CHAPTER VIII
SUMMARY AND CONCLUSIONS

The profile of Kerala Agriculture since 1960 clearly established that the cropping pattern in the state made a significant shift from the traditional food crop, paddy to coconut gardens and rubber plantations besides being diverted to non-agricultural purposes particularly, while the state is 50 per cent short of food production. The cropping pattern changes that had occurred are mainly based upon the farmers decisions, which are influenced by soil fertility, labour availability, cost of cultivation, irrigation facilities, mechanisation, price levels, profitability etc. To examine the above issues, one must know the decision behaviour of primary producers, and to analyse the decision-behaviour, agricultural economists usually prefer supply response studies.

The supply response functions which are popularly and widely used in agricultural economic studies are Nerlovian partial adjustment adaptive expectation model, Koyck model, Bateman model, Behrman model etc. These functions provide useful information regarding farmer’s decision behaviour in response to changes in prices and other economic factors. They help to ascertain how farmers reallocate resources among various crops in response to changes in relative price levels. Naturally there must be certain determinants which motivated the farmers to make a shift in the cropping pattern from the traditional food crop, paddy to cash/plantation crops. Hence it is felt that an analytical study on farmer’s decision behaviour with regard to important crops in Kerala in response to changes in different factors will be useful for policy formulation. The present study is an attempt in that direction. The three crops paddy, coconut and rubber sharing 62 per cent of gross cropped area forms the
major crops grown in Kerala. The present study also examined the inter-district shifts in cropping pattern with reference to paddy, coconut and rubber on area, production and yield. In order to understand the motives for those shifts over the years, farmer's decision-behaviour in area, yield and production adjustment are to be known, which was attempted with the help of supply response models. The specific objectives of the study were,

(i) To examine the response of supply of major agricultural crops in Kerala viz., paddy, coconut and rubber.
(ii) To understand farmer's decision-behaviour in response to changes in price and other non price factors based on supply responses.

The study was exclusively based on secondary information collected from various sources like Directorate of Economics and Statistics, Planning Board, Rubber Board, Coconut Development Board etc. The entire study period was divided into two, from 1960-61 to 1974-75 and from 1975-76 to 1995-96. The collected data were tabulated and inter-district variations were examined with the help of percentage shares. Further growth rates were computed using exponential functions. Farmer's decision behaviour with respect to selected variables was analysed using the usual Nerlovian Partial Adjustment Adaptive Expectations model after making necessary adjustments for statistical errors. The output responses were analysed using area and yield response models for the two sub-periods separately.

The study was presented in eight chapters. Besides the introductory chapter, second chapter reviewed relative literature on the subject Chapter III presented the mathematics behind various supply response models which
formed the theoretical framework of the study. The next chapter reviewed the agricultural development in Kerala as a prelude for analysis. The inter-district shifts and the supply responses of paddy, coconut and rubber were analysed in chapters V, VI and VII respectively.

According to the latest estimates (1995-96) out of the total geographical area of 3885497 Ha., 27.83 per cent was under forests (1081509 Ha.) and 1.11 per cent, barren and uncultivable land (43154 Ha.). About 313131 Ha., i.e., 8.06 per cent was put to non-agricultural use. Kerala had a net area sown of 2264842 Ha. in 1995-96 which formed 58.29 per cent of the total area. The total cropped area during 1960-61 was 2349 thousand Ha. whereas in 1995-96 it went upto 3885.50 thousand Ha., the cropping intensity being 1.65.

Out of the gross cropped area of 2349 thousand Ha. in 1960-61, paddy occupied 752.69 Ha. (32.04 per cent of the gross cropped area). But the share of area under paddy consistently came down and touched 15.36 per cent in 1995-96. The fall in cumulative area under paddy in 1995-96 compared to 1960-61 was 307.76 thousand Ha. The area devoted for all food crops together was 46 per cent in 1960-61 but it came down to just 16.52 per cent in 1995-96. The area under paddy declined from 752.69 thousand Ha. in 1960-61 to 471.15 thousand Ha. in 1995-96.

In the year 1960-61, coconut accounted 21.31 per cent and rubber, 5.23 per cent of the gross cropped area. The area under coconut reached 914.37 thousand Ha. In 1995-96, nearly double the area in 1960-61 (500.76 thousand Ha.). Similarly area under rubber reached 449 thousand Ha., in 1995-96, an
increase of 3.68 times from 1960-61 (135809 Ha.) level. While area under paddy declined by 281.54 thousand Ha. Between 1960-61 and 1995-96, area under coconut and rubber increased by 413.61 thousand 326.13 thousand Ha. respectively. The trends clearly indicate that Kerala farmers are shifting the area under paddy to coconut and rubber, while the state is 50 per cent short of paddy production.

The analysis on inter-district shifts of paddy, coconut and rubber and also the estimation of area responses and yield responses revealed the following.

1. In all the districts of Kerala area under paddy has declined since 1960-61. Area decline was severe in Alappuzha, Thrissur, Malappuram and Palakkad districts. As a consequence production declined from 1067.53 thousand tonnes in 1960-61 to 953.03 thousand tonnes in 1995-96. The season-wise analysis has shown that, by utilising more area under paddy cultivation during autumn and also by increasing yield levels during summer, there is scope for increasing paddy production.

2. During the first sub-period, the total paddy production in Kerala increased due to both area and yield increase. The situation has changed during the second sub-period because of the sharp decline in area under paddy, especially after 1986-87. The increase in yield levels as a consequence of green revolution could hardly compensate for the loss in area to maintain the level of paddy production. Functional analysis has shown that non-price factors are more responsive to production. During the first sub-period,
irrigated area and time trend influenced farmer's area adjustment decisions. But during second sub-period, while allocating more area for paddy, farmers were anticipating more prices during the second period because the price has been comparatively low for paddy comparing with cash crops. Another important factor was yield risk because of the untimely rainfall and untimely planting and harvesting practices. Farmer's decision in respect of area adjustment were also found to be influenced by previous year's area. During the first period, due to severe zonal restrictions on trade account, there was no movement of paddy to Kerala on trade account. On account of the severe shortage, affluent efforts were being made to increase production through area expansion. A fairly large proportion of area was held by farmers who had very little surplus, because availability of supply was more important for them than price. The farmers were careful to increase yield levels also through better management. Farmers tended to shift land to more remunerative purposes and farmers adjusted their output through productivity gains than through area adjustments. The yield risk after mid-seventies involved untimely rainfall untimely planting and harvesting suggesting the necessity for mechanisation in paddy cultivation.

3. From 500760 Ha. in 1960-61 area under coconut increased to 914370 Ha. in 1995-96. Corresponding increase in production was from 3220 million nuts to 5155 million nuts. Kozhikode, Malappuram, Kannur and Thiruvananthapuram were the important coconut producing districts. The increase in area was also higher in those districts which reflects more dominance of coconut. The total production of coconut increased at the rate 26.8 per cent during the first sub period and at the rate 33.2 during second sub period. The yield levels of coconut in Kerala though fairly impressive, it is very low compared to other states. The incidence of pests and diseases,
extending cultivation in marginal and unproductive lands, inadequate input usage and management practices, unscientific planting etc. may have contributed to poor yield. Since mid-seventies, farmers were prepared to allot more area for coconut cultivation expecting high returns.

4. In area adjustments, past year's area and yield of coconut were found to be influencing farmer's decisions during the first and second sub-periods. From 1985-86 to 1995-96, past year's area and yield, time trend, technological factors, and price expectations showed significant correlations to the area under coconut. Coconut showed poor yield response during both sub periods because the yield changes over the years were only marginal. In yield adjustment decisions of coconut, expected price of the crop, past year's yield, and time variable had respectively shown significant correlations, to the yield of coconut. Thus expectations regarding yield as well as price were important factors governing farmers supply decisions along with time trend. Compared to all India levels, Kerala's importance in terms of coconut production is loosing due to certain constraints such as non availability of sufficient numbers of quality seedling of improved varieties, improper spacing, unawareness of the correct fertiliser combinations suitable inter crops for each cropping situation and lack of plant protection measures.

5. In earlier days the cultivation of rubber was limited only to Kottayam district. But since mid seventies, the cultivation spread to other districts particularly Kozhikode, Malappuram, Thrissur and Kannur. The growth rate of area under rubber since mid seventies was found to be higher than the growth rate of yield which established the claim. One of the important factors contributed for this spread is the initiative taken by the Rubber Board for the cultivation of rubber. Correspondingly the production of rubber also
increased in all the districts. Cultivation of rubber became a very viable proposition in Kerala until recently (1997).

6. Supply response of rubber in Kerala was analysed using short term yield response models and long run planted area response models. During the first sub-period in the case of short run yield response, rainfall and time trend were found to be the major yield increasing factors. Price of rubber, time trend and annual rainfall explained 90 per cent variation on yield per hectare. Instead during the second phase time trend and price of rubber were found to have more influence on yield of rubber. It was also seen that technological factors like timely application of fertilizers use of HYVs, proper use of pesticides etc. have more yield response. In the case of results of long run planted area response models, the expected price of rubber was the only variable having direct significant influence upon planted area in the sub period I. During the second sub period expected price of rubber and yield risk were found to have direct influence on area.

7. The analysis on inter crop shifts revealed the following. In Idukki, Kottayam and Pathanamthitta districts, rubber was dominant compared to coconut and paddy. Since mid-seventies area under paddy and coconut were declining whereas area under rubber was increasing in those districts. The area under rubber in Kottayam, Pathanamthitta and Idukki districts were more than area under coconut by 692494 Ha., 233514 Ha. and 19730 Ha. respectively. Kottayam and Pathanamthitta had declining area under coconut whereas area under rubber has increased by 1645 Ha. and 3298 Ha. since 1990-91. In Idukki, the increase in area under coconut comparing with rubber is only marginal. Therefore, it is revealed that, in those three districts, rubber is dominant and there is no scope for further shift in the near future. Even though area under paddy has declined in Palakkad district between
1960-61 and 1995-96, still Palakkad district dominates in the cultivation of paddy. Focusing on the relative shifts the decline in area under paddy is occupied by coconut over the years. Comparing the increase in area under coconut with area under rubber it is further revealed that the rate of increase is high for coconut compared to rubber which is very evident from 1980-81 onwards. Similar trends were observed in Kannur, Thiruvananthapuram, Kasaragode, Kozhikode and Wynad districts. Considering in to the shifts in cropping pattern more shift occurred in northern districts of Kerala compared to southern sides.

8. Knowledge about decision behaviour of farmers is crucial for policy planning. The analysis revealed that in the case of paddy, non-price factors such as technology, rainfall and yield risk are the significant determinants of farmers behaviour and price played only a very nominal role. As a consequence of this behaviour farmers frequently shift to other crops like coconut and rubber.

9. In the case of coconut and rubber, farmer’s decision behaviour is considerably influenced by supply response. For instance in the case of coconut previous area, yield, technology and price expectations were found to influence farmer decisions. Similarly in the case of rubber, technology, price, yield and price of the competing crop are the major influencing factors. Hence we may conclude that farmer’s decision behaviour are sensitive in the case of coconut and rubber.
BIBLIOGRAPHY