CHAPTER VII

SUMMARY OF MAJOR FINDINGS AND POLICY RECOMMENDATIONS

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CHAPTER - VII
SUMMARY OF MAJOR FINDINGS AND POLICY RECOMMENDATIONS

7.1 INTRODUCTION

Farm power consisting of manual labour, agricultural tools, draught animals, tractors, implements, equipment and machinery is an essential farm input. In almost any agricultural production system the annual expenditure on farm power, whether on labour, draught animals, or fuel and depreciation of machines, largely exceeds the costs of other inputs such as agro-chemicals and seeds. In many developing countries, agricultural production and food security are adversely affected because of insufficient use of farm power, low labour productivity and / or labour scarcity. The need to improve agricultural labour productivity is increasingly recognized. In the case of such items as pump sets for irrigation, the need for machinery is undisputed. Rather than agricultural mechanization, it would be preferable to use the term Farm power or labour productivity enhancing technology, to recognize not only the importance of manual labour and hand tools, draught animals and mechanical power, but also the other issues related to the labour scarcity, such as cropping and farming systems.

Finding solutions to environmental problems in agriculture requires agricultural tools and machinery. For example take soil tillage and pesticide application, the latter also addressing health concerns. Similarly, machines are required to assist in reducing post-harvest loss and aiding on-farm processing. Thus it is now recognized that agricultural mechanization is crucial in the fight against hunger and poverty. At the same time it can address environmental and health concerns. Therefore, formulation of efficient mechanization strategies is required. Hence, in the present study an attempt
has been made to examine the impact of mechanization on paddy cultivation in Tirunelveli district. The specific objectives of the study are:

1. To study the cost and returns structure of Mechanized and Non-Mechanized farms in the study area.
2. To scrutinize and compare the net income distribution and extent of inequality in the net income distribution of Mechanized and Non-Mechanized farms in the study area.
3. To identify and analyze the causes for yield gap and the determinants of yield of Mechanized and Non-Mechanized farms.
4. To estimate input demand and output-supply elasticities for Mechanized and Non-Mechanized farms.
5. To estimate the nature of returns to scale for Mechanized and Non-Mechanized farms in the study area.

The Proportionate random sampling method has been adopted for the present study with Tirunelveli District as universe. Tirunelveli District comprises of 19 blocks. All 19 blocks were assigned in a descending order according to the area of agricultural land under cultivation of paddy. Among these first four blocks were chosen for the study namely Ambasamudram block, Cheranmahadevi block, Kadayam block and Pappakudi block. The panchayat villages of these four blocks were assigned in descending order according to the area under cultivation in each village. Out of the total number of villages listed, the first 4 villages were selected from each of four blocks namely Ambasamudram, Cheranmahadevi, Kadayam and Pappakudi block for the purpose of the study, thus making the total number of selected villages are 16. In all 16 villages, farmers were divided into Mechanized and Non-Mechanized. Among the
Mechanized farmers, 250 farmers were selected by adopting proportionate random sampling method. Similarly, 250 Non-Mechanized farmers were chosen randomly from the group of Non-Mechanized farmers. Thus, the total sample of 500 farmers each 250 sample farmers from the total number of mechanized and non-mechanized farmers were randomly chosen separately for the purpose of the study.

The homogeneity test with respect to net income per acre of these two farms namely mechanized and non-mechanized farms was examined by using the Analysis of Variance Technique (ANOVA). It was found that there existed significant difference between them, and they were treated as separate units for further analysis.

7.2 SUMMARY OF MAJOR FINDINGS

It was found that more than 93 per cent of the selected paddy cultivators in the study area are literate. Family size of the farmers in both groups was found to be high and more number of family members was found to participate in agricultural activities, particularly in paddy cultivation.

The size of operational holdings ranged from 0.5 acres to 4.6 acres with a mean 2.43 acres per farm in the case of small farmers, whereas in the case of large farmers it ranged from 5.20 to 9.78 acres with a mean of 6.72 acres.

Regarding the cropping pattern, food crops like paddy, tobacco, oil seeds such as groundnut and coconut and commercial crops like cashew, fruits and spices are raised. Paddy is the most predominately cultivated food crop in the district.

The farmers with an experience of more than 5 years in the cultivation of paddy were found to constitute 74 (73.55 per cent). Hence, this long term association of
farmers with the cultivation of paddy led to better productivity and maximum profit in paddy cultivation.

### 7.2.1 Cost and Return structure

The cost and return structure of Mechanized and Non-mechanized farm of paddy cultivation revealed that Mechanized farm yielded higher returns amounting to Rs. 15097.18 compared to Rs. 14216.31 in the case of Non-Mechanized farm. As the Mechanized farm yielded higher return in physical and monetary terms it is found to be more profitable than the Non-mechanized farm in the study area.

It may be concluded that in the case of mechanized farm yield per acre, returns per acre and net income per acre are higher while the expenditure on irrigation and human labour are lower when compared to non-mechanized farm. Therefore, Paddy cultivation of mechanized farm is more profitable and beneficial than Non-mechanized farm.

From the nature and the extent of per acre net income distribution it is found that the concentration of frequencies in the distribution of per acre net income effected is negatively skewed in the case of Mechanized farm and it is positively skewed in the case of Non-mechanized farm. It indicates that the given per acre net income distribution has a greater variation towards the lower values in the case of Mechanized farm, whereas for Non-mechanized farm it has a greater variation towards higher values.

The per acre net income shares of farms cultivating Mechanized farm and Non-mechanized farm measured with disparity ratios, and Lorenz curves indicated that inequality in the distribution of per acre net income was higher for Non-mechanized
farm compared to Mechanized farm. The logarithms of variance test showed that there is a significant difference in the degree of inequality of per acre net income between Mechanized and Non-Mechanized farm cultivating paddy.

7.2.2 Determinants of Yield, Yield gap and Yield constraints

In order to identify the determinants of yield a Cobb-Douglas form of multiple regression model was fitted with six factors including (i) human labour in Man days (ii) bullock labour in pairs (iii) fertilizer in Rs. (iv) Pesticides in Rs. (v) cost of irrigation in Rs. and (vi) capital flows in Rs. for Mechanized and Non-mechanized farms.

In the case of mechanized farms, all six independent variables are jointly explained about 81.66 per cent variation in yield. Fertilizer is the most important determinant of yield. It is followed by human labour and capital flow. The regression model fitted is highly significant as per F-test.

To examine whether structural difference existed between small and large farmers under mechanized farms, Chow’s test was used. The results revealed that there is a structural difference between the two groups of farmers. The analysis based on dummy variables revealed the existence of structural differences between the two groups of farmers of the slope level. At the slope level variable, capital flow is responsible for the differences in their yields. At intercept level the co-efficient of dummy variable is not statistically significant. It implies that there is no difference in technology adopted for both groups of farmers (small and large).

The regression analysis for non-mechanized farm revealed that 81.39 per cent of the variation in yield is attributed to the six explanatory variables. Among the significant variables, human labour had a greater influence on the determinants of yield.
Chow’s test revealed that there existed structural difference between the two groups of farmers. Further, it is observed that there is a neutral technical change between the two farmer groups as there is no significant difference in intercept terms. At slope level, variable capital flows was responsible for the difference in their yield.

The analysis of yield gap revealed the existence of a gap between the potential and actual yield per acre for both farmer groups in each farm. The yield gap was found higher in the case of large farmers than in the case of small farmers in both Mechanized and Non-mechanized farms.

The Garrett’s ranking technique was applied to identify the major constraints to the attainment of potential yield and it was found that severity of disease, pest attacks, water shortage and credit were identified as major constraints for both small and large farmers cultivating under mechanized and non-mechanized farms.

7.2.3 Analysis of Input Demand Elasticities and Supply Responsiveness

The analysis of labour demand revealed that labour demand was highly sensitive to changes in rice price. The demand for labour with regard to real wage rate was elastic in both cases. It is observed from the analysis that increase in farm wage had a relatively serious negative effect on the demand for labour. In other words, 10 per cent reduction in wage rate could increase labour employment by more than 10 per cent. Increase in area under rice of both farms had favourable effects on labour demand while the impact of changes in capital flows was low.

The analysis on the demand for variable inputs in response to changes in their own prices for both groups in each farms revealed that demand for variable inputs was elastic and sensitive to changes in their own price. The cross price elasticities of the
inputs were negative and low for both farmer groups in each variety. It indicates that these variables were complements rather than substitutes.

Regarding the supply responsiveness, supply elasticities were highly sensitive to price changes in rice for both farmer groups under each farm. The demand for variable inputs was found to be negative and greater than one in response to increase in its own price, for both mechanized and non-mechanized farm. The negative and low responsiveness of output supply to increase in prices of variable inputs namely human labour, fertilizer and pesticides. Fixed factors produce a favourable impact all the same for both farmer groups. Capital flows had a higher impact on large farmers than on small farmers in mechanized and non-mechanized farms in the study area.

The indirect estimates for mechanized and non-mechanized farms revealed that the constant returns to scale operated in both mechanized and non-mechanized farms in the study area.

7.3 CONCLUSION

Thus, it is concluded from the analysis that mechanized farms are economically more feasible and benefited more than non-mechanized farms irrespective of the size of farms in the study area. Size-wise, it is seen for both mechanized and non-mechanized farms, small size farms benefited more than large sizes farms. This could be due to the better supervision and more efficient farm management favoured by the smaller size of operational holdings. This indicated that apart from mechanization, efficient allocation of inputs, direct supervision and farm management are crucial determinants of economic viability and benefits of paddy cultivation in the study area.
7.4 POLICY RECOMMENDATIONS

The Government should encourage the farmers to go for Mechanized farming instead of Non-Mechanized farming by removing all constraints and inhibitions in this respect.

On the basis of observations in the study area and findings, it is believed that extension service officials may improve technical efficiency by advising the farmers on input application at the proper time as recommended.

The government should find ways and means to reduce the yield gap in the study area.

The farmers in the study area were of the opinion that they could not achieve the maximum yield due to severity of diseases and pest attacks irrespective of mechanization. It is believed that the farmers should be educated properly to apply the pesticides at the prescribed level and this may be done through intensified extension services.

Non-availability of credit was the other constraint. It is recommended that financial institutions should revitalize and revamp the existing credit facilities in the study area so that the farmers could get timely credit for undertaking improved cultivation practices.