Chapter 1
INTRODUCTION

The problems related to Indian agricultural development have received the close attention of economists both in India and abroad. The agricultural sector contributes nearly 50.0% of the net domestic product and offers employment to nearly three-fourths of the total population in India. Expenditure on food accounts for nearly 70.0% and 60.0% of the per capita monthly total consumption expenditure in the rural and urban areas respectively. Some important industries, viz., the textile (jute and cotton), edible oil and sugar industries depend mainly on agricultural raw materials. Again, the growth of fertilizer industries and industries producing agricultural implements and machineries depends on the growth of agriculture. Agriculture also earns a major part of the foreign exchange.

One such problem is related to the techniques of measurement of growth rates and the selection of appropriate periods for this purpose. It is now recognized that while the conventional technique of compound interest formula gives a rough idea of annual compound growth rates of output, different growth curves, both linear and asymptotic, should be fitted to the sample data in order to find the actual nature of growth, that is, to ascertain whether growth rate is rising, constant or falling.

Another related problem is that of fluctuation in
agricultural production. The problem was highlighted by S.R. Sen in the address delivered at the twentieth annual conference of the Indian Society of Agricultural Statistics at Waltair in 1967. He noted that the higher the growth rates, the higher are the fluctuations and discussed at length the factors responsible for this fluctuation.

Measurement of growth rates or fluctuations cannot naturally be the final objective of economists. They also want to know how farmers behave. The measurement of response of agricultural production to different growth components and particularly growth factors such as price, yield and irrigation has also been studied by them. The supply responsiveness of agricultural production has obvious policy implications. Hopefully, knowledge of past behaviour in these areas can lead to better predictions of short run domestic food and raw materials and the effect of various specific policies on agriculture and on overall growth can be better understood.

Economists have employed different models to measure the elasticity of supply of agricultural output in response to various factors, particularly price. The interest in this subject was revived and stimulated since the publication by Nerlove in 1958 of the results of his distributed lag model designed to measure the short run and long run elasticities of supply of crop output with respect to changes in price. Though the Nerlovian adjustment model is now being used extensively for this purpose, mainly because of computational ease, attempts are being made,
though very few in number, to use other models such as expectation models and to choose the best of these models on the basis of certain statistical criteria and some *a priori* restrictions on the parameters in the models.

In addition to these problems, economists have concentrated on various other problems such as economic 'rationality' of the farmers, the response of marketed surplus to price changes and the effect of PL480 on the growth of agriculture in the recipient countries, the relationship of land tenure systems and agrarian organization to the efficiency of factor use and the question of the existence and measurement of disguised unemployment etc.

Studies in the above areas have been carried out at both micro- and macro-levels. While the micro-studies have been carried out on the basis of data collected through different village studies, surveys and resurveys conducted by various professional and educational institutes and individual researchers, macro-studies are based on aggregative State level or national level data. Thus, while in micro-studies the villages are the units of observation, in the macro-studies the State or the country as a whole is the unit of observation. Very few studies in agrarian economic structure are made at a district or block level. Aggregation at the State level or national level sometimes cancels out the effects of many important factors that are critical for a particular district or region.
Keeping in view the importance of district level studies we attempt to carry out in the following chapters a district level study of some problems of agriculture (discussed below) in three States in Eastern India, viz., Bihar, Orissa and West Bengal.

We have selected these three States for the following reasons. These States are mainly rice-producing States. In Bihar and West Bengal and in some districts in Orissa wheat has emerged as an important cereal crop since the mid-1960s having affected a change in the cropping pattern in the districts of these States. These States were till 1965-66 among the agriculturally least developed States in India. It is further felt that the expansionary potential in the traditional rabi farm belt has been almost exhausted and therefore, much greater attention than before should be given to the condition obtaining in agriculture in the Kharif belt comprising mostly the south-eastern part of the country.

The problems that we have discussed in detail are:

1. measurement of growth rates and fluctuations in crop production in the States of Assam, Bihar, Orissa and West Bengal (chapter 2),
2. contribution of different growth components such as area, yield and crop pattern to the growth rate of crop production in the districts of the States of Bihar, Orissa and West Bengal during the so-called pre- and post-Green Revolution periods (chapter 3),
3. supply response of major cereal and cash crops to changes in price and non-price factors such as rainfall, yield and irrigation (chapter 4) and
4. effect of fertilizers and water supply on yield
The final chapter (chapter 6) presents a summary of findings of our studies.

The study of the above problems relates to the period from 1950-51 to 1975-76. But in some cases we are forced to consider small sample periods depending on the availability of data on some critical variables such as fertilizers.

In the early 1970s there took place a reorganization of the districts in Bihar. As its result, Patna was divided into two districts - Patna and Nalanda; Gaya was divided into three - Gaya, Nawada and Aurangabad; Shahabad into two - Bhojpur and Rohtas; Saran into three - Saran, Gopalganj and Siwan; Champaran was partitioned into East Champaran and West Champaran; Muzaffarpur into three districts - Muzaffarpur, Vaishali and Sitamarhi; Darbhanga into three - Darbhanga, Madhubani and Samastipur; Monghyr was partitioned into Monghyr and Begusarai; Purnea into Purnea and Katihar and Hazaribagh into two, namely Hazaribagh and Giridih. This reorganization has increased the number of districts from seventeen to thirty-one. We have considered the pre-reorganization boundaries of the districts and aggregated the data wherever they are considered necessary. For example, the figure of total cultivated area in Patna for 1974-75 means the total cultivated area in Patna and Nalanda taken together.

We started our analysis with four States, namely Assam,
Bihar, Orissa and West Bengal. But with the progress of our study we found it extremely difficult to collect data on most of the variables for Assam, mainly because of political turmoil, recently brewing in the State. Therefore, we ultimately concentrated on only three States, namely, Bihar, Orissa and West Bengal.