INTRODUCTION AND PLAN OF STUDY

In agriculture to-day, resource productivity and efficiency of resource use play a vital role in the allocation of resources. International productivity differentials in agriculture have always been a major concern to economists. In fact, since World War II resource productivity in particular regions of the world and international productivity differentials have taken an added importance. This is mainly due to the ideological currents and to the recognition of the existence of widespread poverty in the world. Thus, the need for increasing the productivity of resources and the efficiency of resource use in particular areas of the globe have been deemed especially important.

The production function approach provides us with a useful tool for measurement of resource productivity. Perhaps, the most appropriate use of production functions is that of guiding the farmers in their individual decisions. The data can also be of considerable help for certain purposes of policy. The farmers are expected to maximise their profits with their limited resources. In a semi-commercial peasant agriculture like ours this may not be always the case. Even then production function studies can provide the basis for improving conditions of farmers not only in commercialised agriculture but also in countries having peasant farming as a dominant form of agricultural organisation. Thus, the farm production functions can provide
general guidance for farmers' decisions, credit policy formulation, readjustment of agricultural regions etc.

Improved knowledge of farmers and increased commercialization of peasant agriculture in recent years have increased the need of experimental designs and research in biological fields. This also lends support to the estimation of production functions. Different sets of data can be better adopted for economic interpretation and recommendations. An increasing number of farmers in India have become more aware of the market and wish to use fertilizers, modern feeds and similar resources in a manner approaching optimum production conditions.

Under the highly commercial operations to be found in the U.S.A. and other industrialised countries of the west, management is satisfied to continue the use of a quality fertilizer or feed ration when such use is profitable. It is concerned with the most profitable quantity and mix of inputs. Under large-scale operations, large profits may be sacrificed unless fertilizers are used at levels which give most profitable yields, or unless livestock rations are those which minimise costs for given gains. These conditions may not obtain under the generally peasant agricultural organisational form in India. But conditions are changing and there is general agreement that Indian agricultural producers are
becoming more profit-and-cost conscious. In any case, production function studies have considerable descriptive value and offer plentiful information on what is happening on farms.

The present study has been made in the belief that production function studies in the Indian context are meaningful. Accordingly, an attempt has been made first to examine the goodness of fit of different forms of production functions. (i.e. linear, cobb-Douglas (loglinear) and semilog) On the basis of preliminary investigations, it has, however, been found that cobb-Douglas production functions are the most promising from the point of view of goodness of fit.

The present study is by no means the first in the field in India. Quite a large number of studies have been made earlier with the objective of fitting Cobb-Douglas function to Indian data. We have offered in Chapter-II a brief résumé of the works done by eminent scholars in the sphere. But the present study claims the distinction of being the first to have been undertaken with reference to two particular periods. These two periods are designated Period-I and Period-II. The first period covers the three years from 1963-64 to 1965-66. It is obvious that this was a period before the introduction of the new agricultural technology in India. In this period, therefore, agricultural producers depended by and large on traditional inputs and traditional methods
of production. The use of chemical fertilizers, H.Y.V. seeds and other modern inputs was not widespread. It is for this reason that we have designated all farmers in Period-I as traditional farmers. Again, the traditional farmers in Period-I have been divided into 'treated' and 'non-treated' groups following the practice prevailing at that time of the Agriculture Department of the West Bengal Government. The traditional 'treated' farms received advice and investment funds from the Government of West Bengal. They were provided with advice regarding scientific methods of cultivation and at the same time they were given additional assistance in the form of fertilizers, improved seeds, plant protection chemicals and improved implements etc. which the cultivator might ask for after he had received training on improved methods of cultivation. The traditional 'non-treated' farmers in Period-I did not receive any such help with respect to advice and investment funds as mentioned above. In fact, all the inputs were provided by the traditional 'non-treated' farmers themselves and they depended mostly on animal power. After 1965-66, this dualistic policy of the Government was abandoned and no special treatment was given to particular groups of farms. On the other hand, Period-II covers the years 1972-73, 1973-74 and 1974-75. The significance of Period-II lies in the fact that all the farmers used high yielding varieties of seeds (H.Y.V.) for different crops. It is
important to note that modern inputs like chemical fertilizers, pesticides etc. were used by the farmers in this period to a considerable extent and as such the farmers in this period are treated as non-traditional farmers. Again, it is also important to note that these non-traditional farmers received technical advice as well as supply of inputs from the relevant Government Department.

In other words, the two periods in the present study are chosen in such a way that they represent respectively the Pre-Green-Revolution and the Post-Green-Revolution agricultural situations in India. Again, this background, the main thrust of the present study has been to test the following hypotheses:

1. the new technology is land-saving and labour-using in nature;
2. the new technology is seed-fertilizer-water based;
3. the traditional agricultural technology of the first period as well as the Green-Revolution technology that has followed it is size-neutral. In addition, (4) an attempt has also been made in the present study to examine whether 'Owned-cum-tenanted' farms are more efficient than the 'Purely owned' farms in the use of technology in the two periods concerned. The first two hypotheses have been tested by comparing the production functions of farms using traditional technology in Period-I with the production functions of farms using the new technology in Period-II. In the same way, a comparison of production functions of small and
large farms in both the periods has been made in order to test the third hypothesis. Finally the production functions of 'purely owned' farms have been compared with the production functions of 'owned-cum-tenanted' farms for both the periods in order to test the fourth hypothesis.

An analysis of costs and returns of the farms in both the periods is another dimension of the present study. This is mainly concerned with the analysis of the efficiency of farms according to farm size and ownership pattern. We have proceeded on the basis that net income per unit of land could serve as a meaningful though partial, measure of farm efficiency. It was observed that neither total costs or paid out costs could be a useful basis for assessing the efficiency of farms under Indian conditions. The question of farm efficiency on the basis of size and ownership pattern has been examined in the context of traditional technology agriculture (i.e. Period-I) and new technology agriculture (i.e. Period-II).
The present study is divided into the following Chapters.

Chapter - I : Sources of Data And Research Methodology.

Chapter - II : Cobb-Douglas Production Function - Its Advantages, Applications and Limitations.

Chapter - III : Production Functions For Period-I And Period-II.

Chapter - IV : Production Functions For Small (Upto 7.5 acres) And Large (above 7.5 acres) Farms In Period-I And Period-II.

Chapter - V : Production Functions for 'Purely Owned' And 'Owned-Cum-Tenanted' Farms In Period-I And Period-II.

Chapter - VI : Farm Costs And Returns In Period-I And Period-II
   a) Relationship between farm size and efficiency in Period-I and Period-II
   b) Distribution of net income to different inputs according to farm size in Period-I and Period-II
   c) Relationship between ownership pattern and efficiency in Period-I and Period-II

Chapter - VII : Summary And Conclusions.
In addition to the Chapters mentioned above three appendices have been added in the belief that these appendices provide some additional but useful information not incorporated in the text.

Appendix A: Districtwise Production Functions In Period-II

Appendix B: An Explanation of the Differences In Costs And Returns of Traditional 'Treated' And Traditional 'Non-treated' Farms In Period-I

Appendix C: Farm Costs And Returns: Districtwise Disparities In Period-II.