.29% for rice, rape and mustard, jute, potato and sugarcane respectively.

The productivity trend of all the crops studied was fluctuating. It did not make any improvement, rather the productivity trend of most of the crops registered a declining trend despite immense potentialities of crop productivity in the State. The annual compound growth rates of productivity were 0.16% for rice, -0.16% for rape and mustard, -0.15% for jute, -0.20% for potato, and 1.47% for sugarcane.

The study of growth rates of productivity of the selected crops reveals that during the second sub-period ranging from 1961-62 to 1970-71, productivity of almost all the crops except sugarcane increased at varying rates. But in the last sub-period (i.e. 1971-72 to 1977-78) growth rates of productivity of all the selected crops were negative, showing that
planned efforts could not make any substantial impact on the growth of crop production and productivity in the State. The first sub-period (i.e. 1951-52 to 1960-61) was relatively better than the third sub-period in respect of productivity of crops, mainly due to good weather condition prevailed during that period.

6. Inter-district Variation in Productivity:

The inter-district comparison leads to the following conclusions. The productivity of almost all the crops studied is found to be higher in the upper Brahmaputra valley districts viz. Sibsagar and Dibrugarh. The lower valley districts namely Kamrup and Goalpara are found to be least efficient in productivity of selected crops. The Hills region comprising Karbi Anglong and N.C. Hills districts, though backward in infrastructural facilities is specialised in the production of rice, rape and mustard and jute.

Cropping pattern is not uniform for all the districts although rice (paddy) is cultivated extensively in all the districts. It has been found that high productivity districts are less diversified than the low productivity districts and the intensity of cropping is found to be higher in the low productivity districts viz. Kamrup, Goalpara, Nagaon and Cachar than in the upper Brahmaputra valley districts.

7. Causes for the Inter-district Variation in Productivity:

Besides soil and rainfall, input distribution and absorption of new technology with package of practices like use of
fertilizers and pesticides, application of tractors and other agricultural implements, adoption of high yielding variety seeds are some of the important causes for the inter-district variation in productivity. The disparity in availability of "agricultural infrastructure" in the form of rural electricity, literacy rate of agricultural workers, road transport and communication, availability of irrigation facilities, agricultural credit per cultivator, number of bank branches and extension services is an added factor in inter-district crop productivity differentials.

However, rainfall is the most critical factor which affects the cropping pattern and productivity significantly.

Theil’s information index which has been used to measure the production inequality among the districts reveals that the degree of inequality in the production of major crops has increased over the years except in the case of jute and sugarcane. This disparity is due to differences in crop productivity among the districts.

8. District-wise Variation in Productivity Growth Rates:

The compound growth rates of productivity of selected crops vary among the districts. Though the Hills region is backward in infrastructural facilities, it has shown the positive growth rates for all the crops studied for the period from 1951-to 1978. It is also found that no district is specialised in the production of all crops. Moreover, the growth rate
of sugarcane productivity is found to be positive for all the districts. Rice, although it is a dominant crop for all the districts, has shown the negative growth rates in Goalpara, Darrang and Lakhimpur districts. Nagaon district accounts for the largest area in jute cultivation, but the district has witnessed the negative growth rate in productivity of jute.

9. Factors Affecting Production and Productivity:

   An assessment of the efforts undertaken by the government under different plans has been made to identify the causes affecting productivity and production.

   All sorts of factors, viz. institutional, technological, natural and organizational have been examined and found that there has been a serious lack of these factors in the State.

   The poor performance of agriculture and low level of production per unit of land in Assam are found to have been caused by a multiplicity of factors like extension of cultivation without any significant improvement in the farm technology; poor coverage of area under high yielding variety seeds; low level of fertilizer consumption; inadequate use of pesticides; under-utilization of irrigation potential already created, lack of assured water, particularly for rabi crops; insufficient credit facilities to small and marginal farmers; uneconomic size of land holdings, absence of adequate research, and extension services, poor base of agricultural marketing, heavy damage to crop yields caused by recurring floods and tardy implementation of land tenancy reforms.
10. Suggestions:

In view of the existing constraints of agriculture in the State, some of the important short and long range remedial measures for acceleration of agricultural progress through higher productivity could be summed up as follows:

Agrarian Reforms:

The line of action to be taken in this direction can be broadly stated as follows:

(A) Acquisition of land by the government for distributing the same among genuine cultivators. The land should be acquired for this purpose by (1) launching a vigorous land reclamation and drainage policy (2) expropriation of estates owned by non-cultivating owners—by individuals or institutions—except where they are felt necessary as model farms or for such other scientific purposes, (3) appropriation of land which are not cultivated according to good rules of husbandry, including lands which are left fallow or uncultivated without sufficient reasons.

(B) The genuine cultivators must be settled on land by allotting on lease to each a holding of a suitable size to support the whole farm family. Credit facilities must be provided on easy terms by the State to help them to acquire full ownership in course of time.

(C) Necessary measures should be taken to safeguard
these holdings against being transferred by the allotment holders. These measures should take the form of prohibiting the holding or any part thereof from being alienated, mortgaged, leased or sold without the permission of the State. This, of course, presupposes adequate provision of credit by the government.

(D) To ensure best results, the holding of allotment should be made conditional to the observance of certain regulations such as (1) that the land must be cultivated by the owner himself (2) that he should live on the farm or as near to it as possible (3) that the holding should not be sub-divided into uneconomic units when the heirs of the allotment holder inherit the property.

But it is to be noted that agrarian reforms or land reforms may be a necessary condition of agricultural development, but certainly it is not a sufficient condition. Therefore, if a land reform is to succeed in increasing output, it must be tailored to the physical, technological and to the cultural conditions of the particular area, and it must be coordinated with appropriate supporting measures. Without other programmes, changing the agriculture from a stagnant feudal system to a stagnant peasant system will only increase the security of tenure and possibly redistribute some income. Therefore, along with the land reform measures, emphasis should also be given to such yield increasing techniques as improvement of seed, heavier fertilization, improved land management and animal husbandry, and use of chemicals
for better control of weeds, pests and diseases. Effective use of such technology depends upon raising the technical skills and management capability of the entire farm labour force. The land reform that best serves these needs must give maximum incentive for increased output to the largest proportion of farmers.

The successful operation of land reform measures, however, depends on the following conditions in the State.

(A) A clear set of detailed maps and descriptions of existing property rights of landlords and tenants is urgently needed. A fair and equitable redistribution of land will probably not be possible until such records are developed.

(B) The increased efficiency and production desired from a land reform will rarely occur until a whole set of ancillary services can be provided. A whole supporting set of institutions must be ready to put into action.

(C) Since land reform is carried out under governmental efforts, the government should have some option to retain a part of the bundle of rights in land. The government should also set both ceilings and floors on size of farm in order to facilitate distribution of land to the genuine cultivators and to increase efficiencies on very small farms. The State assumes responsibility for the enlargement and consolidation of small and scattered holdings. New lands acquired by the State should also be utilized for this purpose.
Co-operative Farming:

Land reform measures will not solve the problems of small farmers unless these measures are supplemented by other suitable measures. To solve the problem of under equipment on the one hand and inadequate supplies of current production resources available to the small farmers on the other, co-operative farming is advocated as the most suitable remedy.

In Assam, a serious attempt was made to organize co-operative farms only during the third five year plan. By the end of 1971-72 there were 114 joint farming and 294 collective farming societies in the State. But the progress of co-operative farming in Assam is not encouraging. The spirit of co-operation and enthusiasm for the programme are rarely seen. In agricultural operations, the necessary guidance and assistance were lacking. This assessment has been done in two rounds between 1964 and 1966 by the Agro-economic Research Centre, Jorhat. However, the study reveals that in spite of so many lapses, the prospect of co-operative farming in Assam cannot be ruled out.

Co-operative joint farming creates two basic problems. Firstly, the joint farm cannot lay off the family labour. Secondly, managing of a joint farm with centralised decision making requires special skill and talent which is not easily available in rural areas. Therefore, in the light of the existing constraints, a new form of co-operative which may be called
as "co-operative association" can be formed. The co-operative association in contrast with the joint farming, will emphasise only the co-operative, joint or mutual use i.e. service co-operatives and not the ownership of production resources. It certainly will not require pooling of income. The independent identify of the individual farm will continue but the cattle and implements will be owned by farmer members. Besides, certain costly implements like tractors or even iron plough, if needed would be owned by the society and leased out to members on rent.

The co-operative association based on voluntary co-operation for co-operative use of resources, will supply the necessary institutional changes in the present organization of the small farmers economy.

Collective farms' with landless labourers should also be organized on reclaimed waste land. The landless labourer have no tradition of individual farming, and, therefore, the sense of ownership on reclaimed waste land would not have developed. In a collective farm of landless labour on reclaimed waste land neither would there be any suppression of individual freedom nor any loss of incentive to production. The management and organization of such collective farms should be provided by the State to a great extent in the beginning. As the capacity for management of these landless farmers develop, the control should be transferred to the management of the landless labourers.

"State Farming" should also be developed on such reclaimed waste land for the purpose of research and
The problems of agriculture in the State are varied and complicated. Hence, a comprehensive plan covering minor irrigation projects, control of crop pests and diseases, education and rural community development, spread of cooperative movement, development of leadership in the rural communities, adequate provision of short and long term credit and other measures which directly or indirectly affect the well-being of the cultivating classes, should be taken up immediately.

Agricultural Research, Education and Extension Services:

The development of agriculture requires the exploitation of large quantity of under-utilized resources already in agriculture — the unskilled labour, the land, the capital and the capital formation potential. The various institutions required for achieving this purpose — the land reforms, the research programmes, the seed multiplication and distribution agencies, the credit agencies and marketing agencies — all depend for their creation and operation on large quantities of trained manpower.

Therefore, development of education and extension services is urgently called for to broaden the mental horizon and motivate farmers, and to teach farmers the decision making techniques. Production oriented extension education programme should have three primary objectives. Firstly, they must serve
to stimulate a framework of farmer attitudes and aspirations conducive to acceptance of technological change. Secondly, dissemination of results of production increasing research to farmers must be done by extension services. Extension programmes must be closely tied to research organization. Thirdly, production oriented extension programme must provide training and guidance to farmers in decision making.

The present extension services in Assam are not adequate. The village level workers (VLW) and Agricultural Extension Officers (AEW) who are at present working at the grass root level should require production oriented training in two important areas. Firstly, they need technical knowledge of agricultural production, including knowledge of current farming practices and of new technologies as they are produced. Even more important is knowledge of the supporting sciences which are necessary to the understanding of innovation, for diagnosing failures, and for adapting innovation to variable conditions. Secondly, extension agents need training in communicating knowledge. They should know not only mechanical methods of transmitting knowledge, but also the communication and leadership channels within the rural sector.

On the organizational aspect, certain changes should be made so that operation of an extension programme be modified to suit local condition. Local control of extension programme is necessary in this respect. This control may be exercised only by a committee of local farmers who advise the chief
extension officers, or a local body may control the operation by hiring and paying the extension officers. The local body may be appointed by the existing village panchayats or it may be elected democratically by the farmers or appointed by the extension personnel. The base level extension service still remains with the State Department of Agriculture. If extension education service is left to the responsibility of the Assam Agricultural University, it would yield positive results and the gap that exists between the genetic potential and the field results could be drastically reduced.

Agricultural research should be environmental based and production oriented so that it can suit the specific needs of the State. The soil and water of the tropical humid environment of Assam need special treatment for its effective utilization to raise crop yield. Therefore, agricultural research in the State should be directed to evolve seeds and technology that will be most appropriate for small and marginal farmers. Technology of package have to be worked out on fields of farmers in actual farming situations rather than on government experimental farms. Practical demonstrations on the use of modern practice of agriculture at farmer's field, farmer's training at block level, timely and adequate supply of inputs will go a long way to help the farmers in adopting the improved technology in agriculture.

Extension works without the development of agricultural research will not be effective. Therefore, all types of
research namely basic research, adaptive research, developmental research and test-demonstrations should be developed in the State. According to Prof. Mellor, basic research which is done by one very well staffed and equipped central experiment station is highly transferable. Therefore, such type of research should be developed at University level (mainly at Assam Agricultural University, Jorhat) and the developmental and adaptive research which are generally based on basic research under varied local conditions should grow and develop at district level. Test demonstrations deal with the wide scale testing of adaptive research results. This is a part of the extension process and that can be arranged at farmer's field by the extension staff to disseminate research results. Extension services should not be target oriented, rather it should be production oriented.

Flood Control:

The problem of flood in the State is very complex in character. Almost every year, it creates a substantial damage of crops and properties including human lives. Therefore, flood control is an immediate necessity. The present system of flood control measures which may be called as "structural measures" like embankments, dams, barrages and various river training works are ecologically unsound and environmentally inapt measures. Since the river beds are rising up as a result of excessive soil erosion particularly in the upper catchment areas, embankments have to be raised at regular intervals, resulting in wastage of resources. Moreover, breach
of these embankments and inundation of settlement as well as cropped areas have become a regular feature in the Brahmaputra valley.

Most of the tributaries of the Brahmaputra originate in the Himalayas and each of the north bank tributaries has wide catchment area. Therefore, these tributaries usually carry huge amount of sediments particularly during the period of rainy season and deposit the same at the bottom of the rivers. Thus the river beds are rising up causing high intensity of flood in the State. Therefore, an "Integrated Basin Management Programme" covering soil and water conservation, prevention of soil erosion more specifically at the upper catchment areas, afforestation, channel development etc. should immediately be taken up as a flood control measure. No plan of action will be fruitful unless the upper catchment areas are saved from erosion. Hence it is necessary to take immediate measures to prevent erosion specially at upper catchment areas. The Brahmaputra commission took up a scheme in 1970-71 to study the flood hydrology of the Brahmaputra basin. But a very close involvement of the various agencies dealing with soil conservation measures with the flood hydrology scheme in survey, planning and projecting is urgently needed for the development of scientific flood control strategy.

Secondly, the whole state should be divided into certain zones which may be called "Flood-Prone Zones" on the basis of intensity of floods. The Land Records Department in consultation with the State Agriculture Department should prepare a
broad-based map of flood-prone areas. The areas which are subjected to recurring floods may be termed as "High Flood Zone" where human settlement should not be allowed at any cost. People living in such zone should be resettled in other places like government reserve land. Continuous damage of crops and other properties due to floods can thus be prevented. The areas which are less vulnerable to flood should also be identified and such areas should be left idle periodically during the period of floods, some areas should be put to non-farm uses, and in some areas cultivation of such crops which are resistant to flood should be grown.

Thirdly, a well-organized system of flood forecasting can prevent loss of flood damage to a considerable extent. Such forecasting is possible if prompt and timely information on the river stage in the upper reaches and other meteorological data are connected together. The Central Flood Forecasting Stations located at Ziro and Pasighat in Arunachal Pradesh must be strengthened and equipped with modern tools and techniques so that timely information regarding occurrence of flood can be transmitted to the flood sensitive areas.

Fourthly, long-term measures such as construction of detention dams across the major tributaries of the Brahmaputra should be taken up to check the incoming silt and save the crop lands from further damage.

Any solution to the flood problem takes long time, and, therefore, some well-adapted agronomic programmes are needed
to effectively deal with the flood affected areas. One effective measure in such direction is the cultivation of short-duration crops in flood prone areas so that they can be harvested before the onset of flood. The crops which are resistant to flood should also be grown in such areas.

Since flood control is a gigantic task, there must be involvement of various departments for its effective solution. The departments like agriculture, soil conservation, engineering, state planning, and flood control must be linked together for the solution of the chronic problem of the State.

Crop Insurance Scheme for Farmers:

There should be some devices by which the farmers in the State could be protected against the hazards of flood, drought, excessive rainfall, winds, plant diseases and insect pests. This is possible only through a scheme of State-subsidized crop insurance scheme. Only this year (1985) the government of Assam has decided to introduce a statewise crop insurance scheme to provide financial support to farmers in the event of crop failures due to flood and such other natural hazards. This is a positive step in this direction. The scheme of crop Insurance will be operated by the State Government with active involvement of the General Insurance Corporation of India.

But the coverage of the proposed scheme is very limited. It will be applicable only to Sali paddy and it will cover only
the Development Blocks of Goalpara, Barpeta, Darrang, Sonitpur, Nagaon and Cachar Districts. Therefore, it is necessary to cover all the districts where intensity of flood is higher. A major difficulty in introducing crop insurance in the State is the non-availability of reliable time series data on crop losses. Integrity, honesty and sense of responsibility are the qualities required for both the farmers and the administrators to make the scheme a success.

Illiteracy of the cultivators is another hindrance for the effective implementation of the scheme. They do not understand the meaning and significance of crop insurance scheme.

The scheme can be operated by the State Agriculture Department with the aid and advice of the government. Crops which are more vulnerable must be protected through crop insurance scheme.

Irrigation and Water Management:

The most important factor for improvement in agricultural yields is the availability of adequate and timely water supply. Though well distributed rainfall and abundance of residual moisture have been sustaining the cropping system in the State, a network of irrigation facilities during abnormal situations is an immediate necessity. Moreover, the present state of low utilization of irrigation potential can be improved by taking up the following measures:

(A) The long duration variety of kharif crops which occupy the farmer field up to Nov-Dec, reduces the need for
irrigation for the rabi crops. Hence, suitable short duration variety of kharif crops should be evolved and adequate quantity of such type of seeds should be provided to the farmers.

(B) Assured water supply through irrigation increases the incentives of the farmers if they are provided with infrastructural support like credit, improved seeds, fertilizers, pesticides and extension services.

(C) For the development of agriculture within the command area of a irrigation project, a joint and coordinated efforts of different departments like irrigation, agriculture, extension services, marketing, financing and transport and communication is highly essential and for that purpose intra-departmental co-ordination committee can be constistituted at various levels.

(D) Due to continual low plan allocation till 1982-83 the irrigation projects in hand could not be completed in time causing colossal waste of time and money. Hence, adequate resources should be allocated to this sector, so that projects already in operation could be completed expeditiously.

(E) Provision for low cost minor irrigation facilities can be made available to small and marginal farmers through self-help basis on token monetary incentives.

(F) The quality control circle of the Department is an inter-departmental unit, to look into the matters relating to qualitative execution of the works and to suggest corrective
measures as and when necessary. But this unit is considered
grossly insufficient in view of the increasing number of irri-
gation projects and schemes already undertaken by the
Irrigation Department. Hence, the unit must be strengthened
with adequate and expert staff and persons having adequate
knowledge on irrigation works or persons involved in irrigation
projects should be inducted to the quality control unit.

(G) Assam is endowed with large potentialities of ground
water resources. Therefore, adequate arrangements should be
made to tap fully the ground water by means of tube-wells and
other wells. To quicken the pace of this programme, organiza-
tion of lift irrigation co-operatives to help small farmers for
digging wells or energising them will go a long way to step up
agricultural productivity.

(H) Since irrigation is comparatively a newer introduc-
tion in the State and Assam is situated in a different environ-
mental setting, the experiences and research findings available
in other parts of the country cannot be transmitted to the
State. Hence, a very strong research base is needed to find out
the system of irrigation which will be locally adaptable and
technically feasible.

Sound Seed Policy:

Increased availability and use of scientific inputs such
as more popular high-yielding varieties should constitute the
main elements of the new agricultural strategy leading to higher
rate of agricultural productivity. Production and multiplication of quality seeds for all crops particularly paddy, jute, pulses and oilseeds through competent seed certifying agencies is pre-requisite for the progress of agriculture in Assam. But these seeds must be scientifically tested and locally adaptable. The Agricultural University of the State should evolve suitable seeds and make them available to Government farms for multiplication of foundation seeds. The Government farms, in turn, should distribute the foundation seeds to the registered growers for the production of certified seeds.

The certified seeds so produced should be distributed to the farmers through the network of government's supply agencies so that the farmers get at a reasonable price. Demonstrations can be arranged at Government farms, through which the idea of the advantages of high yielding varieties, multiple cropping and other modern intensive agricultural practices can be given to the farmers. This will increase the incentives of the cultivators for the adoption of high yielding seeds along with modern package of practice.

Fertilizers and Manures:

Since soil fertility in Assam is steadily decreasing due to continuous cropping, application of fertilizers and manures at appropriate time with required doses is absolutely essential.

Fertilizers should be made available to the farmers at the time of need through well-organized distributive agencies.
The existing village level co-operatives can be used as fertilizer distributing agencies to the farmers. But for that purpose suitable incentives in the shape of transport and storage subsidy and distribution margin shall be provided to the co-operatives or any other distributive agencies recognized by the Govt.

Again, adequate credit support for purchasing the required inputs should be provided to the farmers. The abundant green-manures available in Assam and cowdung can also be used for raising the productive capacity of soil. With little effort and a little determination, farmers can use these manures extensively to raise the crop yields in Assam.

Since most of the farmers in the State are illiterate, it will be highly beneficial to the users, if demonstrations are arranged by the government periodically at certain consuming points of different areas.

To save the crops from pests and diseases, adequate supply of insecticides and pesticides should be provided to the farmers if possible at subsidized prices. Unless the plant protection measures are strengthened, the benefits of high yielding crops will not be gained. Hence, adequate attention must be given to prevent crops from pests and weed attacks. Each block in the State should be equipped with adequate number of plant protection machines for large scale operation and required number of staff for this purpose.
Agricultural Credit:

Flow of credit to farmers in Assam has yet to take roots and get stabilized. Therefore, a well-organized agricultural credit system has to be developed for Assam, based on the concept of service, economic viability and development of the area. Credit should be made available to the farmers in the shape of inputs, to ensure their actual utilization in production process.

Since majority of the farmers in Assam are small farmers having less than 1 hectare of land, they should be provided with "crop loans" either directly to the farmers or through the co-operative societies where such societies exist. The period of repayment of the loan should be lengthened in times of flood, drought and any other natural calamities. Linkage between credit and other inputs is called for. For small cultivators "consumption loan" is as important as production to maintain health and efficiency. The existing co-operative structure must be strengthened and viable so that they can supply the required inputs to the farmers. To tackle the problem of growing overdues, administrative machinery and recovery mechanism must be tightened.

Mechanization:

Mechanization although is time saving and labour saving has not been used extensively in the State. At the present system of land holding structure, it is neither practicable nor
desireable to adopt the mechanised system of cultivation. If the selective use of mechanical powers for ploughing, sowing, weeding, harvesting as well as in post harvest operation is highly effective for output expansion. Since the small farmers are not able to purchase these costly implements, these (implements) should be provided to the farmers through the service co-operatives or through the agents of Agro-industries Corporation on hire basis. Further, research should also be made for evolving intermediate technology mostly suited for small farmers with limited availability of investible resources.

Price Support:

Due to the absence of well-organized agricultural marketing, the farmers in Assam have been subjected to exploitation by unscrupulous traders and money lenders. Therefore, a suitable policy for the development of agricultural marketing in the State is pre-requisite for the progress of agriculture. The number of regulated markets should be increased to cover the whole area of the State and the number of marketable crops to be included into the regulated markets should be increased.

Timely fixation of "floor prices" and prior knowledge of such prices among the farmers is considered essential, because farmers can allocate the land resource in response to the floor prices. Massive procurement of food and fibre crops through government agencies is not only essential for stabilizing prices but it also ensures remunerative returns to farmers. In addition, a broad based market should be set up where one can sell their products.
product's at the prescribed floor price as and when he wants to do so. Effective implementation of price support policy should receive greater attention.

Preservation of Forest:

Forest, though not directly related to agriculture is highly useful in maintaining and preserving the productive capacity of soil through much needed natural vegetative cover. Besides, it prevents soil erosion, stabilises climatic condition and helps the farmers in the management of pest and diseases of domesticated crops. Hence, preservation and maintenance of forest become an immediate necessity at least for the sake of agriculture.

Agricultural Planning at Micro-level:

There is extreme variability in agriculture due to differences in soil, cultural, institutional, technological and geographical factors. Soil erosion, population growth, development of new insects and pests and flood affect the environment within which development planning is carried on and call for variation in plans from area to area and from time to time. The problems of Hills region are different from the plains region due to differences in geographical location and practice of cultivation.

Therefore, emphasis should also be placed on district level planning and if possible on the block level, if development
planning is to be successful. Two major steps are required for this purpose. Firstly, the variation in agriculture must be specifically understood and documented if plans are to be molded to it. This calls for cross-sectional studies of agriculture to distinguish differences among regions or districts. Secondly, it calls for continuing such studies over time so that temporal differences may also be understood and adjustments made.

Inter-sectoral Approach:

As agriculture cannot function in isolation, it must be supplemented by industrial and tertiary sectors. The modern technology is the result of industrial efforts. Chemical fertilizers, pesticides, tractors and other agricultural implements have to flow in from the well-conceived complex of industries, similarly, for agricultural marketing and finance, agriculture has to depend on tertiary sector. Therefore, a well-co-ordinated multi-sectoral approach is highly essential for smooth and steady agricultural progress.