INTRODUCTION
CHAPTER I

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Coconut is a crop having multiplicity of products with multifarious uses to mankind. It plays a major role in the economic and social lives of the people of more than eighty countries in the tropics. Coconut has been eulogized as *Kalpavriksha*, the all-giving tree of heaven. As it is successfully grown in tropics, it is also known as *King of Tropical Palms*. Coconut is truly royal, not only in its grace and stature, but in its boundless generosity to mankind.

The recorded history of coconut cultivation goes back to 300 B.C. in India in the post-*Vedic* times in *Ramayana*. There are different views regarding the origin of coconut. The first view is that it had originated in Tropical America from where it had been taken to Pacific. The second view assumes that from a place of origin on the coasts of Central America, the equatorial currents of the sea took it to the Pacific Islands. The third and the generally accepted view holds the assumption that it has originated in the South Asia or in the Pacific from where it reached America. References have been made on coconut in *Raghuvaamsa* of Kalidasa and *Sangam* literature, which testify the antiquity of coconut in India. There was a popular belief that the coconut represented the prosperity of the people of Kerala, which literally means the land of coconuts. But its origin in India remains disputed.

1.1. Economic Importance

Coconut is a crop of small and marginal farmers. Although the cash earning of coconut farmers from small holdings are inadequate to meet the family requirements in full, coconut culture and industry sustain the economic well being of nearly 10 million people. There are about 5 million coconut holdings in India, of which 2.5 million are in Kerala. The contribution of coconut palm and its products to the annual income of Kerala
is around 15 per cent and to the agricultural income is around 35 per cent (Thampan, 1993). Coconut products constitute the major article of interstate trading and the related activities provide direct employment to over one million people.

Coconut is used both as tender nut and mature nut. Tender coconuts are used as natural mineral drink. Mature nuts are used for consumption as raw coconut and for making copra, oil and other diversified products. Copra holds promise as a source of edible oil, the contribution of which to the edible oil pool in India is around 6 per cent. The proportion of nuts utilized for production of copra in the country is around 38 per cent (Aravindakshan, 1996). The copra production has gained momentum in certain states and the quantum produced has doubled over few years, even though the copra content or oil content is comparatively lesser in these areas. Coir and coir products constitute the major items of export by which the country earned foreign exchange to the time of Rs.303.05 crores from 61,031 MT of coir during 1999-2000 (Kerala State Planning Board, 2000). Toddy lapping is another important industry connected with coconut in Kerala and Goa.

Apart from the traditional products, coconut has become important as a raw material for agro-based industries for manufacture of new products like desiccated coconut, coconut cream, spray dried coconut milk powder, preserved and packed tender coconut water and coconut water-based vinegar. Besides, coconut shell is used as a fuel in households and rural industries. It is also used as a raw material for the manufacture of shell charcoal, activated carbon, shell powder, ice cream cups and handicrafts. Coconut wood is used for construction of houses and also for making furniture and handicrafts.

1.2. Trend in Area, Production and Productivity

The significance of coconut palm can be established from the fact that it is grown in more than 80 countries of the tropics. Recently India has become the largest producer
of coconut with the production of 14,925 million nuts from an area of 1.91 million ha., which accounts for 27.57 per cent share in production, while its share in area is only 16.02 per cent. Productivity was the highest in India having 7,822 nuts/ha. as against 3,757 nuts/ha. in Indonesia and 3,414 nuts/ha. in Philippines (1998-99). Based on the All India Final Estimate of Coconut (1999-2000), the production has declined to 12,251 million nuts from an area of 1.78 million ha., resulting in a productivity of 6,892 nuts/ha.

In India, coconut is now grown under varying soil and climatic conditions in 17 states and 3 union territories. The All India Final Estimate of Coconut (1999-2000) further indicated that 92.64 per cent of the total area and 90.69 per cent of the total production in the country is concentrated in four southern states viz., Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, which shows a slight decline from the previous year. Among the four southern states, Kerala accounts for the largest area of 8.99 lakh ha. (50.51 per cent of total area) and the largest production of 5,167 million nuts (42.17 per cent of total production), followed by Karnataka having a total area of 3.21 lakh ha. (18.03 per cent of the total area) and Tamil Nadu with a production of 3,222 million nuts (26.30 per cent of total production). This estimate shows a slight reduction in the percentage contribution to total area and production in Tamil Nadu than the previous year. In the case of productivity among the four southern states, Tamil Nadu tops with 10,599 nuts/ha., followed by Andhra Pradesh with 10,342 nuts/ha. The productivity in Kerala is 5,747 nuts/ha., while Karnataka has the lowest productivity (5,210 nuts/ha.).

The highest productivity of our country was recorded from the non-traditional states of Maharashtra (15,013), Pondicherry (14,182 nuts/ha.) and West Bengal (13,401 nuts/ha.), as per the All India Final Estimate of Coconut (1999-2000). While analysing

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the reasons for the higher productivity in the non-traditional areas, it is worthwhile to
examine the remarks made by Jain (1984) regarding that of wheat in West Bengal.
According to him, "They were practicing what we called text book farming, 'I hey do not
know about wheat and they were not people who were claiming to know much about
wheat, so whatever we tell them, they adopt and adopt it rather successfully", Today we
find it applicable in case of coconut also.

1.3. Productivity Enhancement - Problems and Prospects

India stands in the forefront in productivity among till other coconut producing
countries of the world. Still the potential for accomplishing higher productivity remains
very high as illustrated by the productivity of above 15,000 nuts/ha. recorded from
certain pockets of our country. The reasons for this wide variation in productivity within
the country need a critical analysis.

The factors responsible for the low productivity of coconut in the major producing
state of Kerala and its continued stagnation over the previous decades have been analysed
by several experts. The low productivity is mainly attributed to the so-called debilitating
root (wilt) disease widespread in the prime producing slate coupled with other
unscientific management practices (Aravindakshan, 1996). Further, the exhaustion of soil
caus ed by the continuous removal of coconut biomass, the low level of input use, the
rainfed nature of coconut culture without supplementary irrigation, the widespread
prevalence of root (wilt) disease and the slow rate of replacement of the senile and
unproductive palms were reasoned as the major factors responsible for the low
productivity and continued decline observed in Kerala (Thampan, 1993).

Though part of the decline in productivity in Kerala can be attributed to the rapid
area expansion, the per palm productivity has also been declining. Often the decline has
been attributed to the increasing proportion of old palms in Kerala and the spread of the
root (will) disease, This is likely to be true at a superficial level, at a more basic level the factors making for the decline seem to be cultivation practices followed and the low level of input use. Despite the favourable price situation, what are the factors that make for such low levels of input use is a serious question (Narayana et al., 1991).

Kerala State Planning Board (1997b) attributed the reasons for the poor performance of coconut in Kerala as large number of old and senile palms, little attention given for managing the palms, inadequate facilities to provide supplementary irrigation, incidence of root (wilt) disease, low levels of fertilizer use and small size of holdings.

Thampan (1999b) remarked that coconut farming, though popular in Kerala, did not attract devoted attention of the farmers as a result of prevailing socio-economic constraints to profitable production. The restraining effects found expression in the form of cultural management, slow spread of improved varieties, lack of diversity in product utilization, high cost of production, low profitability and waning interest in farming.

When compared to other coconut growing states like Tamil Nadu and Karnataka, coconut is seen predominantly as an irrigated crop and input use also found better. Less incidence of serious diseases like root (wilt) disease and less number of senile and unproductive palms were also observed as the factors responsible for higher production and productivity of coconut in other states like Tamil Nadu.

The expert views revealed low input use, lack of irrigation, large proportion of old and senile palms and little care and management coupled with incidence of root (wilt) disease as the major problems responsible for the poor performance of coconut in Kerala.

The low levels of input use as pointed out as a major limiting factor warrants the need to analyse the existing transfer of technology strategies and the Government policies related to coconut. Coconut being a perennial crop is confronted with several specific problems
in the development of technology and its dissemination. The long duration nature of the crop poses problems for the farmers also in adopting technologies.

Some of the problems specifically related to plantation crops and influencing transfer of technology have been reported by Muliar and Arul Raj (1981). Long pre-bearing age and higher time lag between treatment and response acted as major barriers in developing technologies related to plantation crops. Too long time required for getting observable results in the demonstration plots and convincing the farmers was still more difficult for the extension agencies. Low contribution of plantation crops to total income of small and marginal farmers, less time and interest towards better management of plantation crops, huge capital requirement and low immediacy of returns hampered wide adoption of technologies even though the profitability was high. The farming community being cheated with low quality seedlings, adulterated fertilizers and some 'wonder cure' pesticides utilizing the long duration of the crop was observed as another serious constraint.

As the pre-bearing age of coconut is too long, the farmers may find it difficult to manage the palms without deriving any income from it. Huge capital requirement, low contribution of coconut to total income and longer time period required for getting results of input use can also result in lack of interest towards better management. Hence it is very much important to ensure a stable and attractive price for coconut so as to safeguard the interest of the coconut growers. But the price of coconut oil in India is higher than that of international markets and also it has to move along with the price of other edible oils. Such a situation may not encourage any enhancement in the price of coconut oil. On the other hand, we must think of diversifying the use of other products, rather than depending on the single commodity, coconut oil. In addition, a market strategy for coconut and its products by giving due importance for promoting the use of coconut oil in
non-traditional areas and in elevating the demand in the traditional areas can ensure year-round demand for coconut. Simultaneously, the possibilities for export promotion of coconut oil and potential markets for value added products should also be explored.

Further, any advantageous position in the price of coconut oil is not often transferred to the coconut growers whereas it is mostly enjoyed by traders (Aravindakshan, 1996). Frequent fluctuations in the price of copra and coconut oil are the most serious problems confronting coconut production and industry. The possible proposition to overcome this problem is to set up coconut growers’ co-operatives in proper lines for marketing and processing of coconut. Reasonable support price coupled with co-operative marketing can safeguard the farmers’ interest especially during the years of high production and fluctuating prices.

Product diversification and elevation in the use of coconut oil and other products will again necessitate increase in production. Also with increasing cost of production, the productivity has to be increased so as to make Indian coconut oil competitive in the global market. Concerted efforts of research, extension and farming community are urgently required to increase the per palm and per hectare productivity of coconut.

1.4. Need for the Study

Among the different coconut growing states, the rate of growth in the production of coconut is the lowest in Kerala. The overall increase in the productivity of coconut in Kerala over a period of four decades has been only 9.97 per cent, which is the lowest compared to the achievements made in other states. The overall productivity improvement for the country as a whole over the same period was also much higher at 21.92 per cent. The improvement in the neighbouring state of Tamil Nadu accounted to 48.95 per cent (Thampan, 1993).
Kerala being the prime producer of coconut, any decline in productivity of the crop would reflect on the total output of the country. Research studies related to the determinants of productivity of coconut in different regions are very limited and most of the views expressed are based on the experience in the field. Also, the interactive effects of the various personal, socio-psychological and biological factors to productivity are not yet studied. At this juncture, a detailed investigation on the factors responsible for the present levels of productivity of coconut in Kerala and Tamil Nadu was found highly relevant. Hence, this study was proposed with an intention to analyse the factors that determine the level of knowledge on the coconut technologies, the level of adoption by the farmers and ultimately the productivity of coconut.

1.5. Specific Objectives

- To assess the level of knowledge of the coconut growers and the extent of adoption of the recommended technologies related to coconut cultivation, contributing to productivity,
- To study the personal, socio-psychological, economic and biological determinants of knowledge, technology adoption and productivity of coconut,
- To assess the recommended coconut technologies based on their level of appropriateness, knowledge and adoption.
- To find out the association and contribution of the determinants towards knowledge, adoption and productivity,
- To draw a general picture of the coconut cultivation and allied enterprises in Kerala and Tamil Nadu through multidimensional analysis and to suggest a model transfer of technology network for improving coconut production.
Scope and Importance of the study

The present study is first of its kind in coconut, investigating the individual as well as interactive contribution of different factors to technology adoption and productivity of coconut in Kerala and Tamil Nadu, using multitude of methods. The study might provide valuable information on the variations between root (wilt) diseased and non-diseased areas and two adjacent border districts in terms of various characteristic influencing adoption and productivity.

Assessment of coconut technologies based on their appropriateness, knowledge and adoption levels would help the researchers in refining the existing technologies and in developing appropriate technologies for future. The feedback related to the already implemented development programmes on coconut would help the planners and development agencies to re-design their programmes. The results of the study regarding relative importance of various factors and the interactive effect of different factors in contributing to adoption and productivity can be very well utilized by the researchers, policy makers and development agencies to formulate ideal strategies for development of coconut.

Report on situational analysis on product diversification units can motivate other potential growers to begin enterprises on coconut. The existing units can understand the constraints faced by similar units and the techniques of solving problems. The report may also help the development agencies to understand the problems faced by the different diversification units so as to help the entrepreneurs to run the venture successfully.

In the light of the findings of the study, a transfer of technology model would be suggested for improving coconut cultivation, which might be helpful for the planners and development agencies.
1.7. Limitations of the Study

As the conditions prevailing in different regions of coconut cultivation vary considerably, generalizations cannot be drawn on the coconut cultivation in other parts of the country. Even though detailed information has been collected from the study areas through survey method, the amount of other information collected from non-study areas through other methods may not be that exhaustive and will have some subjective bias. But such data were used only to supplement the data collected from the study area. Out of the several identified variables, twenty-two variables closely associated with the study and which could be manipulated at the farming system level were only selected due to time barrier. However, the influence of certain variables like rainfall and price of coconut have been supplemented by analyzing secondary data. As the price of coconut underwent violent fluctuation during the period of study, the influence of the higher price obtained might have reflected on most of the responses. Also, drastic variations in the intensity of mite infestation were recorded in all the study areas during the period of study and hence minor changes are expected at the present level. Limitations of time, financial resources, conveyance and other physical facilities have been encountered as in case of several other studies.