CHAPTER VIII

SUMMARY AND CONCLUSIONS
Coconut cultivation and industry contribute substantially to the economy of Kerala so much so that coconut may be characterised as the backbone of the State's economy. Kerala's share in the total area under coconut in India in 1983 was 59.15 per cent and its share in all-India production of coconut in the same year was 43.15 per cent.

India's Position in Coconut Cultivation in the World

India occupies the third position in production of coconut in the world. India's share in world production of this crop was 14.8 per cent on the average in the triennium ending 1976. Philippines is the biggest producer of coconut (33.2 per cent); and Indonesia comes second (20.8 per cent). The share of Philippines in the production of copra (conversion of the coconut kernel into oil bearing copra) is even better, with 48.2 per cent of world output of copra. On the other hand, India's share in the case of copra is only 7.5 per cent, which is not commensurate even with its own share in world coconut production. This means that, unlike Philippines where a substantial portion of coconut is converted into copra, in India the major share of coconut goes for direct consumption purposes.
India is the third largest oilseed producing country in the world with an area of 25.3 million hectares and production level of 12.5 million tonnes of all oilseeds. It is true that, in terms of area and total production, coconut does not occupy any leading position in the oilseed economy of India as a whole. In 1975-76 the total area under coconut in the country was only 11,14,700 hectares compared to 70,18,800 hectares under groundnut, 22,63,300 hectares under sesamum and 34,92,100 hectares under rapeseed and mustard taken together, However, this all-India comparison is inadequate for an understanding of Kerala's economy because, for Kerala State, coconut oil has a pre-eminent place, though other oils such as palm oil, have recently entered the consumption basket in the state.

Changes in area under Coconut

Data given by the Directorate of Economics and Statistics, Government of Kerala, show that area under coconut was increasing till 1975-76. But, between 1975-76 and 1979-80 the official figures show decline in area. Our suspicion, strengthened by analysis, is that this is due to changes in the methodology of data collection adopted by the Directorate. In fact,
The increases in area under coconut over the years was due to substitution of other crops by coconut and by extension of coconut cultivation to uncultivated lands. The most substantial increase took place in the period 1965-66 to 1969-70 when the area under coconut increased by 20.73.

Coconut had a clear price advantage during the 1960s. But, during the 1970s this price advantage was lost to other crops such as cashewnut and rubber. However, substantial areas under different annual crops were converted into coconut gardens.

Analysis of trends in district-wise area under coconut, according to the Directorate of Economics and Statistics, shows that there was decline in area in four out of the eleven districts. Quilon and Cannanore witnessed faster growth rates compared to other districts. On the other hand, Alleppey and Kottayam districts registered negative growth rate in area; these are incidentally the districts which are intensly affected by root-wilt disease.

During the 9 year period between 1955-56 and 1964-65 area kept increasing but at a slow average rate of 2.5 per cent every year. During the 5 year
period, 1965-66 to 1969-70, area under coconut increased on an average at a very fast rate of 4.84 per cent. During this period specially and the earlier 9 year period area kept increasing owing to a number of factors. Though there was the depressing affect of the decline in productivity, which was caused mainly by the impact of the worsening root-wilt disease, area under coconut grew, apparently due to the following reasons:

1) Coconut was a crop which provided a greater income compared to most other crops;

2) Land reforms had increased the number of small farmers and for them coconut was a crop which met their cash needs;

3) The state government provided certain attractive schemes for the extension of area under coconut.

Productivity of Coconut Farms

A study of the trends in average productivity of coconut farms in Kerala measured in terms of nuts per hectare shows that there has been an alarming decline in productivity. From 6832 nuts per hectare in 1957-58, it reached a very low figure of 4712 nuts per hectare in 1982-83.
Recent debates among economists show the importance of the size-productivity debate. Though there is controversy regarding methodology, definition etc, the controversy rests around the reported finding that size and productivity are inversely related. The case of coconut would, thus, be interesting to see if this relation exists in a plantation crop. Data in their raw form show that holdings between 0-200 cents had the highest range of yield of 34-48 nuts while holdings between 201-500 cents showed the next highest range of 29-31 nuts. Holdings between 501-600, 601-700, 701-800 cents gave 23, 50 and 19 respectively. Holdings between 901-1000 cents and above 1000 cents gave 31 and 19 nuts respectively.

The yield rate for the size group 601-700 cannot be taken as representative as the number of cases in this group was not statistically significant. Thus, if we leave out the size-group 601-700, we see that yield has been coming down as the size of holdings increases.

Based on data generated by the field study we worked out the co-efficient of correlation between yield and size of coconut holdings.

The co-efficient of correlation worked out to -0.496. This value was significant at the 5 per cent level (one-sided test). Thus, it is clear that an inverse relationship exists between size of coconut holdings and productivity.
Size-productivity relation was also studied after elimination and impact of irrigation; for this the data was separated into those cases which had irrigation and those which had no irrigation. The holdings which were not irrigated were studied using correlation. The resulting co-efficient was \(-0.234\). This was not significant. Thus, when the effect of irrigation was eliminated we see that the inverse relation between size and productivity is not significant.

We tried to see if the inverse relation between size and productivity existed after eliminating the impact of quality differences between coconut holdings. Value of land was taken to denote differences in quality of land. Accordingly, productivity and value of land were correlated. The result was a co-efficient of \(-0.264\). This value of the co-efficient was not significant even at the 0.1 per cent level. This means that the inverse size-productivity relation was eliminated when analysis of the same was done after taking into account differences in quality of land.

Some researchers have opined that analysis of only productivity per unit of land is inadequate. They argue that, instead, output per unit of labour should also be analysed in relation to size of holdings. We adopted this method and got a correlation co-efficient of 0.586. Thus, it is clear that productivity of labour is higher in bigger farms.
Kerala is slowly, but steadily, losing the prime position it enjoyed as the leading coconut producing state in the country. The monopoly it has in coconut is being challenged by states such as Tamil Nadu and Karnataka which are contributing their might in terms of increasing area and production.

There have been occasions when coconut trees were cut under the pretext of an "unremunerative" crop to give way to more "profitable" crops such as rubber and cocoa. This was a feature in the southern pockets of the state. The farmers did this in the background of low prices during 1982 when other edible oils like groundnut were recording higher levels of prices.

Coconut farmers are reeling under the grip of middlemen who control and monopolise the market scene with the result that a reasonable price is denied to the farmers for their produce. Uneconomic prices and unsteady market, because of multinationals and monopoly producers, are playing havoc with the livelihood of the average coconut farmer. The conditions of coconut farmers have been aggravated by the inability of our science and technology institutions to find a remedy for a killer disease such as root-wilt despite years of extensive research.
An analysis of the trends in production in various districts of Kerala shows that, out of the eleven districts, six have witnessed decline in coconut production. The decline in production was quite sharp in Alleppey district. Of the remaining five districts, which showed an increasing trend, Ernakulam had the biggest increase. For analysing the trend three measures were used: average cumulative percentage variation, absolute percentage variation and the values obtained by fitting a linear trend equation of the form $y = a + bx$. Till 1969-70 the rate of increase in production was faster than that in the subsequent periods. Since 1970-71 the rate of change in production has been negative, with an improvement only after 1980-81.

Data relating to changes in production were decomposed into yield effect, area effect and interaction effect for the period 1955-56 through 1982-83 using the following formula.

$$P = A_1 \times y + y_1 \times A + y \times A$$

where $P$ is change in production (between $t_1$ and $t_n$), $A_1$ is initial area (in $t_1$), $A$ is change in area (between $t_1$ and $t_n$), $y_1$ is initial yield (in $t_1$) and $y$ is change in yield (between $t_1$ and $t_n$). Our analysis shows that
the yield effect or contribution of yield to change in production has been negative throughout the period except in the last period 1980-81 to 1982-83. It was mainly the increase in the area which contributed to increase in production till 1969-70 and which continued to have a positive contribution even during the period 1970-71 to 1974-75.

With better farming practices, which require ploughing, digging basins and applying adequate quantities of fertilizers, the total returns of coconut gardens in general, and those of small farmers in particular, can be increased. But, the additional cost involved is often beyond the capacity of small farmers. Further, the existence of certain cultivation practices such as overcrowding of palms in small plots of land have their own rationale so far as small cultivators are concerned. It appears that plots with density of cultivation above that prescribed by scientists as optimum, give larger net income.

Primary data collected through field survey shows, that, according to the farmers who were given multiple choices, the main reasons for decline in yield of coconut were: (i) disease (94.35 per cent) (ii) declining quality of soil (55.37 per cent); (iii) rise in input prices (23.73 per cent); and (iv) ageing of palms (23.73 per cent).
Use of Modern Practices

Data shows that a majority of respondents use the local variety as planting materials. The main reason given for this preference is that the hybrids have lesser tolerance to root-wilt disease. The hybrids, once affected by the disease, deteriorate faster than the local variety. Also, root-wilt affected palms are poor in their capacity to survive till bearing and their mortality rate is very high.

Opinion collected from the respondents also shows that hybrids are erratic bearers and tend to perform badly under lesser care. The hybrids are also more prone to failure in establishing into grown-up palms than the local variety. Moreover, many farmers opined that the short life-span of hybrids was a major disincentive. The farmers also complained that there was massive adulteration in the supply of hybrids seedlings.

The local varieties, on the other hand, have a better record in establishing and growing into bearing palms and are more resistant to root-wilt.
Most of the coconut farmers who were interviewed in the present study opined that modern practices have no advantage over traditional methods as far as their impact on profits was concerned.

The opinion of the sample respondents regarding the effect of mixed cropping of cocoa on the productivity of coconut was examined. Out of those who responded about the impact of cocoa on the productivity of coconut, only 7.69 per cent claimed that cocoa cultivation benefited coconut productivity, albeit indirectly, that is, through the benefit of manure given to cocoa which was also utilised by coconut. Over 67 per cent of those for whom the question mattered opined that cocoa cultivation reduced coconut productivity and 24 per cent could not discern much change. This finding is quite important because certain scientists have been promoting the theory of nutrient contribution by certain intercrops.
Study of paid maintenance costs shows that holdings above sizes of 600 cents have a lower proportion of their total paid maintenance costs spent on soil improvement such as application of manure and tilling of soil. It is mainly the holdings in size groups 51-600 cents that do substantial expenditure on tilling and application of manures. For all holdings, cost of plucking was quite substantial ranging from 21 to 56 per cent of total paid maintenance cost. This is because plucking is a semi-skilled job and all planters require hiring of climbers.

The share of marketed nuts in total production was found to be about 79 per cent. The number of nuts marketed declined by more than 18 per cent between 1981 and 1983. Analysis of marketed surplus per acre in relation to size of the coconut gardens gave only a weak correlation coefficient of 0.003. This implies that marketed surplus is uniformly distributed among different size-groups.
we have worked out the cost-return ratios for different size-groups. In order to see if there was any relation between cost-return ratio and its distribution size-wise, we used the correlation technique. The correlation co-efficient turned out to be 0.704. This value is significant at the 1 per cent level. Thus, we see that returns are greater compared to costs on bigger farms.

Another criterion for efficiency evaluation is the profitability of farms. Of course, there are limitations in this analysis as profitability is a biased concept which portrays the farming operation in the same way as a capitalist farm which produces with the aim of selling and for a profit. This may not be true of a coconut grower in Kerala. This is because, for most of the coconut growers, income from coconut cultivation and sales account for only a part, in some cases a small part, of the grower's net income. Most of the growers use a substantial portion of their produce for domestic consumption. In fact, for some, cultivation is mainly for domestic consumption, though they would sell the surplus. But, for many, cultivation is certainly not guided by such considerations as profit maximisation and input efficiency. Many coconut plots are, therefore,
operated in conditions of low input use. We deliberately avoid usage of terms such as 'grown under conditions of neglect', as the rationale behind such terms need not apply in full to local conditions.

Despite the above limitations, average profits from coconut cultivation of the sample households have been compared size-wise using correlation.

Data on average profit from coconut cultivation is presented. This was arranged according to size of holdings. In order to study the relationship between average profit and size-wise distribution of holdings, we used correlation which worked out to 0.054. The value of the correlation co-efficient was not significant even at the 5 per cent level. Therefore, we cannot argue in favour of any significant relationship between size of holding and average profit per acre. As neither any significantly positive nor negative relationship exists we can only say from the data that average profit does not change significantly with differences in size of holdings.

The field survey also revealed that, among cultivable crops, coconut was still the most profitable one. This is because other crops which are profitable, such as rubber and coffee, cannot be grown on coconut land.
Competing crops such as tapioca, oil palms, yams, pepper, nutmeg, ginger, banana, plantain etc do not offer better profits.

The distribution of households of various sizes according to profit range reveals quite interesting facts. For sizes below 200 cents profit per acre is below the range of Rs. 501-750. Incidentally, the size 101-200 cents shows 11 cases above Rs. 5000 per acre and, as expected, sizes above 600 cents have profitability above Rs. 5000 per acre. These findings are not unexpected as they are mainly large-size holdings which can have high profits per acre as the size of their marketed surplus is larger.

**Coconut Prices and Marketing**

A study of yearly changes in farm prices shows that farm prices of coconut have been widely fluctuating. Though unstable, the price changes have been progressive and therefore must have acted as an incentive for many farmers to adopt coconut cultivation.

An analysis of yearly trends in coconut farm prices over the 22 year period starting 1955-56 and ending 1977-78 shows that there has been an average increase of 28.11 per cent, while the average increase for all major crops was 25.33 per cent. Thus the farm price increase of coconut in these 22 years was only slightly higher than normal. In this period coconut farm prices registered the second highest increase among farm prices.
of other important crops. Coconut farm prices increased by 591 per cent compared to 901 per cent increase in cashewnut farm prices and fared much better than arecanut whose farm price increased only by 113 per cent.

It is clear that, though there were wide fluctuations in the prices of coconut from time to time, in general there was a substantial increase in the farm price, witnessing an increase from Rs. 137.40 per 1000 nuts in 1955-56 to Rs. 1266.40 per 1000 nuts in 1982-83.

Wholesale prices have also kept fluctuating over the period under study. As can be seen, absolute prices also witnessed a very fast rate; the price level increasing from Rs. 131 per 1000 nuts to Rs. 1410.28 in 1981-82.

In order to better analyse the changes in farm prices of coconut between 1955-56 and 1982-83 we broke down the period into three year sub-periods. Farm prices of coconut increased most rapidly between 1964-65 and 1966-67. The second highest increase was between 1955-56 to 1957-58. Price decreased in two sub-periods. Between 1973-74 and 1975-76 it was highest with a decline of 24.88 per cent. Price declined again between 1970-71 and 1972-73. There was an increase in price in other
sub-periods ranging from 9.93 per cent and 12.50 per cent except in 1979-80 to 1981-82 when it increased only by 0.96 per cent.

An increase in price, other things being equal, should result in an increase in production. But this takes place with a time lag. In the case of coconut, which is a perennial crop, there are two kinds of time lags in the changes in production. These two time lags are short-term and long-term. The short-term time lag in changes in production take place as a result of changes in cultural practices such as irrigation, manuring, spading, plant protection measures etc. This time lag takes place normally within a year. The other time lag in changes in production takes place through an increase in area under coconut cultivation and the time-period involved is the gestation period of the newly planted palms beginning to yield.

We measure here the changes in production taking place in the short-term. In order to study the impact of changes in prices on changes in production we have used correlation method. We have tried to measure the impact of farm price of coconut and wholesale price of coconut oil on production. On correlating farm price and production of coconut between 1955-56 to 1981-82 we got a
co-efficient of 0.035. This was not significant statistically. So a definite answer cannot be given regarding the relationship between the two. But, it must be noted that the relationship is positive. A positive co-efficient would signify that a change in price is followed by a change in production in the same direction.

To see if changes in wholesale price of coconut oil had any impact on production of coconut we used correlation analysis. The resultant co-efficient was -0.187. This was not statistically significant, but we observe that the relationship is negative. A negative relation signifies that changes in price have an opposite impact on production.

Prices of coconut and coconut oil are to a large extent determined by excess demand as reflected in the quantum of imports. Production of the major oil seeds also had no influence on coconut oil prices. This may be due to limited substitutability of coconut oil by other oils, due to entrenched food habits and tastes. Moreover, production of other oils may not have a strong influence as it may be excess demand which influences price.
The parity index calculation made by us shows that coconut farmers were in a favourable position. This is because except for three years between 1955-57 and in 1975-76 prices received by coconut farmers was greater than prices paid by them.

Parity index, however, is not adequate to explain the problem faced by coconut farmers, or the absence of it. This is particularly true of the large proportion of small coconut cultivators. Only a detailed class-wise, size-group-wise analysis will give us adequate clue about the implications of the apparently favourable parity index. It is, of course, true that coconut farmers are better off than farmers of many other crops in this respect.

**Marketed Surplus**

On analysing marketed surplus per acre for various size-class of holdings it was seen that it gave a very weak though positive correlation. The value of the correlation co-efficient was 0.003, which is almost insignificant. But on analysing table 6.8 it was seen that till the size-group 401-500 cents marketed surplus per acre kept increasing. It was lowest for size-group 0-50 cents with 471 nuts per acre. From the size-group 501-600 cents
onwards there was no regular trend in marketed surplus. The figure of 3466 for size-group 601-700 is not taken into consideration as it is exceptional.

The trade in coconut oil is also controlled by a handful of traders, most of whom are the millers themselves, whereas the retail market for coconut oil is spread all over the country. Due to the lack of good number of wholesale traders, competition is weak and prices are not always determined by supply and demand. The markets for coconuts and coconut products are well integrated and the prices of coconuts and copra are determined by the coconut oil prices.

Only about 50 per cent of the 2.95 lakh tonnes of copra produced in Kerala is used for crushing in the local milling sector and the balance is marketed mainly to Maharashtra. The copra crushed annually in Kerala yield 96000 tonnes of coconut oil.

About 3/4 of the nuts produced in Kerala are disposed off in the form of nut itself by the cultivators after retaining 15 per cent for their own consumption. Out of this, 950 million nuts are used up in raw form in Kerala annually.
The share of marketed nuts in total production was found to be about 79 per cent. The number of nuts marketed declined by more than 18 per cent between 1981 and 1983. Analysis of marketed surplus per acre in relation to size of the coconut gardens gave only a weak correlation coefficient of 0.003. This implies that marketed surplus is uniformly distributed among different size-groups.

The prices of coconut are largely determined by merchants. Following the import of coconut oil, the demand for coconut oil from Kerala has declined. This has had a dampening and often disturbing effect on the production of coconut.

Decline in coconut prices, even for brief periods, has undoubtedly serious implications to the survival of Kerala's economy in general and the State's agrarian economy in particular.

Hence, appropriate policy instruments have to be evolved by the government for ensuring not only remunerative prices for the coconut farmers but also to avoid undue fluctuations in coconut farm prices. This would, necessarily involve the creation of a viable market structure.