CHAPTER VI

SUMMARY OF FINDINGS, CONCLUSION AND SUGGESTIONS

Sugarcane has been known from time immemorial even before the age of ancient civilization. In the eighteenth century, the sugarcane crop is cultivated almost all over the world. Sugarcane is one of the major cash crops of India which is the homeland of sugarcane cultivation and sugar production.

The sugarcane crop produces direct source of food that is sucrose and whole range of by-products which are vast potential reservoir for human and animal consumption. Besides this, the sugar industry’s by-products are capable of providing energy as a renewable source.

India is the second largest producer of sugarcane producing 23.3 per cent of the world production, next to Brazil (26.5 per cent).

Uttar Pradesh, Maharasthra, Tamil Nadu and Karnataka contribute a major share of area and production of sugarcane at the national level. In India, Tamil Nadu, Karnataka and Gujarat have registered the highest yields in sugarcane production in 2002 - 2003.

Sugarcane is a significant commercial crop in Tamil Nadu. Among the sugarcane growing States in India, Tamil Nadu ranks fourth in area (0.28 m.ha.) and
production (30.28 m. tonnes) and first in productivity (106.7 tonnes per ha.). Tamil Nadu represents for 6.42 per cent and 10.75 per cent of area and total production of sugarcane in India in 2002-03. Tamil Nadu's productivity is 50 per cent higher than the national productivity which is nearly 66 tonnes per ha. in 2002 – 2003. Sugarcane is grown in four seasons, namely early season (December-January), mid-season (February-March), late season (April-May) and special season (July-August) in Tamil Nadu. Out of 37 sugar factories in Tamil Nadu, three are in the public sector, 16 in the co-operative sector and 18 in the private sector.

Theni is a predominant agricultural district where more than 60 per cent of the people are engaged in agriculture. It is one among the major sugarcane cultivating districts of Tamil Nadu. It stood at the tenth place in area (10,590 hectare), fifth rank in production (14.05 lakh tones) and second place in productivity (132 tonnes per ha.) in 2002 – 2003.

A random sampling of 300 farmers, 150 each in planted and ratoon types were selected from 12 villages of three blocks namely, Periyakulam, Bodi and K. Myladumparai in Theni district. The sample farmers in each type are classified into small and large farmers. Those cultivating an area of five acres and more are grouped under the large farmer category, while those cultivating less than five acres of land are classified as small farmers. There were 97 (64.67 per cent) small farmers and 53 (35.33 per cent) large farmers in the case of planted sugarcane and in the case
of ratoon sugarcane, out of 150 farmers, 86 (57.33 per cent) and 64 (42.67 per cent) are under small and large farmer groups respectively. The homogeneity with respect to net income per acre of these two group of farmers namely small and large in each type is examined by using the Analysis of Variance Technique. It was found that there existed significant difference between them and they are treated as a separate unit for further analysis under each type.

In the foregoing chapters, the characteristics of the selected farmers, cost and returns structure, nature of distribution per acre, net income, determinants of yield, yield gap and yield constraints, input demand elasticities, supply responsiveness, labour absorption and returns to scale are all discussed. In addition to this, a succinct summary of the leading findings, a short conclusion and a few policy oriented suggestions are presented in this concluding chapter.

6.1 SUMMARY OF FINDINGS:

It is found that more than 80 per cent of the selected sugarcane cultivators in both type (planted and ratoon) as well as in both groups in each category (small and large) are educated and above the age of 30 years. Family size of the farmers in both groups is found to be larger and more number of family members are found to participate in agricultural activities, particularly in sugarcane cultivation.
The size of operational holdings ranged from 0.75 acre to 4.85 acre with a mean of 2.72 acre and 2.57 acre per farm in the case of small farmers of planted and ratoon crops respectively, whereas in the case of large farmers, it ranged from 5.25 acre to 12.5 acre with a mean of 7.25 acre and 8.15 acre of planted and ratoon crops respectively.

The farmers with an experience of more than five years in cultivation of sugarcane are found to be more than 90 per cent. Hence, this long term association of farmers with the cultivation of sugarcane led to better productivity and maximum profit in sugarcane cultivation.

A study of the input and output structure at mean levels of small and large farmers producing planted sugarcane revealed that small farmers obtained significantly larger yield per acre than the large farmers. The significant difference between two groups of farmers was found with respect to the use of human labour, chemical fertilizers and pesticides. Compared to the small farmers in the study area, the yield reaped by large farmers is relatively lesser. At the same time, the inputs namely fertilizers and pesticides used by large farmers are found to be higher than their counterpart. Similar results are also observed in the case of small and large farmers cultivating ratoon sugarcane. But a comparison of the levels of input used and yield obtained per acre by two farmer groups in each type revealed a higher yield and more uses of inputs in the case of planted sugarcane than ratoon sugarcane.
Thus, it is found that the cultivation of planted sugarcane required a higher level of fertilizer application and lower level of pesticides due to its greater responsiveness to the output, even though the sugarcane technology remains neutral to farm size. Thus, it satisfied the first hypothesis.

As sugarcane cultivation normally needs a quite close supervision which is easier for small farmers, a small farmer is likely to have a greater concentration in maximizing his farm output than a large farmer.

A small farmer is more likely to have an intimate knowledge of his farm land and its requirements than others. This enable to the small farmers increase the production efficiency in both types in the study area.

Thus, it may be concluded from the analysis that the small farmers are more efficient in the use of inputs and they produced higher yields than the large farmers.

Sugarcane cultivation in general, is found to be labour intensive in the study area. The analysis of utilisation of labour in both types reveals the fact that the cultivation of planted sugarcane at large can help to provide gainful employment to the rural population under both farmer groups.
From the analysis, it is clear that it satisfies the second hypothesis namely there exists structural difference in input use in cultivating sugarcane in the study area irrespective of farm size and different types of cultivation.

The analysis of cost and return structure of the farmers cultivating planted sugarcane and ratoon sugarcane reveal that the small farmers received higher returns amounting to Rs.12,931.32 in the case of planted sugarcane per acre and Rs.16,266.72 in the case of ratoon sugarcane. The yield per acre of small farmers is 51.21 tonnes and it is 47.81 tonnes in the case of large farmers producing planted sugarcane. In the case of ratoon crop, the yield per acre was 46.71 tonnes for small farmers and 43.84 tonnes for large farmers.

Thus, it is inferred that the planted sugarcane gave higher returns in physical and monetary terms but it is found to be less profitable than the ratoon sugarcane type in the study area.

It is also observed from the analysis that the large farmers spent higher amount per acre and received lesser net returns compared to small farmers in both types.

The variable cost formed about 80 per cent of the total cost in both groups. Harvesting, bundling and transportation which are the major cost component
accounted for more than 44 per cent of the total cost. The pattern of other input expenditure is almost similar to the two types.

Thus, it may be concluded from the analysis that the yield per acre of small farmers is significantly higher than that of the large farmers. This may be due to the more intensive use of inputs and better personal supervision and farm management by the small farmers. Thus the third hypothesis of the research is proved beyond doubt.

An examination of the economics of sugarcane cultivation showed that each rupee spent resulted in a benefit of 0.47 in the case of small farmers and 0.36 in the case of large farmers cultivating planted sugarcane, whereas in the case of ratoon sugarcane, it is 0.76 and 0.59 for small and large farmers respectively. This indicates that this could be the outcome of better economics and institutional position of small farmers compared with those of large farmers in the study area.

Comparing the nature and the extent of per acre net income distribution, it is observed that the concentration of frequencies in the distribution of per acre net income effected is positively skewed for both small and large farmer groups in each type of sugarcane crop (planted and ratoon). Thus, it is deduced from the analysis that the given per acre net income distribution has a greater variation towards higher value net income per acre for both farmer groups in each type in the study area.
Regarding the extent of variation, the measures of decile, disparity ratio and Gini Coefficient indicate that the inequality in the distribution of per acre net income is higher for the large farmers compared with that of the small farmers in each type of sugarcane. The logarithms of variance test showed that there is a significant difference in the degree of inequality of per acre net income between small and large farmers cultivating planted sugarcane and ratoon sugarcane in the study area.

A Cobb-Douglas type of multiple regression model is fitted to identify the major determinants of yield of small and large farmer group cultivating planted sugarcane. The four independent variables chosen to explain the variations in the yield of sugarcane are (i) human labour, (ii) bullock labour, (iii) fertilizer and (iv) capital flows for planted sugarcane. In the case of ratoon sugarcane, the variable bullock labour was excluded from the model for estimation.

In the case of small and large farmers cultivating planted sugarcane, all the four independent variables jointly explained about 76 to 81 per cent of the variations in the yield of sugarcane. Among the significant variables, human labour has a greater influence on the determination of yield in the case of small farmers and it is followed by fertilizer. The fitted regression model is statistically significant at five per cent level. In overall case, capital flows are found to be the most influential input on yield determinations of planted sugarcane.
In order to examine whether structural differences exist between small and large farmers cultivating planted sugarcane, Chow’s test is applied. The results reveal that there exist structural differences between the two groups of farmers.

Further, it is observed that sugarcane cultivation is neutral in technology between the two farmer groups. At slope level, the variable fertilizer is responsible for the differences in their yield. Thus, it may be concluded that the use of fertilizers differentiate in the yield of small and large farmers cultivating planted sugarcane in the study area.

The regression analysis for ratoon sugarcane reveals that the independent variables caused about 67 to 70 per cent of the variations in the yield per acre. The variables, human labour, fertilizer and capital flows are significantly related to yield for both farmer groups. Fertilizer and capital flows are found to be the most influential variables in the determination of yield for small and large farmers respectively. The fitted regression model is statistically significant at five per cent level.

The examination of structural differences between small and large farmers reveals that there exists a structural difference between small and large farmers in the study area. The analysis based on dummy variables reveals the existence of structural difference between the two groups at slope level. At the slope level, the
input namely capital flows is responsible for the differences in the yield. At the intercept level, the coefficient of dummy variable is not statistically significant, indicating that there is a neutral technology change between the two farmer groups in the study area.

The analysis of yield gap reveals the existence of a gap between the potential and actual yield per acre for both farmer groups in each type. The yield gap is found higher in the case of large farmers than in the case of small farmers.

The Garrett's Ranking Technique is applied to identify the major constraints to the cultivation of sugarcane and it is found that water shortage is identified as major constraint for both small and large farmers cultivating planted sugarcane.

In the case of ratoon sugarcane, small farmers have reported that the inadequate credit facilities and water shortage to be the main constraints against maximum yield. Similarly, majority of the large farmers have identified water shortage as a major constraint. Thus, it may be concluded that inadequate credit facilities and water shortage are identified as major constraints in the study area.

The analysis of labour demand elasticities reveals that labour demand was highly sensitive to changes in sugarcane price for both small and large farmers in each type of sugarcane cultivation. The demand for labour with regard to real wage rate is elastic in both cases. It is observed from the analysis that increase in farm
wage has a relatively serious negative effect on the demand for labour. In other words, a 10 per cent reduction in wage rate can increase labour employment by more than 10 per cent. But in practice, there is no need for wage reduction to increase farm employment.

It is also observed from the analysis that the negative and low responsiveness of labour demand to increase in the price of bullock pairs, fertilizers and pesticides indicates that manipulation of input prices is not effective. Increase in area under sugarcane of both types has favourable effects on labour demand while the impact of changes in capital flow is low.

The analysis on the demand for variable inputs in response to changes in their own prices for both groups in each type reveals that demand for variable inputs is elastic and sensitive to changes in their own prices. The cross price elasticities of the inputs are negative and low for both farmer groups in each type of sugarcane. It indicates that these variables are complements rather than substitutes.

Regarding the supply responsiveness, supply elasticities are highly sensitive to price changes in sugarcane for both farmer groups under each type. The negative and low responsiveness of output supply to increase the price of variable inputs namely human labour and fertilizer is observed. Fixed factors produce a favourable impact
on the same for both groups of farmers. Capital flows has a higher impact on large farmers than on small farmers in planted and ratoon sugarcanes in the study area.

The indirect estimate of the groups of farmers in both types reveals that land and human labour are the dominant factors in sugarcane cultivation in the present study. It is evident from the analysis that the share of land to total output is the highest for small and large farmers.

The constant returns to scale are operating in the production of planted and ratoon types of sugarcane cultivation.

6.2 CONCLUSION:

Thus, it is concluded from the analysis that the small farmers are economically more efficient than the large farmers irrespective of the type of sugarcane cultivation in the study area. This could be due to the better intensive supervision and more efficient farm management favoured by the smaller size of operational holdings. This indicates that apart from efficient allocation of inputs, direct supervision and farm management are crucial determinants of production efficiency.
6.3 SUGGESTIONS:

On the basis of the findings, the following suggestions are advanced:

- The study results confirm that the technology of sugarcane cultivation is neutral to different size groups of farmers.

- Hence suitable training, seminars and work-shops in advanced scientific cultivation may be arranged to the farmers by the governments. Adequate extension functionaries may be involved to train men and women farmers and workers who are engaged in sugarcane cultivation, to adopt scientific method of cultivation.

- The yield gap analysis reveals that there exists scope for increasing the yield by bridging the yield gap. Required incentives, in terms of technology, inputs and operational methods are to be given to the farmers by the government departments and agencies.

- Necessary theoretical, technical and practical information and guidance must be given to the sugarcane cultivators by exhibiting model farms in every block at a significant location.
• The Government must come forward to accord adequate recognition to the farmers who are able to show considerable achievements through invention and innovations in increasing the yields.

• The prevailing technology is highly labour intensive in character. However, farmers expressed the difficulties of getting adequate labour and high cost of labour. More capital-intensive technology will bring greater benefits to the existing farmers. It may affect the workers a little. But, it is found to adjust itself for the better in due course.

• The comparative advantages of cultivating sugarcane should be made known and highlighted in easily understandable language to the farmers with adequate details.

• The Indian farmers need guidance and proper motivation often. The extension agencies can motivate the farmers in a better way.

• The Government should try to arrange short tours for the farmers to the nearby sugarcane cultivating places in and around Tamil Nadu and show them the changes and enable them to get first hand information from their ‘sweeter friends’.

• The demand for the variable inputs in response to their own prices revealed that the inputs are sensitive to their prices. Similarly the supply elasticities are
highly sensitive to price changes in sugarcane. The Government should provide the essential facilities such as technical know-how and credit at affordable rates of interest to the farmers.

➢ Another serious problem is shortage of irrigation facilities which are very frequent in practice. The government should come forward to study the nature and extent of the problem and bring a possible remedy by providing adequate irrigation facility. The farmers may be helped in providing easy credits or even subsidies to dig wells and make better irrigational facilities for their fields.

➢ The co-operative sector also should contribute in a better way for the better performance of the sugarcane growers by adopting villages and favourable practices by making modern inputs, tools and materials available at cheaper cost and at the right time. It will go a long way in making structural changes in the sugarcane sector.

➢ Very often, it is found that the “trickle-down-effect” in India’s economy seems to be very weak. Necessary steps should be taken to enhance the effects of the sugarcane development programmes and strategies to reach the needy farmers.
The sugarcane growers suffer and lose much. They are unable to transport their products to popular markets/ factories promptly at reasonable charges. Adequate facilities should be made in this regard.

There is much scope for the utilisation of farm yards manure or composted manure in the cultivation of sugarcane. It will improve the soil health in the long run.

Another area of suggestion is concerned with the proper treatment and recycling of the sugarcane wastes which can be used as manure in the field.

It would be more useful to consider the varying costs of production met by marginal, small and large farmers while the support prices for sugarcane and its products are determined by the Government. It will make the whole process more plausible and profitable and in turn improve the Quality of Life of the farmers.

In the agricultural sector, the role of the marketing intermediaries should be taken into account as they exploit the 'poor' farmers and cause much damage to them. At times, neither the producer nor the ultimate consumer is deriving the benefits. This scenario should be changed at any cost. The Agricultural Universities and Lead Banks and other Nodal Agencies should come forward
to adopt even the remote rural villages, educate the farmers and give a take off and big push to their farm activities.

These are a few vital suggestions. The researcher is confident that the implementation of these measures can pave the way for greater success in sugarcane cultivation.