SYNOPSIS

THE IMPACT OF FARM TECHNOLOGY ON IRRIGATED RICE PRODUCTION – A STUDY WITH REFERENCE TO MADURAI DISTRICT OF TAMIL NADU

1.1 INTRODUCTION

Agriculture in India is undergoing transformation. Traditional technology is slowly giving way to modern technology. This transformation to new technology and techniques brings to the fore new problems and thus offers new opportunities and new avenues of research to agricultural economists. The ‘New Strategy’ for agricultural development, which was initiated in 1966, in essence called for the implementation of High Yielding Varieties Programme (HYVP) in all districts selected under Intensive Agricultural District Programme (IADP) and allied schemes. The strategy was concerned with higher productivity of crops per acre, but with multiple cropping, the HYVP had assumed ‘crucial importance’ in the Planning Commission’s agricultural development strategy.

There is a great impact of Green Revolution on the power structure at various levels and the issue of taxation of agricultural incomes. In the year 1966, the implementation of technological change in High Yielding Varieties Programme (HYVP) in all districts selected under Intensive Agricultural District Programme (IADP) scheme was introduced. The strategy was concerned with higher productivity of crops but with multiple cropping, the HYVP had assumed
‘crucial importance’ in the Planning Commission’s agricultural development strategy. The most interesting feature of the new agricultural strategy was that the movement for scientific agriculture and programmes for research and extension received fresh stimulus. A three dimensional approach towards agricultural development was chemical technology that guaranteed minimum paddy as an incentive to agricultural production. Technological change or the new strategy proposes to make a new technological breakthrough in India which comprises the introduction of new and HYV of improved seeds, increased application of the recommended dose of fertilizers and extension of the use of pesticides that can save crop from destruction by insects. This technological change brought spectacular changes in the agriculture production of our country. The increase in production of food grains recorded after 1966-67 is described as Green Revolution. The rapid introduction of HYV of paddy and wheat and their multiplied effects on other crops justify the name Green Revolution.

The new agricultural strategy technology adopted since the mid sixties has helped in revolutionizing Indian agriculture. Technological change in agriculture is characterised by the use of pesticides, irrigation, machinery, improved implements, soil conservation and the like. The successful adoption of these components of new strategy has resulted in the increase of agricultural production. The introduction of above mentioned components of new agriculture strategy depends upon factors like irrigation, size of farm, capital, institutional credit, and
extension services. There are many regions with better factor endowments. The new agricultural strategy was the first to adopt modern inputs and derive the benefits as a sequel. The present study, concentrates on the impact of technological change on agricultural production in Tamil Nadu, particularly in Madurai district.

STATEMENT OF THE PROBLEM

The new farm technology adopted since the mid sixties has helped in revolutionizing Indian agriculture. Technological change in agriculture is characterised by the use of pesticides, irrigation, machinery, improved implements, soil conservation and the like. The successful adoption of these components of new strategy has resulted in the increase of agricultural production. The introduction of above mentioned components of new agriculture strategy depends upon factors like irrigation, size of farm, capital, institutional credit, and extension services. There are many regions with better factor endowments. The new agricultural strategy was the first to adopt modern inputs and derive the benefits as a sequel. The production performance of the rice production is of critical importance in improving the efficient use of resources. The cost of production and net returns obtained per unit would determine the profitability of the rice production. The profitability of an enterprise depends upon the efficient use of the resources in production. The present study is a modest attempt in this
regard. This study is an attempt to analyse the impact of farm technology in terms of high yielding seeds in rice production in Madurai district.

**OBJECTIVES OF THE STUDY**

The main objective of the study is to analyse the impact of farm technology particularly improved High Yielding seed technology on rice production. The specific objectives of the study are:

1. To analyse the cost and return structure of Traditional and High Yielding Variety technology of and of small and large farmers producing Traditional and High Yielding Variety of rice.
2. To identify and analyse the determinants of yield and factors causing yield gap with regard to farmers cultivating two varieties of rice and of small and large farmers group.
3. To estimate and analyse the input demand elasticities and supply responsiveness of two variety group of farmers.
4. To investigate the labour absorption capacity and supply responsiveness of each variety with regard to their own prices and prices of variable inputs and units of fixed inputs.
5. To study the nature and returns to scale for both new high yielding variety and traditional of rice cultivating farmers.
6. To study the impact of new technology on factor shares and to measure the nature of factor biases in technical change.
METHODOLOGY

Designing a suitable methodology and selection of analytical tools are important for a meaningful analysis of any research problem. This section is devoted to describe the methodology which includes choice of the study area, sampling procedure, period of study, collection of data, method of analysis, tools of analysis and measurement variables.

Choice of the Study Area

The area chosen for the present study is Madurai district, situated at the southern most tip of Tamil Nadu. Eighty three per cent of its population is residing in villages and 58.8 per cent of its working population is anchored in agriculture and its allied activities. This district stands first in area under cultivation and third in production of rice among the districts in Tamil Nadu. The area under rice was 26052 hectares and production was 101264.12 metric tonnes in 2007-08 which clearly indicates the importance of the rice in the area. As the soil is fertile more than two crops are raised. There are many modern rice mills in and around Madurai. Hence, the choice of Madurai district as the unit of the present study.

Period of the Study

The field survey was conducted from September 2007 to March 2008 for the collection of primary data. This period relates to the main season for rice cultivation in Madurai district. The reference period of the survey is 2007-08.
**Sampling Procedure**

Multistage stratified random sampling technique has been adopted for the study, taking Madurai district as the universe, the block as the stratum, the village as the primary unit and rice cultivators as the ultimate unit.

Madurai district comprises 7 blocks. Rice is mainly cultivated in Madurai East and Madurai West which show more than 60 per cent of area under rice in this district and hence the selection of sample villages was restricted to these two blocks. A list of area under rice in 2007-08 for all the villages of the two blocks was prepared from the records of the Joint Director of Agriculture, Madurai. Ten villages in each block, which account for the highest area under paddy cultivation in the descending order of magnitude were selected as the study unit for primary data collection.

**Collection of Data**

**Primary Data**

A reconnaissance survey of the study area was undertaken to form a crystal clear picture of the process and activities involved in rice cultivation under actual farming conditions. Based on the information gathered a farm level, a detailed schedule was drafted, pre-tested and used in the field-survey. The objectives of the study were clearly explained to the farmers personally and their co-operation ensured. The details regarding the general characteristics of the sample farmers,
farm structure, size of holding, cropping pattern, cost and returns, methods of sale, quantity retained, quantity sold and other aspects relating to the overall objectives of the study were collected from the sample farmers through the direct personal interview method. Even though the farmers did not maintain adequate farm records and accounts, they were able to furnish the particulars on the strength of their long association with farming. However to minimize recall bias, suitable cross checks and re-checks were carried out.

**Secondary Data**

Secondary data were collected from:


(ii) Office of Assistant Director of Economics and Statistics, Madurai District.

In addition to that, books, journals and magazines were referred. Journals such as Indian Journal of Agricultural Marketing, Indian Journal of Agricultural Economics, Agricultural Marketing, Indian Journal of Marketing and other relevant journals were referred for collecting secondary data for the study.

**Tools of Analysis**

In order to analyse and compare cost and return structure of two varieties of rice, Cost A and Cost C concepts used by farm management studies have been adopted for the present study.
In order to identify and to compare the factors influencing yield of rice for both varieties, multiple linear regression model was used.

The structural differences between two groups of farmers in each variety were examined by testing the equality of parameters of the multiple linear regression model by using Chow’s test.

If the differences exist, the intercept and slope dummies were introduced in the model, to find out whether the differences occur at the intercept level or slope level or both.

In order to compute demand and supply elasticities and to study absorption of labour, the normalised profit function was jointly estimated along with the four variable input demand functions with random disturbances.

Garrets ranking technique was adopted in order to rank the constraints of yield gap by the farmers cultivating rice.

CHAPTER SCHEME

The report of the present study “The Impact of Farm Technology on Irrigated Rice Production – A Study with reference to Madurai District of Tamil Nadu” has been organised and presented in eight chapters.
Chapter I introduces the subject and deals with the agricultural development in India, components of new technology, rice cultivation in Tamil Nadu and Madurai, statement of the problem, objectives of the study, limitations of the study and chapter scheme.

Chapter II reviews the earlier studies relating to cost of production, yield gap and yield constraints and profit function approach and various concepts used in the study.

Chapter III describes the methodology which includes the choice of the study area, sampling procedure, collection of data, period of study, methods and tools of analysis and measurement of variables. Further, the profile of the study area is also presented in this chapter.

Chapter IV analyses the characteristics of sample farmers, the cost and returns structure of rice cultivation.

Chapter V examines the determinants of yield, yield gap and yield constraints.

Chapter VI discusses input demand elasticities, supply responsiveness and labour absorption in rice cultivation.

Chapter VII presents a summary of the findings, the results arrived at and the suggestions made in the context of the research findings.