CHAPTER VII

SUMMARY
AND
CONCLUSIONS
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A brief summary of the findings derived in the previous chapters are presented here to draw appropriate conclusions for the Economics of coconut plantation.

SUMMARY OF THE FINDINGS

The coconut palm is a versatile tree crop. No other tree crop grown in India can match coconut palm in its versatility. It provides nutritious food and refreshing drink, oil for edible and non-edible uses, fibre of commercial value, shell for fuel and industrial uses, alcoholic beverage, lumber and variety of miscellaneous products for use as domestic fuel. The palm is amenable to both plantation and homestead management. It tolerates other crops grown in the same holdings and thus adjusts itself either as a major or minor crop. While responding favourably to scientific management, the palm also tolerates negligent farming to a certain extent. Thus it can adopt to the divergent farming situations and management practices that are prevalent in the different agro-climatic regions.

Plantation crops are very important for the national economy from the viewpoint of their vast employment.
potential, income generation, export and import substitution. Among these, coconut palm is a versatile plant which is most valuable to the small farmers in the tropical world. Almost every part of this palm is used for the daily needs of the people and it is rightly described as "Kalpavruksha".

Coconut in India is a crop of great importance. It is a crop with many uses. It is a source of food, drink and shelter to the humanity. Coconut is known as "Kalpavruksha" or the tree of heaven in our country due to advantages and various uses the palm offers. It is valued both as a food crop and an oil seed. India ranks third in the world in coconut production, next to Phillipines and Indonesia.

Copra and coconut oil are the two traditional commodities in the domestic markets. Coconut oil commands a unique position as a premium priced oil for both edible as well as non-edible uses and six percent of the vegetable oil production in the country is accounted by coconut oil and is cherished by Keralites as a cooking medium.

More than 10 million people depend directly or indirectly on the crop for their livelihood by its cultivation-processing, trade and industrial activities. The coir industry which provides direct employment to more than 4 lakh workers, derives its raw material from coconut. Export of coir and coir products earns foreign exchange.
to the tune of Rs.100 crores every year. In the recent years industrial units based on coconut kernel and coconut shell have come into existence creating wide employment opportunity to a sizable section of the population and export opportunity.

Coconut is not grown in all the states of India, but is confined to coastal belts and certain interior tracks where the agro climatic conditions favour its growth. It is grown contiguously in the major coconut growing states of Kerala and in island groups such as Lakshadweep, Andaman and Nicobar Island and Kasaikal in union territory of Pondicherry. In other states it is confined to certain pockets accounting small area in each state. The four major coconut growing states viz., Kerala, Tamil Nadu, Karnataka and Andhra Pradesh together account for more than 91 percent of area under coconut in India. The small state of Kerala, with 55.8 percent of the area accounts for 41.9 percent of the production of coconut in India in 1991-92. Karnataka State stands at the third place both in terms of area under coconut and production in the country.

The present study is carried out to understand the economics of coconut plantation by examining a case study of Tumkur District in Karnataka. The large scale cultivation in Tumkur district of coconut is mainly concentrated in Tiptur and Chiknayakanahalli talukas, occupying an area of 16384 hectares in Tiptur forming about 25.21 percent of the total area under
coconut in the district. And Chiknayakanahalli taluka occupying an area of 15381 hectares accounts for 23.66 percent of the total area under coconut in the district. Therefore, Tiptur and Chiknayakanahalli talukas were purposely selected for the study. Two villages were selected at random from each taluka. The names of the selected villages are i) Madenure, ii) Biligere from Tiptur taluka and iii) Kenkere, iv) Thimtapura from Chiknayakanahalli taluka. The farmers of the sample villages were divided into three groups, based on the size of their land holdings, namely, small medium and large. The list of farmers with the land holdings owned by them was obtained from the records available with the Village Accountants of the respective villages. In all 120 sample farmers from the four selected villages were chosen for detailed investigation on various aspects of cost of cultivation, production, productivity of coconut garden, income derived, marketing of coconut etc. For evaluating the objectives of the study necessary primary data were obtained from the selected farmers through personal interview method with the help of pre-tested and structured schedule. The primary data were collected for the agricultural year 1994-95. The study has been carried out with the following objectives.

i) to estimate the trends in the area, production and productivity of coconut crop in Tumkur District and also in Karnataka.

ii) to estimate the average cost of cultivation of coconut, production, productivity, income received and output-input ratio in the cultivation of coconut plantation in Tumkur District.
iii) to study the economic viability of raising of coconut plantation in Tumkur district.

The following hypotheses have been tested in the study:

(i) Area, production and productivity of coconut plantation have increased significantly in the Tumkur district and also in Karnataka.

(ii) Coconut plantation is profitable in the Tumkur District.

(iii) Big farmers are benefited more by coconut plantation as compared to small and medium farmers.

The compound growth rates of area, production and productivity of coconut for Karnataka are found to be 3.06 percent, 3.14 percent and 0.01 percent respectively for the period 1980-1994. Growth rate of area, production and productivity at the Tumkur district level are estimated to be 2.35 percent, 3.51 percent and 1.25 percent respectively for the period 1984-85 to 1995-96. The compound growth rates of area in case of major coconut growing districts like Tumkur, Hassan, Chitradurga, Chikmagalure are estimated to be 6.44 percent, 1.93 percent, 4.95 percent 2.09 percent, respectively for the period 1980-81 to 1993-94. The compound growth rates of production in case of Tumkur, Hassan, Chitradurga and Chikmagalure are estimated to be 12.77 percent, 1.98 percent 4.28 percent 2.16 percent respectively. The growth rate production of coconut is found to be very impressive in Tumkur district. The compound growth rates of productivity in these districts; Tumkur, Hassan, Chitradurga
and Chikmagalure are estimated to be 5.95 percent, 9.75 percent and -0.01 percent and -0.07 percent respectively for the period 1980-81 to 1993-94. While Chitradurga and Chikmagalure districts have registered negative growth rates, Tumkur and Hasssan have witnessed good progress in improving the productivity.

The area under coconut in major coconut growing states in India showed an impressive growth during the period 1955-56 to 1970-71, but the growth rate is slacked in the seventies and early eighties. It is surprising to note that actually there was reduction in production of coconut in Kerala, which resulted in lower growth rate in all India level. Even in Karnataka there was no considerable increase during the fifties but a steady increase in the average production was noticed during the seventies and eighties. The only exception to this general trend is in Andhra Pradesh where there was only marginal changes in area during the period 1950-51, but showed a slow but steady increase thereafter. The total production of coconut during 1950-51 was only 3582 million nuts which rose to 9283 million nuts during 1989-90 recording an increase of 157 percent over a period of 40 years. It is interesting to note that there was a steep rise in production of coconut in all the states during the period 1985-1990. In Karnataka the production increased up to 1970-71 and then there was declining trend till 1980-81.
As a result of well distributed rainfall from 1984-85 onwards, the production of coconut in Andhra Pradesh, Tamil Nadu and Kerala increased considerably which boosted the all India production to the level of 9283.4 million nuts during 1989-90. In Andhra Pradesh, the production of coconut fluctuated and showed a declining trend till 1985-86 but showed a steep rise thereafter. The production of 195.8 million nuts recorded during 1985-86 which reached 654.7 million nuts during 1989-90. The low level of production in Andhra Pradesh for 1970-71 to 1985-86 was mainly due to the frequent cyclones and the recurring droughts in coconut growing areas. In Tamil Nadu, the production was around 400 million nuts during sixties. During seventies and eighties the production increased steadily with a steep increase during last four years. In Karnataka the total production of coconut was slowly increasing throughout the four decades except during the first half of sixties. Productivity of coconut in major coconut growing states in India shows that the average productivity in India during 1950-51 was 5759 nuts per hectare which increased to 6532 nuts during 1955-56. Thereafter productivity was found to be declining steadily throughout except during last four years. The declining trend in all India productivity was mainly due to the declining trend in Kerala. During 1950-51, Kerala produced 2026 million nuts accounting for 57
percent in the national production which slipped down to 47 percent during 1989-90 though the actual production increased to 4394 million nuts during 1989-90. In Kerala, the average productivity of 6917 nuts per hectare during 1955-56 was highest and then decreased to 5617 nuts during 1965-66 and to 4964, 4792 nuts during 1975-76 and 1985-86 respectively. The existence of larger areas under rainfed conditions resulted in the lower productivity in Kerala. By providing irrigation facilities for coconut gardens particularly in the northern districts of Kerala where the dry spell extends to 5-6 months, the productivity of palms can be enhanced considerably. In Karnataka the productivity per hectare was relatively low during the fifties and sixties with a dip during 1965-66 and reached the all India level during seventies and remained without much fluctuations. In Tamil Nadu the productivity per hectare was always high, though fluctuating widely. The average productivity was almost double than that of Kerala. It is interesting to note that the high average productivity in Tamil Nadu is mainly due to the high density of palms, which is about 319 palms per hectare. The corresponding figures of Kerala and Karnataka are 229 and 112, respectively. Though average yield per palm in Karnataka is 54 nuts, the yield per hectare is low because of very low palm density. Whereas in Tamil Nadu with a low average yield of 44 nuts per palm, the productivity is found to be
almost double than that of Kerala as well as the country as a whole.

Considering districtwise area, production and productivity of coconut in Karnataka during 1980-81, Hassan district was found to be dominant in areawise, Chitradurga district dominant in productionwise. But drastic change could be seen in the area, production and yield after 1985. Thumkur district out did other districts. For instance during 1989-90 the area under coconut cultivation was 53 thousand hectares and production stood at 352.3 million nuts with an yield rate of 6647 nuts per hectare. And this trend has continued thereafter. It could be interesting to note the growth trend in area cultivated, production and productivity at national, state and district levels. The area expansion under coconut at the national level has shown better performance than that of state and district levels. At the national level the area under coconut has increased by 35.37 percent in 1994-95 over the base year 1985-86. At the state and Tumkur district levels, the area under coconut has increased by 20-62 percent and 19-35 percent in 1994-95 over the base year 1985-86. At the national level and district level production has increased by 35.39 percent and 32.53 percent in 1994-95 over the base year 1985-86 respectively. At the state level production has increased by only 21.0 percent during the above period. However, it is the
Tumkur district which has excelled the national and state level performance in terms of productivity. The productivity has increased by 16.35 percent in Tumkur district whereas at the State level the productivity has increased by only 0.6 percent and at the national level, productivity has remained stagnant and no change has taken place in the productivity. It can ultimately be inferred that the position of Tumkur district in the coconut economy in terms area production and productivity is far better than that of the state and national levels. This shows the importance of coconut economy in Tumkur district.

The primary objective of this study is to investigate the feasibility of raising coconut plantation in Karnataka in general and in Tumkur district in particular. In this regard, the study has attempted to estimate the cost cultivation of coconut plantation, production, productivity of coconut, gross returns, net income, and output-input ratio with the help of primary data.

Cost of production during the establishment period is found to be very high and the farmers need to spend large amount of money for 6 to 7 years without having any returns from the plantation. The study revealed that the farmers in the Tumkur district are hesitant to venture into coconut farming due to the initial investment, uncertainty about
the yield after the establishment period and the ignorance about
the advantages of coconut plantation.

Total cost per acre during the establishment period in
case of irrigated small, medium and large farmers worked out to be
Rs.21707, Rs.21067 and Rs.20885 respectively. Out of the
total cost, material cost (fertilizer and compost), labour
and irrigation costs were found to be estimated at 12.94 percent,
23.08 percent and 50.75 percent respectively in case
of small farmers. In case of medium farmers fertilizer
and compost, labour and irrigation costs were found
to be 22.95 percent, 32.28 percent and 50.72 percent
respectively. Similarly, in case of large farmers,
material (fertilizer and compost), labour and irrigation
costs were estimated at 12.83 percent, 20.86 percent and
52 percent respectively during 7 year establishment period.

The total cost per acre in the first year of
economic period in case of small, medium and large (irrigated)
farmers worked out to be Rs.4641, Rs.4367 and Rs.4254
respectively. Out of the total cost, material (fertilizer
and compost), labour and irrigation costs were found
to be estimated at 8.23 percent, 20.69 percent and
23.27 percent respectively in case of small farmers.
In case of medium farmers, material cost (fertilizer and
compost), labour and irrigation costs were found to be 8.06 percent, 20.61 percent and 21.98 percent respectively. Similarly material cost (fertilizer and compost), labour and irrigation costs were found to be estimated at 6.75 percent, 20.45 percent and 22.57 percent respectively in case of large farmers.

The total cost per acre during establishment period (unirrigated) worked out to be Rs.16638, Rs.15375 and Rs.14874 respectively. Out of the total cost, material cost (fertilizer and compost), labour and irrigation costs were estimated at 6.92 percent, 27.62 percent and 48.32 percent respectively in case of small farmers. In case of medium farmers compost and fertilizer, labour and irrigation costs accounted for 11.60 percent, 26.58 percent and 48.20 percent respectively. In case of large farmers, fertilizer and manure, labour and irrigation costs accounted for 6.49 percent, 26.55 percent and 47.96 percent respectively.

The total cost per acre in the first year of economic period in case of unirrigated farms for small, medium and large farmers worked out to be Rs.3356, Rs.3199 and Rs.3936 respectively. Out of this total cost, material (fertilizer and compost), labour and irrigation costs accounted for 26.82 percent respectively. In case of medium...
Irrigation is observed to be very expensive in case of small and medium size farmers. Major part of the expenditure of coconut production is on irrigation. The farmers in the Tumkur area can reduce cost by adopting soil conservation methods like husk barrial. The study also reveals that a major investment goes for the application of chemical fertilizers. The prices of chemical fertilizers go on increasing from time to time and the expenditure on chemical fertilizers will always be on the increasing trend. Hence, use of compost and judicious use of chemical fertilizers is essential so as to develop the low cost management in the production of coconut.

The yield per acre of coconut in case of the small farmers was high as compared to that of the large and medium size farmers in both irrigated and unirrigated plantation. This is inspite of the fact large size farming has various advantages. The small
farms of the Tumkur district are found to be more efficient than the medium and large farms in the production of coconut.

The production in the irrigated plantation is observed to be higher than that of the production in the unirrigated plantation. This proves that the productivity of coconut palms can be directly attributed to the availability of water.

The average yield of nuts per acre or the productivity of coconut in Tumkur is higher than the national average and also that of many traditional coconut producing states. This, in addition to the low cost of cultivation proves that coconut cultivation can be done profitably in Tumkur as well as in Karnataka.

The small farmers of the study area produced more of tender nuts as compared to the medium and large farmers. The small farmers had a major share in the total production of tender nuts. The small farmers did not give much attention to the production of copra and desiccated coconut due to their urgent need for finance and their
inability to wait till the maturity of coconut. Hence there is a need for financial institutions that can help the farmers so that distress sales can be avoided.

Like in other coconut growing areas, the medium and large size coconut growers of the sample area are well aware of the fact that the production of desiccated coconut and copra can bring large profits to them because of high prices. As a result, their production was found to be constituted mainly desiccated coconut and copra.

It may be observed here that though the small irrigated and unirrigated farmers were able to produce more per unit area than the other two categories the net profit and output-input ratios in case of small farmers were found to be less than other two categories. This is mainly due to the sale of large number of tender coconut by the small farmers as compared to other two categories.

The performance in the irrigated sector was found to be superior to the unirrigated sector in all the areas. The only consolation in the unirrigated sector is that of a low cost of cultivation and this is mainly due to the non-application of fertilizers. From the analysis, it is clear that irrigation is one major factor that plays an important role in the coconut plantation and a highest productivity can be
attained when coconut plantations are provided with water. Thus raising of coconut plantation was found to be highly profitable in Tumkur district in case of irrigated plantation. It is also found that the production of coconut can also be carried out profitably even in the unirrigated areas of Tumkur district without incurring heavy cost.

The study on marketing reveals that there are wide fluctuations in the prices of coconut and related items. This is mainly due to the fluctuation in the price of coconut oil.

The study further reveals that there are no major coconut related industries in the near vicinity of the sample area. The coir manufacturing units, soap manufacturing units etc., which make use coconut as a raw material are not found in the vicinity of the sample area. The marketing of coconut is largely done in the raw form in the absence of cottage industries like soap, coir and carpet manufacturing units. As a result, farmers get low prices and the new farmers are hesitating to enter into the coconut plantation.

The sale of coconut is mainly concentrated in the form of tender coconut, desiccated coconut and copra. The sale in the advanced form like sale of coconut oil, coconut vinegar etc. is not done by the farmers.
A careful examination of the earnings of the coconut farmers in the small, medium and large groups both in the irrigated and unirrigated plantation shows that the farmers are in a position to earn a good income from the coconut plantation. Thus, coconut plantation is economically viable to the farmers of the Tumkur district which provides better income and employment to a large section of the population.

CONCLUSIONS

On the basis of the results of the present study the following conclusions are drawn:

1. The estimates of growth rates of area, production and productivity of coconut indicate that though there was considerable expansion in area under coconut, and increase in production, there is a vast scope for increasing the productivity levels in the Tumkur district as well as in Karnataka State. For this, one of the basic requirements is the promotion of irrigation facilities. The response of coconut to irrigation is found to be significant, the provision of irrigation facilities to coconut plantation would go a long way in increasing the production and as well as productivity in the district/state. Efforts should be made to create irrigation in the district so that new area under coconut plantation with irrigation facilities would boost production as well as productivity.
2. In addition to irrigation, chemical fertilizers, use of compost and application of pesticides are very important in increasing the productivity of coconut gardens. Therefore efforts should be made to conduct large number of fertilizer experiments in the farmers garden covering different soil types, under rainfed and irrigated conditions. It is also important to fix up fertilizer schedules for pre-bearing and bearing palms in irrigated and unirrigated plantations.

3. In the establishment of coconut gardens, the first and foremost thing is raising quality seedlings/procuring seedlings from a well known orchard. Efforts must be made to raise and distribute quality seedlings at subsidised rates particularly to small farmers which will ensure not only cent percent survivability but also will help to increase production and productivity of palms.

4. Cost of cultivation of coconut can still be reduced in the Tumkur district as well as in other parts of the country by adoption of soil conservation methods which help to increase moisture content of the soil and hence reduces the cost of irrigation. Again the small farmers can reduce their cost by resorting to group management. Therefore, the farmers should be encouraged and helped to adopt soil conservation methods.

5. The drip irrigation technique developed for coconut gardens supplies the daily water need of 32 litres/palm in dry months at four dripping points located at one metre distance from
the hole around the palm. The water is allowed to drip at about 30 cm below the soil surface at the rate of 2 litres/hour. This eliminates loss of nutrients by leaching. There is about 40 percent saving of water than in basin system of irrigation. There is no weed growth, since surface remains dry thus appreciably reducing the cost of weeding. The farmers should be encouraged by providing sufficient technical knowledge and required credit so as to adopt drip irrigation technique for coconut plantation which will help to reduce the cost of cultivation to a great extent.

6. The development of mixed farming and multiple cropping systems in the coconut garden lands is also noteworthy as compared to a monocrop of coconut. Under mixed farming, the interspaces in coconut gardens are planted with fodder grasses and legumes, black pepper, banana or other fruit trees. Fodder grasses and legumes grown in one hectare of coconut garden under irrigation could maintain 4 to 5 milch animals and provides full employment to a medium size farm family. And the cow dung when cycled through a biogas plant produces gas adequate to meet the lighting and cooking needs of the farming family. The recycled dung thereafter can be applied to the palms and grass as manure. Under experimental conditions, the present net income per hectare of coconut garden under mixed farming with irrigation could be increased as much as 300 percent. The farmers should be given sufficient guidance and financial support so as to adopt
mixed farming and multiple cropping systems in the coconut garden lands.

7. Organic manure, green manure and use of oil cakes, these three types of organic farming in coconut not only ensure continuous supply of nutrients to the coconut, but also improves the physical characteristics of soil and increases the population of beneficial microorganisms present in the soil. And recently proved that these manures can be used for the control of pests and diseases. Therefore concerted efforts should be undertaken to use these locally available manures for the benefit of small and marginal farmers of our country.

8. Unfortunately, Research and Development efforts in post-harvest processing sector of coconut are neglected or have been rather slow with the result that the increased productivity could not be absorbed by the traditional processing sector. Meanwhile, the production of coconut is expected to reach 20,000 million nuts by the end of this century if the present trend continues. Since the inception of the Board, some R & D efforts in the post-harvest processing of coconut could be streamlined and strengthened. But not much has been achieved. Therefore, the development of appropriate processing technologies for the fuller utilisation of the major products and by-products of coconut assumes considerable importance in a country like India. Utilisation of coconut water and
skimmed coconut milk in various food preparations, in soft drink preparations, coconut shells for the manufacture of activated carbon etc., are some of the fields yet to be developed and popularised in the country. Efforts should be made to create awareness about the various end uses of coconut and its by-product among the farmers of Tumkur district and also the required industrial base for such activities should be established and encouraged in the district.

9. Coir, the golden coloured fibre extracted from the coconut husk, can be put to a multiplicity of end uses. Coir industry in India is an important agro-based cottage industry and produces a wide range of products from coir fibre and coir yarn and helps to earn much needed foreign exchange to the country. Therefore agro-based cottage industrial units should be established and encouraged by providing technical know-how and finance to the local people in the district so that coconut and its products will be used for various end uses. This also creates a lot of employment to the rural mass.

10. In Karnataka, the processing at the primary level is restricted to the conversion of coconut into ball copra. In the absence of growers'organisations at the primary level to undertake processing activities, the farmers are compelled to dispose of the harvested produce every time to the local middleman processors to whom the farmers are invariably
indebted. As such, there is no vertical integration in the coconut processing sector in the Tumkur district with the result that the farmers are often deprived of the benefits of price support measures with copra as the base. Hence there is a need to establish growers' organisations at the primary level to undertake processing activities and to create vertical integration in the coconut processing sector in the district. Such organisations will also help the farmers in providing necessary farm inputs and transfer of technology.