CHAPTER I
INTRODUCTION

In most of the developing countries agriculture is a source of livelihood and sustenance for majority of the people and its growth provides the greatest hope for improving the living standards of the people. It provides food for the people, raw materials to industries, capital and labour to other sectors of the economy. Thus the development of agriculture plays a major role in total economic development of a country. Hence formulation of agricultural development strategies needs much care and attention.

At any point of time agricultural production system can be characterized by four basic resource technology situations viz., unlimited land static technology, limited land static technology, unlimited land dynamic technology and limited land dynamic technology (Shand).\(^1\) In the first situation the land and labour supplies increase with static production techniques, the growth of agricultural output depends on the quality of land. In the second situation with increasing labour supply keeping other factors of production constant or declining, agricultural output will not increase. Under these circumstances development policies play an important role in raising the productivity in agriculture. In the third situation with all the factors of production increasing agricultural output will increase. The last situation is where land is a scarce

---

factor of production. So the growth of the output depends on the intensive use of land with optimal mix of other inputs. This is the situation that prevails with the great majority of farmers in developing countries.

The existence of various combination of resources and technology in different countries and even in different parts of a country means that there are multiple paths of technology development. But two constraints exist for agricultural development, i.e. an inelastic supply of land and labour scarcity. The former problem could be overcome by improving existing biological technology whereas the later could be offset by developing mechanical technology. The ability of a country to achieve rapid growth in agricultural output and productivity seems to hinge on its ability to make an efficient choice among the alternative paths.

Indian Agricultural Development

Indian agriculture with nearly three fourths of the nation's population engaged in its activities and contributing a little less than one third of the gross national product, holds the key for economic development of the country. Approximately three quarter of gross cropped area is sown to food crops with predominance of cereals. This was consistent with the situation when the First Five Year Plan was launched with emphasis on agricultural development to solve the problem of food shortage. This was aimed at by harnessing the available water supply. The Second and Third Five Year Plans also stressed the need for self-sufficiency in food production but with a break-through in
agriculture. The Fourth Five Year Plan document observed that the new agricultural strategy should place emphasis on improvement in the productivity of crops since there is little scope for bringing additional land under cultivation.

This emphasis found expression in schemes on intensive cultivation in areas most favourably endowed with assured irrigation with the support of required supplies of chemical fertilizers, pesticides, credit and extension services. The programme received a new thrust with the spread of fertilizer responsive and high yielding varieties of crops particularly in wheat and rice since the mid sixties. This has brought a major break-through in technological progress in Indian agriculture and its impact was the Green Revolution. The food grain production increased from 55 million tones in 1950-1951 to 189 million tones in 1994-1995. This increase in food grain production was largely due to the increased productivity through seed-fertilizer technologies. The use of fertilizer increased productivity through seed-fertilizer technologies. The use of fertilizer increased from 1.9 kg/ha from 1960-1961 to 65.53 kg/ha from 1992-1993. Similarly pesticide use increased from 8.62 thousand tones to 70.79 thousand tones during the above periods.

**Problem Focus**

The impact of high yielding varieties on income distribution and employment generation was commented. Shand pointed out that physical environment and institutions affect the impact of HYV on income and
employment generation. Dantwala argued that to bring about agricultural growth with social justice priority to infrastructural development and scientific research should be given in areas with deficit endowment and institutional reform in technologically advanced areas. The performance of HYV paddy has been more disappointing in view of economic, institutional and infrastructural constraints.

Given the importance of this technological change for future food grain production in India, it is necessary to examine the performance of HYV and analyse the extent and nature of success in the range of production environments and explore the factors influencing the performance. There is a general belief that a few farmers are fully adopting the institutional reform in the potential production technology but still their farm yields are far below the potential level. Such productivity differences are mainly due to lack of use of package of practices in full which is partly related to the technical inefficiency of the farmers.

The performance of farms is largely determined by technical efficiency given the positive dependency of allocative efficiency upon technical efficiency. Variations in technical efficiency were found to be partly explained by differences between farmers in a range of technical practices followed within each environment and season. Even after two decades of experience

\[2\] Shand, R.T., "Recent Indian Experiences of the International Transfer of Cereals Grains Technology", Development Studies Center, the Australian National University, 1978.

\[3\] Dantwala, M.L., "Future of Instutional Reforms and Technological Change in Indian Agriculture", Economic and Political Weekly 12, (31, 32 and 33) 1299-1306, 1978.
with the new rice technology wide differences in technical practices between environments and within environment, within season and between seasons exist. These differences represented the managerial ability of farmers with their production conditions in any season and over time. Production conditions vary within each environment owing to microphysical and microclimatic factors. While few farmers were very near to their individual frontier most were below this level. There are rare exceptions where most farmers clustered near their frontiers. Sub optimal performance in terms of efficiency was the norm for most farmers. With this in view the present study is undertaken in the Tirunelveli District with the following objectives.

**Objectives**

The overall objective of the study is to measure the level of technical efficiency of farms.

The specific objectives were

- To study the existing input use behaviour by the farms
- To measure the technical efficiency, allocative efficiency and economic efficiency through frontier models, and
- To suggest policy options to improve the farming efficiency of farmers and to increase food grain production.
Limitations of the Study

This study was confined to Tirunelveli District with specific agro-climatic conditions. Hence the conclusions will apply only to areas with similar conditions. The study was a static analysis. The price of inputs and outputs, production technologies and market conditions were taken as given. However the above limitations will not affect the utility of the study because the model is amenable for extensive sensitivity analysis for likely changes in any of the above variables.

Organisation of the Thesis

CHAPTER I: General, introduction, problem setting, objectives, hypothesis, scope and limitations of the study are presented.

CHAPTER II: Concepts used in the present study along with a comprehensive review of the various models and their applications in the past are described.

CHAPTER III: Selection of study area, method of data collection and the different econometric methods used in the study are presented.

CHAPTER IV: The results of the study are presented and discussed with their implications.

CHAPTER V: The results are summarized and conclusions drawn with policy implications.