Part I
The Problem:

Agriculture is considered traditional when farm operations are conducted in the same pattern from generation to generation without much change in the input mixture, farm implements and techniques. In traditional agriculture the technique of production remains outmoded and unrewarding for which the growth of agriculture becomes sluggish. Mollor (1969 : 224) has characterised traditional agriculture as "a technologically stagnant phase". Various explanations have been put forward for its continuity. It is commonly agreed that a departure from traditional agriculture necessitates a change in technology in order to accelerate the process of growth. Technological change in agriculture, generally, refers to a change in technique of production brought about by adoption of new cultural practices through application of non-traditional (improved) inputs and use
of modern tools and implements. Technological change is, therefore, dependent on investment in new high pay-off non-traditional agricultural inputs including modern tools and implements. Investment, by and large, is determined, apart from profitability consideration, by economic opportunities, efficient incentives and other factors. Opportunities occur only when the highly productive modern inputs become available to the farmers.

Land is a major production-base in agriculture, particularly in an economy with a low level of technology. As the farm income is dependent mainly on production from farm land, farmers with a low level of agricultural technology are generally poor. Moreover, in a less developed country the supply of labour in comparison to other material inputs is abundant and as such output and income per head is low. The reason for slow rate of agricultural growth faced by most of these less developed countries is attributed to the various constraints at different levels - farm, village, district and state.

1. Technological change, according to Metcalf (1970:60) occurs with the addition of a new production technique to the existing stock of technology. A farm can change its production technique either by adopting the new technology or by changing its input mix within the constraint imposed by existing technology.
The key to development lies in identifying these constraints at different levels and taking appropriate measures for removing or reducing them to make technological change possible.

A commonly held notion is that the major opportunity for investment is provided by the land-base. The notion prompted the advocates of land reform to emphasise on equitable distribution of land as a means to agricultural development. Their views have been emphatically echoed by political leaders. The social and political objectives sometimes overshadow the real economic issues and as a result it becomes difficult to critically evaluate some of the vital economic questions.

In poor agricultural communities there is little opportunities for productive investment. Being too expensive it is difficult for the farmers themselves to undertake such investment. Even when the farmers possess the necessary land-base and also when they are found to be aware of the benefits flowing from a judicious combination of the more

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2. Kindleberger (1965: 138) maintains that a change in technique of production will change the economic quantity (i.e. productivity) of land and labour.

3. Although a detail discussion on land reform and agricultural development is beyond the scope of the present study, the effect of land reform on investment vis-a-vis growth is briefly discussed in Chapter II.
productive material inputs with land, it is observed that
their actual investment decisions remain uncertain.
Resources are generally used either on conspicuous
consumption to display a higher social status or on other
unproductive investment supposed to be more secure by them.
Such pattern of investment by the farmers, among other
things, reflects the inadequacy of opportunities for
productive investment in agriculture.

It is under such circumstances the state or
state sponsored public or semi-public agencies are to
assume more important role. Unless initiative to induce
the farmers by providing the opportunities to invest in
highly productive inputs is taken by the state, it becomes
difficult to have the much needed level of technology in
order to accelerate the process of growth of agriculture,

With the initiation of New Strategy in mid sixties
a general awakening among the farmers in many parts of India
to raise productivity in agriculture through a change in

countries where the general environment is not favourable
to productive investment, it is likely that a large part
of the savings is kept in such forms as trinkets, precious
stones and metals, coins or textiles. Savers, especially
when they are agriculturists, often buy land with their
savings for reasons of prestige or as a hedge against
inflation". Hunter (1969: 35) also observed, "jewellery,
money lending, social display and patronage will use
up much of the free cash capital which might have
gone back into farm improvement".
technology has been noticed. But the change in technology has not been uniform throughout the country. Some states have already achieved perceptible progress in this direction while Assam is lagging behind on this front. Technological breakthrough has influenced only a small section of farmers in the State. The farmers are found to have clung to their age-old agricultural practices.

There might be constraints of various kinds - operational, economic, environmental and sociological, inhibiting productive investment to bring about a technological improvement. The existing literatures are not sufficient to provide a comprehensive idea in this respect.

All India Rural Credit Survey (1965) enumerated in details only the credit needs of different categories of farmers for current and capital expenditures. All India Rural Debt and Investment Survey (1965) and All India Debt and Investment Survey (1975) highlighted the pattern of investment in relation to the holding of assets by different categories of farmers. National Council of Applied Economic Research (1965) examined the income, investment and saving behaviour of the rural households in general.
The Agro-Economic Research Centre for North-East India, Jorhat studied (Phukan, 1978) for three consecutive years the income, saving and investment of cultivating and agricultural labour families in an agriculturally prosperous district (Nowgong) of Assam. The study dealt only with the quantum and pattern of these variables. Two other studies of the Centre, one on high yielding varieties (Uchaisn, 1969) and the other on double cropping (Phukan, 1970), also analysed certain problems relevant to investment for technological change.

Farm Management study in Nowgong district of Assam (Goswami & Bora, 1977) conducted by Ministry of Agriculture, Government of India, also made some references to the investment pattern in agriculture but has not dealt with the problem of investment specifically.

Apart from these studies Goswami (1963) observed certain problems of agricultural development in Assam. Some other articles and seminar papers while discussing other aspects of agriculture in Assam made some passing references on the pattern of investment, rate of capital formation, cause of slow rate of technological change and others.

All these studies give only a general idea of the problems of agricultural development with casual references to the problems of investment. No specific study has so far been undertaken on this aspect particularly in Assam. A scientific and systematic study based on empirical data to provide a broader and comprehensive knowledge on the aspect for formulating policy and strategy for a technological change through productive investment has been found to be necessary.

The present study is undertaken to analyse the relationship between the land holdings of the cultivating families and the level and pattern of investment by farmers of different size-groups within the existing socio-economic environment. The study also aims at making an assessment of the constraints which inhibit investment in non-traditional agricultural inputs of higher productivity and cause of diversion of resources.

Scope:

From the discussion in the preceding section, it is evident that in order to have a deeper and comprehensive knowledge on the problem of the present study investigation on a large number of relevant factors is necessary. But it is very difficult for an individual researcher to investigate intensively into all the relevant aspects on
extensive scale with limited time and resources. Therefore, the study had to be restricted to a case study of a specific area from where empirical data were collected.

For a clear understanding on the problem it is necessary to take into account the interrelationship between investment and agricultural productivity in the context of agricultural vis-à-vis economic growth of different countries in the past. Attempt is being made to review briefly the process of agricultural development in India during post-independence period. The lack of affinity in physical, cultural and environmental conditions necessitates presentation of a picture of agricultural situation in Assam that reflects the circumstances under which agricultural operation in the state is carried on. It also examines the existing level of technology and scope of its improvement.

Secondly, the study envisages to bring out the relationship between the availability of resources and production pattern of the farmers. In this regard it seeks to analyse the pattern of land holdings, the tenure status, the cropping pattern and the level of income distribution by sources. Analysis of these aspects would indicate the existing opportunities of the farmers for more productive investment.
Thirdly, the study envisages to analyse the existing pattern of investment undertaken by the farmers. As investment takes different forms, an analysis of investment from the standpoint of investment in current and capital inputs becomes more pertinent. The pattern of investment not only reflects the level of technology followed but also the effects of size of landholdings and level of income on different types of investment.

Lastly the study envisages to identify the constraints associated with different classes of farmers as well as with farm operation in general. The identification of the constraints on the basis of the findings of the study is expected to be useful in the formulation of programmes for agricultural development as a whole.

Coverage and Sampling Design:

For the purpose of the study the district of Dibrugarh, situated at the eastern most part of Assam, was purposively selected. Dibrugarh district is considered as one of the agriculturally less prosperous district (U.A. 1976 : 180). The district is deficit in food production and about 75000 tonnes of rice have
to be imported annually to the district. The district is mostly dependent upon outside for pulses, sugar, onion, etc. while about 50 per cent of total requirement of mustard is produced locally (U.O.A. 1973: 20-21). The bulk of agricultural operations are still dependent on traditional practices and the drive towards technological break-through has touched only the fringe of the farming community in the district. The less progressive nature of agriculture in the district is evident from the low proportions of irrigated area and net area sown more than once to the total cultivated area, the proportion of area under High Yielding Varieties of Rice to the total area under rice as well as the average yields of Winter and Autumn Paddy as given in Table 1.6.

Four out of ten Community Development Blocks of the district were selected taking into consideration their representative character of the agricultural situation of the district. Four villages from each selected Block were selected at random. Thus in all sixteen predominantly agricultural villages were selected for the study.

6. The use of inorganic fertilisers per hectare has not been taken into consideration as the available data include also the use of fertilisers in the cultivation of rice which lie outside the scope of the study.
Table 1.1

Proportion of area irrigated and net area sown more than once to total cultivated area, proportion of area under H1V rice to total area under rice and average yield of rice in different districts of Assam.

<table>
<thead>
<tr>
<th>Districts</th>
<th>P.C. of cultivated area (Net)</th>
<th>P.C. of rice area (gross) under H1V (1972-73)</th>
<th>Average Yield (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Irrigated</td>
<td>Sown more than once</td>
<td>Winter Rice</td>
</tr>
<tr>
<td>1. Dibrugarh</td>
<td>0.01</td>
<td>2.15</td>
<td>10.9</td>
</tr>
<tr>
<td>2. Sibsagar</td>
<td>0.17</td>
<td>2.52</td>
<td>19.7</td>
</tr>
<tr>
<td>3. Nongong</td>
<td>2.36</td>
<td>2.69</td>
<td>8.1</td>
</tr>
<tr>
<td>4. Lakhimpur</td>
<td>-</td>
<td>1.78</td>
<td>24.2</td>
</tr>
<tr>
<td>5. Darrang</td>
<td>17.52</td>
<td>22.36</td>
<td>5.9</td>
</tr>
<tr>
<td>6. Assam</td>
<td>10.82</td>
<td>40.88</td>
<td>8.9</td>
</tr>
<tr>
<td>7. Goalpara</td>
<td>11.49</td>
<td>7.83</td>
<td>7.1</td>
</tr>
<tr>
<td>8. Cachar</td>
<td>0.30</td>
<td>18.18</td>
<td>23.2</td>
</tr>
<tr>
<td>9. Narai Anglong</td>
<td>25.43</td>
<td>11.67</td>
<td>37.1</td>
</tr>
<tr>
<td>10. S.C. Hills</td>
<td>14.62</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>State Total</td>
<td>7.15</td>
<td>15.57</td>
<td>13.1</td>
</tr>
</tbody>
</table>

Source: (i) World Agricultural Census, Assam, 1970-71
In the initial stage of survey all the cultivating households within each selected village were listed. As the study is concerned only with agricultural investment non-cultivating and landless households who did not have their own cultivation were excluded. The listed households were grouped into ten groups, taking into consideration the size of operational holdings of the households. Households of different size-groups of operational holding were categorised into four broad categories as (i) marginal farmer (having operational holding upto 1.00 hectares), (ii) small farmer (having operational holding between 1.01 and 2.00 hectares), (iii) medium farmer (having operational holding between 2.01 and 4.00 hectares) and (iv) big farmer (having operational holding 4.01 hectares and above).

With the limited resources at the disposal of an individual research worker, it is almost impossible to cover all households in the selected villages in order to study all aspects of the complex problem of investment in agriculture. Twenty per cent of households from each size-group of operational holding in each village was selected according to random sampling technique for intensive study. Information was thus obtained from two hundred nineteen cultivating households in aggregate.

7. Size-groups of households operational holding (in hectares) are 0.01 to 0.50; 0.51 to 1.00; 1.01 to 1.50; 1.51 to 2.00; 2.01 to 3.00; 3.01 to 4.00; 4.01 to 6.00; 6.01 to 7.50; 7.51 to 10.00 and 10.01 & above.
Data were collected by direct personal interview with the heads of the households. The schedules and questionnaires were drawn up keeping in view the objectives of the study. Special care was taken in collecting data for getting a clear and accurate picture to the extent possible.

Reference Period:

The reference year for the purpose of the present study was from 15th January 1974 to 16th January 1975. The period conformed to the crop year starting from the preparation of land for Autumn Paddy and Jute to the harvesting of the Winter Paddy in December - January. After the harvesting of the principal crop the Winter paddy, the Assamese harvesting festival 'Machop Din' is celebrated on 14th January and thereafter the cultivation of the next cycle of crops begins.

Limitation of Data:

It is already mentioned that the data were collected from households by personal interviews with the heads of the households. The respondents replied the queries from their memory as the practice of keeping records was totally absent. It is obvious that information furnished in that manner suffers from certain limitations.
Government policies as regards ownership of land holdings and terms of tenure are fast changing. In this context certain degree of biasness has crept in and the respondents may understate some informations.

The heads of the households were not fairly educated to appreciate the importance of the study and as such the data might not be as accurate as is expected.

In spite of all these limitations attempts were made to obtain the necessary information as correctly as possible. Attempts were made to check and cross-check information whenever doubts arose.