CHAPTER I

ECONOMICS OF COCONUT PRODUCTS-
AN ANALYTICAL STUDY
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1.1 Introduction

Coconut is an important tree crop with diverse end-uses, grown in many states of India. In India, coconut is grown in an area of 1.90 million hectare, producing 14744 million nuts with a per hectare productivity of 7747 nuts. Kerala’s share in area as well as production of coconut in the country is declining over time.

Coconut contributes to more than rupees 83,000 million to the country’s GDP and about 6 per cent to the edible oil pool. Similarly, the industry helps to earn foreign exchange to the tune of ₹ 13,000 million per annum by exporting coconut and coconut products. About 10 million people are dependent on coconut farming and its allied activities. Besides, coconut is a perennial source for raw materials to a number of other industries like oil milling, coir and coir based industries. Much potential exists for shell charcoal, shell powder, coconut milk powder, etc. Coconut processing and allied industries provides continuous employment to nearly 8 lakhs workers of which 80 per cent are women folk.

The production of coconut in India during 2008-2009 stood at 15729.75 million nuts and 8303 nuts per hectare. The area of coconut decreased by 0.45 percentages, whereas the production and productivity increased to 6.69 and 7.18 percentages respectively.

In Sanskrit the coconut palm is called “Kalpa Vriksa”, which means “the tree which provides all the necessities of life”. Man can use every part of the coconut. The sweet cake can be eaten raw or used in most cooking recipes. A single coconut has as much protein as a quarter pound of beefsteak. Copra, the
dried meat of the kernels, when crushed is the source of coconut oil. The husk, known as coir, is short, coarse, elastic fibers used to make an excellent thatch roofing material for houses. This very tree is also an excellent producer of charcoal which is derived from the shells, and is used not only as a cooking fuel, but also in the production of gas masks and air filters.

The outer part of the trunk of the coconut palm is used for construction, known as porcupine wood for houses and furniture. The swollen base of the trunk, when hollowed, can be turned into a hula drum that the Hawaiians use for entertainment. These are just a few examples to show the diversity of the uses of the coconut palm.

1.2 A Brief History of Coconut

The coconut was first mentioned in 545 A.D. by an Egyptian monk named Cosmos Indicopleustes\(^4\). He visited western India and Ceylon. In his “Topographia Christiana”, Cosmos describes the coconut as the “great nut of India”. The Mahavasma, an ancient chronological history of Ceylon, describes the planting of coconuts in that country in 589 A.D.

In 1280, Marco Polo described coconut as growing in Sumatra, as well as in Madras and Malabar in India\(^5\), calling it \textit{nux indica}, the Indian nut. The first detailed description of the coconut palm in western literature was provided by the Italian explorer Lodovica, di Varthema in his “Itinerio” of 1510, in which he referred to it astenga. The coconut palm was unquestionably spread by Austronesians through the Pacific, perhaps eventually to the Pacific coast of Central America, and westward to India and East Africa. In Western Melanesian charred fruits were cited back to 3000 BC. The coconut was an important tropical economic crop with its enormous range of uses.

Coconut (\textit{Cocos nucifera} L)\(^6\) is an important horticultural crop which provides food, oil, beverage, medicine, fibre and a variety of raw materials, for production of an array of products of commercial importance. Palmae, the palm
family to which the coconut belongs, is one of the oldest and most diverse of the plant families. Palms have many botanical characteristics, such as woody trunk, in many species, perennial growth, leaves which are folded like a fan and the production of a single seed leaf which classifies them as monocotyledons along with grasses, lilies and other families. There are sixty other species under the genus Cocos.

Kerala originally, the land of 'Kera' (coconut tree) has been steadily receding in area under cultivation of coconut losing ground to neighbours Tamil Nadu and Karnataka. Kerala’s share in area under coconut cultivation in the country fell sharply from 57 per cent in the early 1990s to 43 per cent in 2008, while Tamil Nadu and Karnataka together accounted for 41.43 per cent of the total coconut production of 14,744 million nuts a year, according to current year’s Economic Survey of the Kerala Planning Board. In India, coconut is grown in an area of 1.90 million hectares with Kerala accounting for 7.81 lakh hectares, covering 38 per cent of the net cropped areas of the State. 

The crop has a significant impact on the national economy, apart from besides its influences on social and cultural lives of the people in the country. The major portion of coconut production is from the four South Indian states viz, Kerala, Karnataka, Tamil Nadu and Andhra Pradesh which comes to more than 90 per cent of the total production of coconut. Kerala accounts for the largest area and production (41.60 percentage of area and 36.80 percentage of production) followed by Karnataka with 22.10 percentage in area and Tamil Nadu with 34.10 percentage in production. Tamil Nadu tops in the productivity with 13771 nuts /hectare followed by Andhra Pradesh with 9327 nuts/hectare. 

Globally it is grown in 93 countries and in 12.29 million hectare, producing 11.04 million MT (copra equivalent). India, Indonesia, the Philippines, Thailand, Sri Lanka are the five major players contributing 78 per cent of the world area and production. India occupies the third place in terms of area, but the first place in terms of productivity. Coconut products form a direct food
source for a large section of people in the country. Consumption is in the form of tender coconut water, raw kernel and processed foods including coconut oil. The coconut is a benevolent tree, a nature’s gift to mankind, as it is a source of food, beverage, oilseed, fibres, timber, and health products and also associated with mystery and omen in religious and cultural life of the people. The coconut tree provides materials for household utensils and dwellings and therefore, is an important source of livelihood for the people of coconut growing states, especially in the coastal areas. The coconut tree, therefore, is eulogized, reverently as “Kalpavruksha” or tree of life by the sages.

The Liberalisation and Globalisation of trade have put pressure on the developing countries to become more and more competitive and sustainable. It has enormous implications for a country like India where 60 per cent of the population are still employed in agriculture. The opening up of the economy, lowering import tariffs, increased market access and free trade agreements have caused serious problems in many sectors of our agricultural economy. Changing consumer preferences and advocacies, emerging food safety and security concerns, evolving market network and systems of trade also have greater impact on the global market. While these are common to all agricultural crops, it is needless to emphasise the urgency and importance of a perennial crop like coconut in this perspective.

1.3 World Coconut Scenario

The coconut, having originated in South East Asia including Australasia appears to have dispersed eastwards along the Pacific and further in to America, towards the West. It moved to India and Madagascar over the calm tropical waters. Although, it was often considered as an ocean-dispersed nut due to its sustenance viability in sea water for over 100 days, sea travellers were also responsible for the worldwide introduction and propagation of coconut plantation. This is significant from the fact that Spaniards introduced it into West Indies and southern shores of the Caribbean Sea and the Portuguese introduced it to Bahia and other parts of Brazil. Polynesians sea-farmers further spread it to
different Islands of the Pacific. The Arabs disseminated it on the African coasts and maritime Tamils together with the Mariners of the Bengal coast distributed it into the lands of the Indian Ocean.\textsuperscript{11}

Coconut sector is an important contributor of the edible oil economy of India. Coconut is one of the ten most useful trees in the world, providing food for millions of people, especially in the tropics. Regardless of its origin, the coconut has spread across many of the tropics and coastal areas. India is one of the leading producers in the world and occupies third in the list of coconut producing countries, Indonesia and the Philippines being the first and the second respectively. India contributes about one fourth of the world production of coconuts.

1.4 Present Scenario of Agriculture in Kerala

The three most important crops in Kerala are paddy, coconut and rubber. Since they account for over two thirds of the cropped area in the state, they compete with one another for land. Coconut, though, second only to paddy in terms of cropped area, is cultivated by 82 per cent of the rural households as against 62 per cent in paddy and 49 per cent in the case of tapioca.\textsuperscript{12} Kerala's agricultural economy has undergone a structural transformation since the mid-seventies, as marked by switching over a large proportion of its traditional crop area, which was devoted to subsistence crops like rice and tapioca, to more remunerative crops like coconut and rubber.\textsuperscript{13}

The main feature of agriculture in Kerala is the existence of a series of small agricultural environments distinct from different kinds of mixed farming. Perennial crops contribute a major part in total agricultural output and more than 80 per cent of Kerala's agricultural commodities are dependent on domestic and international markets. Kerala's agricultural products have experienced a price crash of unprecedented proportions in the wake of trade Liberalisation in farm products. The brunt of this crisis has been borne by cultivators belonging to the small and marginal farmer category which constitutes a major segment of the rural workforce. Concurrent fluctuations in the prices of agricultural commodities
and the mixed cropping systems thus act as a cushion for absorbing the shock through crops subsidization. Unfortunately, however, the fall in prices now being experienced is all pervasive and as a result even these advantages which the Kerala’s farm front had enjoyed in the past have been disappointing. On the one hand, the Kerala economy is facing a severe crisis of food products, and on the other hand, the decline in income from cash crops due to Liberalisation measures of the Union Government and the decline in foreign income for the state have led to the reduction in the purchasing power of the people. This situation has led to the economic crisis of the state of Kerala and started eroding the much-hyped Kerala model of development.\textsuperscript{14}

\section*{1.5 Context of the Study}

Indian economy has been facing crisis in the farm sector and its worst face is the suicide of farmers in almost all parts of India. Though the agrarian crisis is not new to India, the large scale suicide of farmers in many parts of the country is a new phenomenon. Our farm sector had experienced severe agrarian crisis in the pre-Independence India due to the hostile and colonial policies of the British Government. But after Independence, the government of India started economic planning, fascinated by the USSR model of economic planning. Owing to the adverse effects of partition, the Indian economy was in a shambles. Five Year Plans were initiated as a strategy for economic development. The first Five Year Plan devoted much larger share of our resources to the agricultural sector.

But from the second Five Year Plan onwards, our priority and effort for economic development shifted from agrarian development to the development of large scale modern industries and many of these industries started with foreign financial and technological assistance. Low priority and less financial allocation to agricultural sector in the second Five Year Plan immediately had their serious impact in the middle of 1960s itself. There were some reasons such as drought, flood and war fought with China and Pakistan and the political instability caused low priority for the agrarian sector during the third Five Year Plan also. But the limbo in the farm sector led to some serious thoughts and the Government of
India started to implement the New Agricultural Strategy popularly called Green Revolution in the second half of the 1960s. This new policy helped India to increase the production of wheat in Punjab, Haryana and Western Uttar Pradesh and the production of rice in Andhra Pradesh and in some other parts. This new agrarian policy helped the country to attain self sufficiency to a large extent in food production and freed the country from the draconian and notorious food grains exporting law of the United States of America. But this strategy was not free from limitations and had its own bad effects on the farm sector.

The Green Revolution concentrated mainly on some wheat producing regions and it was not implemented uniformly across India. Secondly, emphasis was more on fine cereals and the production of coarse cereals was not given much importance. Even though the Government of India has made many efforts in the Five Year Plans to improve the performance of the farm sector, the larger section of our population living in rural areas didn’t benefit from it. But the U-turn in our economic policy in 1991 to some extent a paradoxical event in the recent economic history of India. The same political party tried to lead Indian economy along the path of socialism making another serious effort in the beginning of the 1990s to make Indian economy a market-led one. But it is ironical that both these efforts were made not based on the interest either of the people or on the diversified features and larger interests of its economy and polity.

Efforts in the 1950s to move along the socialist path was prompted by the USSR model and it took three decades for our rules to realise that we were on the wrong path. The second attempts to direct Indian economy along the market-led path was also due to internal fiscal crisis and crisis in the balance of payments (BOPs) and serious economic and political compulsions and also to some extent threats from the western multilateral lending agencies and the USA. Both these efforts didn’t help us to solve our serious economic problems like poverty, unemployment, inequality in the distribution of income and wealth and a lot of other social and economic problems. 15
The present study on the economics of coconut products is very pertinent, considering the importance of coconut production in terms of its contribution to Kerala’s SDP and providing livelihoods to lakhs of people directly and indirectly. The study makes an attempt to understand the economic importance of coconut products and the challenges the Indian coconut products are facing from similar coconut producing countries in the world. Stability in the prices of coconut products is necessary for the development of the crop as it involves large investment and long germination period. Forecasting the prices of coconut products may reduce the risk involved in the cultivation of coconut by supplying additional information about possible outcome.

1.6 Significance of the Study

The price fluctuations in coconut products severely influence the cultivation of coconut. During 1999-2001, there was a sharp decline in the prices of coconuts by 75 percentage. To make coconut cultivation remunerative it is essential to diversify. For diversification it is essential to understand the economics behind diversification. The prices should be attractive to farmers so that they continue to invest and undertake coconut farming for their prospective growth. For the product based industry the prices should be remunerative for its survival. Even for diversified coconut products price fluctuations due to international forces and substitutes are very important. In this context, it is essential to analyse the price fluctuations of coconut products so as to arrive at policy suggestions.

1.7 Research Design

1.7.1 Research Issues

1. How far the area, production and productivity of coconut changed during the pre and post-Liberalisation period.

2. How far the prices of coconut products fluctuated during the pre and post-Liberalisation period.
3. Whether market fluctuations in prices affect the export and import of coconut products.

4. Whether there is stability in the prices of coconut products in the future.

1.7.2 Objectives of the Study

1. To study the area, production and productivity of coconut in India with special reference to Kerala.

2. To study the effect of Liberalisation on the prices of coconut products in Kerala.

3. To study the trend in export and import of coconut products during the study period.

4. To forecast the prices of coconut products using Time Series Model.

1.7.3 Hypotheses of the Study

1. There is a significant price difference in coconut products during pre and post-Liberalisation periods.

2. Price variations among different market segments in Kerala are not significant.

1.7.4 Scope and Coverage of the Study

The present study based on coconut products is to understand the economic importance of coconut cultivation and the scope of coconut products. The coconut cultivation in India and major States in India for the period 1974-75 to 2007-'08 has been analyzed to understand the trend in area, production and productivity of coconuts. This is done with special reference to Kerala. In the case of Kerala, all the fourteen districts have been selected for making a detailed study. The study covers a period of 34 years-dividing it into pre and post-Liberalisation period, covering 17 years before and after 1991. First period
1974-75 to 1990-91 has been selected because it is the pre-Reform period and by analyzing the trend in the price and production of coconut products, we can understand the importance of the New Economic Policy of 1991.

The second period is from 1991-92 to 2007-08. This period was very crucial for agricultural commodity trade. This is to analyze the immediate impact of New Economic Policy and WTO agreements. The scope of the study is limited to only three markets-Kochi, Alappuzha and Kozhikode and three coconut products-coconut oil, copra and coconut oil cake. The present study has analyzed the area, production and productivity of coconut in India with special reference to Kerala, the trend in the prices of coconut products and the trend in export and import of coconut products during the study period and the issues associated with it. For forecasting the prices of coconut products such as coconut oil, copra and coconut oil cake, the study is restricted only to the Kochi market.

1.7.5 Data and Methodology

The importance of coconut products in India and Kerala, the challenges to it, its problems and reasons have been studied with secondary data. As this study attempts to analyze the performance of coconut products in Kerala in the context of New Economic Reforms, the year-wise data for the whole period from 1974-75 to 2007-2008 has been analyzed in detail. For forecasting the prices of coconut products, the average monthly prices of coconut oil, copra and coconut oil cake of Kochi market for the period from 1st January 1995 to 31st December 2010 have been taken.

The secondary data collected from different sources are mentioned below.
1.7.6 Sources of Secondary Data

Secondary data was mainly collected from Coconut Development Board, Ministry of Agriculture, Government of India, Kera Bhavan, Cochin. Other relevant data were collected from various government reports like Economic Reviews, Economic Surveys, Data published by the Directorate of Economics and Statistics, Centre for Monitoring Indian Economy, Agricultural Statistics and Various Reports of the Commission on Agricultural Costs and Prices.

1.8 Tools of Analysis

The study has used simple statistical techniques like Percentage, Ratio, Average, One-way ANOVA, Co-efficient of Variation and Trend Analysis to present and draw inference from the data produced.

1.8.1 Techniques for Data Analysis

The following are the techniques adopted for analysis of data.

1.8.2 Growth Rates and Coefficients

The exponential growth rate and annual average growth rate are commonly used techniques in studies like this. With this it is possible to compare the variability of two or more than two series. The growth rate of years is defined as ratio of the difference of the value of the current year and the previous year to the previous year expressed in percentage.

\[
\text{Growth rate} = \left( \frac{\text{Current year value} - \text{previous year value}}{\text{previous year value}} \right) \times 100
\]

Exponential growth rate is calculated based on the least square method. That is we fit the trend line \( y = ae^{bx} \) by method of least squares, then the exponential growth is taken as \( b \times 100 \).
1.8.3 Coefficient of Variation

The coefficient of variation (CV) is the most commonly used technique particularly in studies like this. This is another method to compare the variability of two or more than two series of their relative variation. The series for which the coefficient of variation is greater is said to be more variable or conversely less consistent, less uniform, less stable or less homogeneous. The formula for calculating correlation coefficient is

\[ C.V. = \frac{\text{Standard deviation} \times 100}{\text{Mean}} \]

1.8.4 Trend Analysis

Where there is a time series data which is increasing or decreasing over a period of time, it can be suitable to be fitted in semi-long trend, \( y=ab^x \) or linear trend \( y = ax+b \) whichever is appropriate. The usual method of least square is used to fit the trend. The ratios and percentages are calculated wherever it is appropriate.

1.8.5 Graphs

In order to compare the trend and tendency of the variables in two periods namely pre and post-Liberalisation, we plot the trend eliminated data. On the x-axis we represent the year, when the graphs are given separately. In the comparison graphs on the x-axis we represent the 17 points (from 1-17) indicating the 17 years before and after the Liberalisation period.

1.8.6 Time Series Model

To forecast the prices of coconut products, a Time Series Model based on Auto Regressive Integrated Moving Average Method (ARIMA) and Holt-Winters Exponential Smoothing Models are used. When the data are distributed with constant variance ARIMA model is generally used and when the data
exhibit both the trend and the seasonality, the Holt-Winters Exponential Smoothing Method is used.

1.8.7 Conceptual Framework

Concepts used in the Study

1. **Growth Rate:** The growth rate of years is defined as ratio of the difference of the value of the current year and the previous year to the previous year expressed in percentage.

2. **Seasonality:** Seasonality is defined to be the tendency of time-series data to exhibit a behavior that repeats itself every L period. The term season is used to represent the period of time before behavior begins to repeat itself. L is therefore the season length in periods.

3. **Seasonality Index:** Seasonality Index of a period indicates how much this period typically deviates from the annual average.

4. **First Order Stationary:** A time series is a first order stationary if expected value of X(t) remains same for all t. For example in economic time series, a process is first order stationary when we remove any kinds of trend by some mechanisms such as differencing.

5. **Second Order Stationary:** A time series is a second order stationary if it is first order stationary and covariance between X(t) and X(s) is function of length (t-s) only. Again, in economic time series, a process is second order stationary when we stabilize also its variance by some kind of transformations, such as taking square root.

6. **Exponential Smoothing:** Exponential smoothing is a procedure for continually revising a forecast in the light of more recent experience. It assigns exponentially decreasing weights as the observation gets older. In other words, recent observations are given relatively more weight in forecasting than the older observations.

7. **Market Access:** The market access basically means that various types of barriers to trade like quantitative restrictions, ban on imports, etc. have to be removed and need to be converted back into equivalent tariff.
1.9 Social Relevance of the Study

Considering the importance of coconut cultivation and its contribution to Indian agriculture with special reference to Kerala, the employment opportunities that the sector generates directly and indirectly, the manufacturing importance of coconut products, the challenges and opportunities that the coconut products provide to the livelihood of the people of Kerala and India in general in terms of trade and foreign exchange also have significant relevance to the social and economic life of Kerala.

The present study analyzes the issues associated with coconut cultivation, the fluctuating prices of coconut products such as coconut oil, copra and coconut oil cake. The New Economic Policy of 1991 and the related changes in government policy, India’s engagements with WTO and other regional free trade agreements have been raising serious challenges to the coconut products. The fluctuations in the prices of coconut products have been adversely affecting the economic interest and even threatening the coconut farmers’ livelihood.

So, in this context, it is highly imperative to formulate certain policy options by the government, which should be implemented so as to protect the coconut economy from the adverse effects of neo-liberal policies. This can save the coconut economy and the livelihood of millions of farmers in India to a certain extent. The elected governments should have that responsibility and it cannot escape from it.

1.10 Review of Literature

A comprehensive review of the existing studies on coconut cultivation has been attempted to throw light on the present status, strengths and weaknesses of the existing studies on the topic from the point of view of methodology as well as substance.

Piggott (1964) outlined the world pattern of copra production and trade and discussed the economics of running a plantation, the environmental
conditions and farming practices associated with scientifically based coconut agronomy. The study is also concerned with establishing new plantation, improving old ones and with the processing and marketing of copra and other coconut products. It also listed the diseases and pests of palms and gives advice on their control. The book is provided with a guide to further reading and a glossary.  

Thampan (1975) adopted a practical and essential approach- an economic development concept based on the realities of Asian culture and technology in his book “The Coconut Palm and its Products”. The book provides all the worthy aspects about the coconut palm and its products. It sets a new healthy trend by discussing and putting in proper perspective every aspect of the crop including the cultural, agronomic, industrial and economic. It also exhaustively deals with the factors of productivity increase which later assumed greater global importance. 

Thampan (1980) analysed the technological yield constraint on coconut cultivation in Kerala using data from secondary sources. Region-wise analysis showed that there was a decrease in production in Thiruvanathapuram district by 10 per cent against 45 per cent area increase and 9 per cent in production as against 56 per cent area increase in northern districts for the period from 1955-56 to 1978-79. The reason found by him for this is that the efforts taken by the state since 1955-56 for the expansion of area under the crops would have resulted in the cultivation of unsuitable land for coconut culture. 

Das (1985) observed that the first incentive to large-scale production of the coconut was the use of coconut for soap manufacturing. Another incentive was the use of coconut oil for margarine, as a result of which, vast areas of new coconut plantations were planted by the end of the 19th century. Data relating to area under coconut cultivation speaks of the vast increase in area from 3.2 million hectare in 1938 to 8.3 million hectares in 1980.
Davis, Sudasrip and Darwis (1985) highlighted the research activities conducted by the Indonesian scientists. It dealt with the history of coconut research in Indonesia, investigations on the physiology of coconut palms and on the food habits of the coconut crab. It also considered the coconut botany, breeding, agronomy, technology and agro economy. The study indicated that raising one or more co-operating crops at permissible density under coconut have been found to increase the overall income from the garden substantially and hence the concept of monoculturing the coconut has become obsolete.  

Thampan (1988) studied the price behaviour of coconut oil and groundnut oil of Kochi and Mumbai markets. The period of study was from 1964-65 to 1975-76. He found that the average annual prices of both the oils showed an increasing trend over the entire study period. He stated that the rate of price increase was steeper in coconut oil than in groundnut oil and coconut oil always enjoyed a price premium over groundnut oil during the period of analysis.  

Banzon, Gonzalez, Sonia and Priscilla (1990) provided general information on the value of the coconut as a leading food source in the Philippines. The study accepted the fact that the production of coconut into copra, copra cake and coconut oil does not result in the maximum utilization of the nutritional and economic benefits which can be derived from this agricultural commodity. They argued that expanded product development and improved coconut processing could lead to a greater commercialization of the crop. They held the view that the utilization of coconut kernel as a source of protein concentrates/isolates, in addition to edible oil, could greatly enhance the economic value of the coconut and the challenge of food technologists was to transform these proteins into a range of wholesome and nutritious food products.  

Thampan (1990) found that the coconut palm being a multi product crop, the small and marginal farmers who were involved in production, depend mainly on the palm for satisfying their domestic requirements such as food, fuel and
shelter. Among the coconut-based industries in India, coir manufacture, copra making, oil milling and distillery are important. The contribution of coconut to the national economy is significant. Coir and coir products constitute one of the major items of export every year.

He also stated that coconut had a special place in the social and cultural heritage of the people of India. In all States, for cultural, social and religious functions, copra, inflorescence, tender frond, etc., are used. In short coconut is inseparable from the life and traditions of the people of India.⁵³

Alan (1991) reviewed the important biological factors which influence coconut production. The study identified the means by which the necessary improvements can be realized in the world’s major coconut producing areas. It provided an important insight into the recent objectives and achievements of research and assured that those involved in coconut development would benefit from a greater awareness and understanding of the technical constraints and the means by which they can be most successfully overcome.⁵⁴

Narayana, Nair, Sivanandan, Shanta and Rao (1991) conducted a study on the coconut development in Kerala which deals with its production, consumption, price formation and technology of cultivation. It is also an ex-post evaluation of the credit schemes for the rejuvenation of the crop refinanced by the National Bank for Agriculture and Rural Development. As an ex-post evaluation, it is distinct from conventional studies. The study uses both secondary and primary sources of data. The ex-post evaluation is based on a survey carried out for the purpose during the year 1984-85 the reference period of which was 1983-84. Coconut is one crop amenable to various such combinations and the relative stagnancy in the palm yield over the last ten years or so may in fact be a result of the spreading of such combinations.⁵⁵

Jhanadevan (1993) analyzed the selected development programmes for promoting coconut production in Kerala and the attempts to analyse the awareness about and attitude of coconut growers towards coconut development
programmes undertaken in the state. It has made an attempt to understand the constraints as perceived by agricultural officers responsible for the implementation of coconut development programmes. This study has done an attempt to analyse the three selected coconut development programmes, viz. Area Expansion Programme, Programme for Providing Assistance for Irrigation facilities in coconut in coconut gardens and Integrated Farming Programme for the Coconut Small Holdings for Productivity Improvement, implemented by the Coconut Development Board. The findings of the study have provided adequate insight into the concept of the ongoing programmes which would be of help in the future formulation of projects and their implementation in the future.26

Thomas (1994) analysed the prices of coconut oil and other products in different markets in Kerala and found that the prices of coconut oil and other products are moving in close sympathy with each other. The study indicated that there was a long time equilibrium relationship between the prices of coconut oil and coconut, coconut oil and copra in different markets. The study revealed that the wholesale prices of coconut and copra in the state are controlled by the price of coconut oil in the Kochi market. The study also noticed that the price volatility in Kochi market was simultaneously felt in other periphery market too.27

Aravindakshan (1995) found that there was wide seasonality in the price behaviour of copra and coconut oil in India between 1988 and 1995. Prices of coconut and coconut products showed a declining trend from December-January to May-June and thereafter an increasing trend till November-December. He also stated that there was no appreciable increase in the price during the entire period of investigation while taking the inflationary effect of money into consideration.28

In the COCOTECH meeting (1995), 16 resource papers were presented covering the subjects of health and nutrition, research and productivity, processing and quality improvement, domestic marketing, international trade and country experiences. The meeting recommended the launching of a strong publicity in consuming countries on the beneficial effects of coconut in human
health and on the contributions of coconut products to the environment. The meeting felt the need for coconut producing countries to increase total supply of coconut products to both domestic and international markets.\textsuperscript{29}

Taufikkurahman, Joe and Zul (1995) studied the world production of coconut, exports and imports of coconut oil, copra meal, desiccated coconut and other products for the period between 1990 and 1994. The study revealed that during the last two decades, the combined imports of copra and coconut oil did not indicate any significant increase. The results showed that though wide a range of coconut products have been internationally traded, traditional products which include copra, coconut oil, copra meal, desiccated coconut, shell products and fibre product were still dominating the markets while trade in copra and coconut oil remained stagnant. There was significant expansion of trade in other products in the 1990’s. The study found that there was a noticeable trend in the diversification of coconut products and its market in those years.\textsuperscript{30}

Entrepreneur’s guide on Nata de Coco Production (1996) prepared by the Samiento Research and Development Corporation served as a quick guide to individuals (farmers, groups and companies) in Asia Pacific, who were planning to engage in nata-de coco-production. Special focus on the content was made on the Philippine situation not only as the originator of the technology but also on lessons learned from commercialization up to export of the commodity.\textsuperscript{31}

Thampan (1996) made an exhaustive treatise on coconut in the book “Coconut for Prosperity”. It deals with the environmental aspects of coconut farming and product utilisation. The different sessions of the book cover subjects like food and medical values of the coconut fruit, the economics of coconut farming, socio-cultural significance of coconut palm and its products, coconut research in the world and the international support the coconut industry was getting from various regional and international agencies. This book indeed covered the versatility of coconut palm and its place in the life and well-being of the people.\textsuperscript{32}
Ahamed Bavappa (1997) provided a useful compendium of authentic information on various aspects of coconut cultivation. The study revealed the success of Indian agriculture of transferring new technology to the fields. It provided information regarding the climate, soil, planting-material, preparation of land, transplanting, harvest, yield, coconut products and varieties. It was estimated that from a well maintained garden, an annual yield of 25,000 nuts per hectare can be obtained and in regions with a long spell of dry weather, there was a definite setback in the growth and yield of the coconut palm.

Haridoss and Chandran (1997) examined the price behaviour of coconut and coconut oil in Tamil Nadu and found that the period from January to June was a period of high yield for coconut and the yield was low during the months from July to September. The prices fell below the average during the months of plentiful yield. It was also found that the price indices for both coconut and coconut oil were the lowest during the month of February and the highest during the month of December.

Syed Kamaruddin (1997) presented several major aspects in the production technology of young tender coconuts. More than 25 locally popular varieties from 12 countries had been identified. The hedge-row planting system was helpful for it could facilitate the use of machinery in farm activities. Pre- and post-harvest technologies on the tender nuts were also outlined in the paper. The technique of producing egg coconuts was also explained. The study found that young tender coconut industry had very good prospects and was proven in Malaysia and Thailand. The study concluded that collaborative work among APCC countries in terms of R&D conservation, marketing and promotion helped in a big way in realising coconut potentiality.

Thampan (1997) studied the gains from organic farming and coconut based farming systems. The area, production and productivity of coconut in the different states of India during 1995-96 were taken into consideration. The study revealed that nature friendly farming practices have special significance in
safeguarding the health and nutrition of those who consume products and also for preventing environmental degradation. The study found that the coconut palm was amenable to organic agriculture and these gardens showed high productivity in the absence of inorganic inputs. The study suggested that the organic farming systems when developed on a wider scale would enhance profitability because such products enjoy consumer preference as health foods both in the domestic and external markets. The study concluded that a well organised educational campaign was needed to dispel the lingering doubts from the minds of consumers about the health aspects of coconut oil consumption.  

According to Nampoothiri and others (1998), the coconut palm was mainly a small holder's crop that was ecologically sound, offering a broad range of products and providing income and employment opportunities. More than 10 million families directly or indirectly depend upon it for their livelihood.

Coconut cultivation increases employment opportunities. High Density Multi Cropping System generates additional employment to the tone of 130 to 606 man days per hectare per year. Thus coconut cultivation offers a wide employment potential to family and hired labourers.

Singh (1998) highlighted that the importance of coconut can be gauged from the fact that it was grown in more than 80 countries of the world and in 17 states and three union territories in India with an area of 1.795 M. hectares and a production of 13,968 million nuts. Coconut contributes over ₹ 7000 crores annually to the GDP (Gross Domestic Product) of the country. In the commercial sector coconuts were mainly used for making ball copra and desiccated coconut in Karnataka, while in Tamil Nadu they were used for making milling copra and coconut oil. He stated that in the coastal tracts most of the people depend on coconut for their subsistence.

Markose (1999) stated that the unrestricted import of coconut products, other cheaper vegetable oils and the reduction in import duty were the results of the present Liberalisation policy. To face the stiff competition in the international
market the Indian coconut industry must be competitive. The study also indicated that the price variation of coconut product in the international market required reduction in the cost of production.

He also stated that Liberalisation policy resulted in unrestricted import of coconut products, other cheaper vegetable oils and also the reduction in import duty. Indian coconut industry must be competitive, both quality-wise and cost-wise to face stiff competition in the international market. 39

Balakrishnan Vaidyar and others (2002) have summarized the following medicinal uses of coconut.

1. Coconut cabbage: the young meristematic shoot in the heart of the crown is known as cabbage. It is good for 'vatha' and 'pitha'.
2. Coconut inflorescence: used for curing urinary complaints, back pain and headache.
3. Tender coconut: highly effective for dehydration due to cholera and dysentery.
5. Coconut water: recommended for curing impotency.
6. Coconut kernel: to increase body weight and also as an internal body cleaner.
7. Coconut milk: an ingredient of several ayurvedic preparations for skin and head diseases.
8. Oil: a variety of ayurvedic medicines are prepared.
9. Sweet toddy: it was effective for typhoid.
10. Jaggery: used for preparation of health improving tonics for women after child birth.40

Rathiha and Ghanadhas (2002) studied the strategies for coconut price stablilsation. The period of study was from 1984 to 1999. The study found that the factors responsible for the gloomy marketing situation prevailing in India were (1) Reduction in demand for coconut oil in the industrial sector especially in
soap industry, (2) Easy availability of other oils and fats especially imported palm oil at cheaper prices, (3) Decline in its use for cooking purpose mainly due to the apprehensions of its relation to coronary heart diseases and (4) the import polices of the government. As per the study, product diversification is the only solution for price stabilisation. The study concluded that there was ample scope for the export of coconut and its products and for strengthening co-operatives, restricting imports, future trading, etc. which will pave the way for protection industries.\(^41\)

Samarajeewa (2002) analysed the domestic demand for coconuts in Sri Lanka, using a single equation econometric model. The study found that the domestic coconut consumption accounts for 70 per cent of the total annual nut production in Sri Lanka. Being an essential commodity for household use, the coconuts form a stable domestic market outlet for producers as well. The results of the study revealed that the retail price of coconuts and per capita consumer income are significant variables that determine the quantity of coconut demand in Sri Lanka. The study also identified that there is a significant negative trend in per capita consumption of coconuts over time, indicating declining tastes and preferences by the consumer. The study found that the changes in consumer demand for coconuts to the changes in retail prices are less responsive as indicated by the lower price elasticity value of -0.11. The income elasticity of coconut demand is 0.38 and it is inelastic too.\(^42\)

Singh (2002) considered organic farming as a welcome approach for maintenance of soil health and thereby increasing production. The study revealed that sustainability in coconut farming can be achieved through increasing the farm level income, lowering the cost of production, developing value-added products, promoting farm level processing and finding new uses and extensive markets for coconut products. As per the study, the viable strategy to enhance on farm income was farm level processing and value addition. The study suggested that self-help groups of women can be formed in potential areas and they can discharge the marketing function of coconut products at household/community levels. The study concluded that India can also venture into product
diversification as being done by the technologically developed countries like Philippines, Sri Lanka and Indonesia.  

Singh and Subburaj (2002) conducted a study on the normal price trend of coconut oil in Tamil Nadu over a period of 12 months during 2001. The study indicated that the coconut prices recorded a fluctuating trend throughout the year. During the month of March and September, the prices were lowest and thereafter it increased till December. The prices were at the peak during the month of December. Such a trend coincided well with harvest pattern of coconut. It is also indicated that the farmers experienced seasonal variation in their income from coconut trees.

Singh, Manjunath, Hameed and Bhanu (2002) investigated the coconut based high density cropping system in Goa and the importance of coconut cultivation in Goa. The study states that mono cropping of coconut with poor management has resulted in poor economic returns for the coconut growers in the state. However, vast scope exists for intensification of cropping in coconut with compatible inter crops like pineapple, banana and black pepper under good management for improving the economic viability of coconut garden. Different types of farming systems exist in Goa based on coconut. Other than mono cropping of coconut, mixed/intercropping with fruit plants like jackfruit, mango, arecanut, black pepper, etc, is also prevalent in the state. The study makes an analysis of the production of coconut oil and other vegetable oil production in India. It also analyzed the pattern of demand and supply of coconut oil and the changing trend in the international market. As far as coconut oil is concerned, it has a long highly respected reputation in many cultures throughout the world not only as a valuable food but also as an effective medicine. It is used throughout the tropics in many of traditional systems of medicine. For example, in India it is an important ingredient in some of the ayurvedic medical formulations. 

Srinivasan (2002) reported that the productivity of the coconut crop was constrained by various stresses. Among them the root wilt disease was the major
problem in southern districts of Kerala and Tamil Nadu and also in Goa. The root wilt affected palms were also affected by leaf rot. Incidence of leaf rots increases with an increase in the incidence of root wilt.\textsuperscript{46}

Foretell Business Solution (Pvt.) Ltd. (2003) conducted a study on the strategies for positioning of coconut oil in the emerging scenario. The basic objectives of the study was to find out the trends in coconut oil prices, production, consumption and the factors influencing the demand for it and its new product market opportunities. The study area covered the four major producing states Karnataka, Tamil Nadu, Kerala and Andhra Pradesh. Stratified Random Sampling, Tabular Analysis, Factor Analysis, Regression Analysis, Co-efficient of Variation were the important methods used in the study. The results showed that there was an increase in the area under coconut but the production in the country had shown a negative growth rate of 0.3 per cent annually. The coconut production in the states of Karnataka, Kerala and Tamil Nadu shows a negative growth, except Andhra Pradesh. The study concluded that coconut oil was facing challenge and the industry was experiencing growth stagnation on both production and consumption front.\textsuperscript{47}

Shiva and others (2003) have listed the uses of coconut water. It was an essential component in various ayurvedic preparations for its vast medical properties.

1. Recommended for gastro-enteritis.
2. Substitute for saline glucose in intravenous infusion.
3. Very effective against dehydration due to cholera, dysentery and vomiting.
4. Increases blood circulation in the kidneys and causes diuresis.
5. Recommended for patients suffering from measles, mumps, chicken pox, etc.
6. Tender coconut leaves crushed in tender coconut water is given to jaundice patients.
7. Has ingredients capable of inducing rapid proliferation of plant tissues.
8. Used as bacterial and plant tissue culture medium.
9. Utilized for the development of various products such as bottled coconut water, coconut honey, coco sauce, and coconut lemonade and nata de coco.
10. Used as floral preservative for increasing the vase life of cut flowers and foliages as well as in flower arrangements.
11. Eco-friendly in nature, it is low cost alternative to chemical preservatives such as Silver Thiosulphate, Silver Nitrate, Nickel Chlonde, which are hazardous to the environment. It contains most of the constituents essential for floral preservatives. It can be stored under refrigeration to a certain extent, i.e. 2 to 3 weeks.\textsuperscript{48}

Singh (2003) analysed the price trend of coconut products in India and found that the prices of coconut products in India were moving in tune with the seasonal fluctuations in Kerala. With the expansion of coconut in other regions of the country especially in Tamil Nadu, the seasonal fluctuations in Kerala had little impact on price trend because the lean season of Kerala coincided with the peak season of other regions and vice versa.\textsuperscript{49}

Vasu and Thampan (2003) analyzed the importance as well as uniqueness of International Summit and the impact it made on the coconut community. The proceedings included mainly the constraints and prospects of coconut industry in the changing global scenario. It also discussed the research and development efforts at the national and international levels aimed at reducing poverty in the coconut sector and enhancing the productive capacity of the soil devoted to coconut farming.

The papers presented covered the health and nutritional aspects of coconut products as well as the recent findings on the medical potential of coconut kernel, water and oil. It considered with the opportunities for value addition in coconut through efficient processing at the on-farm and community
levels and the role of women played in the coconut sector. The studies also listed the opportunities for augmenting income and employment in the coconut sector through appropriate farming systems and product utilization.\(^{50}\)

Agustin (2004) remarked that coconut industry provided a significant contribution to the Philippine economy in terms of dollars it earns from exports. The industry, being export oriented, leaves only 23% of production for the local market. Leading export item is coconut oil which accounts for about 90% of the total export in copra equivalent. But coconut oil remained a price taker unlike soya bean oil and palm oil which dominate world trade.\(^{51}\)

Namasivayam and Richard (2004) attempted to estimate the trend in area, production and productivity of coconut in India for the period from 1977-78 to 2001-02. The analysis were done separately in three phases, 1977-78 to 1986-87 phase I, 1987-88 to 1996-97 phase II and 1997-98 to 2001-02 phase III. The trend in growth rate analysis revealed that the growth in area, production and productivity over the years were positive in the first two periods, while in the third period productivity was found to be negative. On the basis of fitted trend future area, production and productivity were predicted. The trend analysis for coconut production showed that India has made a significant contribution to coconut production. The study suggested that increased production could be achieved under the scientific management of coconut garden through better cultivation practices, increased application of plant nutrients, irrigation and pest control.\(^{52}\)

Narayana and Latha (2004) conducted a study to understand the nature of the marketing channels, marketing costs, margins, price spread and producers share in the consumers’ price of coconut in Central Kerala. The results indicated that about 51 per cent of the respondents sold coconuts in the non-husked form. 86 per cent traded it on-farm and only 14 per cent of the respondents sold it outside. The most common marketing channel identified was the Producer-Copra maker-Oil miller-Wholesaler-Consumer. The concept of concurrent margin is
employed to find out the marketing. Margin showed that the producer’s share in
consumers’ rupee was only 60.58 per cent implying a high price spread. Value
addition at the farm-level, however, may help the producers to secure a higher
proportion of the final product price and reduce the price spread.\textsuperscript{53}

Peiris, Fernando and Samarajeewa (2004) analysed the factors that
influenced the use of coconut oil by householders in Sri Lanka. The study
analysed the reasons using generalized linear model. The samples were derived
from urban, rural and estate sectors and also from different income groups. The
significant factors influencing the use of coconut oil were the type of oil used,
monthly income, quality and population sectors. It was found that the proportion
of coconut oil used was higher in lower income groups than in bigger income
groups. The study suggested that improving the quality and dispelling the
misconception among householders would give better prospects to coconut oil
industry. The rapid urbanisation also helped the increased use of edible oil.
Another method suggested in the study was to improve the use of coconut oil to
allay the fear of adulteration.\textsuperscript{54}

Srinivasan (2004) examined the impact of alternative price stabilization
policies for edible oils and oilseeds in India with the help of a multi market
equilibrium dynamic simulation model. The study revealed that with lowering of
the tariff protection on oil imports, not only did the domestic prices decrease, but
also there was a reduction in price variability. He argued that while greater
protection to the domestic processing sector increased domestic prices, it also
made them more unstable. Freeing up of import was found to stabilize domestic
prices, even though world prices were more variable than domestic prices.
Imposing tariff barriers prevented this from happening. Based on the study, a
fixed level of tariff even at a higher level was not useful in stabilizing oil prices.
A system of variable levies which adjust to international price and domestic
supply situation is what would be required. As the bound rates of tariff under
WTO are fixed quite high for all edible oils with the exception of soyabean oil,
there is enough room to adjust import duties for price stabilization purposes. The
maximum import tariff rate required to stabilize prices within a reasonable price band is as low as 25 per cent.\textsuperscript{55}

Carandang (2005) studied the Philippine Coconut Research and Development and its opportunities. Land utilization and production for the 1996 and 5 year average were taken into consideration. He found that Philippines ranked second in the production of coconuts in the world and one of the top ten principal exporters of coconut oil. He also found that in terms of land utilization and production, coconut is second only to paddy and sugar. He stressed that because of the desirable detergency and lathering quality, big companies were investing millions of dollars to mimic the properties of coconut oil. He identified some derivatives of coconut oil having anti-microbial, anti-viral, anti/protozoal and anti-fungal properties. He was of the opinion that the implementation of WTO would soon affect the domestic market of the Philippine economy.\textsuperscript{56}

In pursuance of the policy of Liberalisation of the Government (2005), there have been progressive changes in the import policy in respect of edible oils during the past few years. Edible oil, which was in the negative list of imports, was first decanalised partially in April 1994 with permission to import edible vegetable palmolein under Open General Licence (OGL) at 65 per cent duty. The basket of edible oils under OGL import was enlarged in March 1995 by bringing all edible oil (except coconut oil, palm kernel oil, RBD palm oil) under OGL import at 30 per cent duty. However, virtually, there has been no import of oil seeds largely because of the adoption of the safety measures in the case of the soyabean at the port and also due to quarantine restrictions.\textsuperscript{57}

Kumar and Jha (2005) analyzed the factors which have made impacts on the edible oil economy of the country, remarked that the impact of Liberalisation on India edible oil economy was phenomenal. The country was almost self-sufficient in edible oils during 1991-92 to 1994-95 when the sufficiency level was in the range of 95 to 98 per cent. However, gradually it declined to about 53 per cent in 2002-03. Almost for four out of 12 years, the country spent 50 per
cent of the total expenses on agricultural imports for the import of the edible oil. Based on the study, trade in oilseeds got completely deregulated within a short span of time with Liberalisation. They argued that the dramatic decrease in self-sufficiency was a clean indication that Globalisation has already made an impact with far reaching consequences in this sector. 

Mathew, Sebastian, Kumar and Swami (2005) rightly pointed out that the Indian coconut economy was subject to a situation of global competition even before the liberalisation era because coconut oil had to compete even then with other vegetable oils and fats in the international market due to the amiability of vegetable oils like palm oil, soyabean oil in the world market as the changed global trading has inadvertently affected the domestic prices.

Rathinam (2005) apprehends that the major threat and challenges to be faced by the Indian coconut industry consequent to trade Liberalisation would be import substitution with cheaper products of similar nature for domestic users, greater competition for export and improper labeling and packaging.

Arancon and Idroes (2006) overviewed the coconut production and trade performance of coconut oil and virgin coconut oil in 2006. The period of study was from 2001 to 2005. The study estimated that the world coconut production for 2006 was around 11.04 million copra equivalent, which was down by 5.83% over the production in 2005. This was due to the low production of coconut in Indonesia. It was also forecasted that the total coconut production of the country would be 14.06% to a level of 2.26 million MT in 2007. Coconut oil was the dominant product traded in the world market and the world export of this was 1.57 million MT of which the Philippines and Indonesia shared by 61%. The export share for the member country of APPC totalled 71.55%. European market was the major destination of the export of CNO with a market share of 40.8% of the total in 2006, followed by Asian market including Australia with 29%, the USA market with 21.3%. Other markets like African and South American
countries took the balance of 8.9%. The study also forecasted that the world export in 2007 would be similar to that of the 2006’s figure.\textsuperscript{61}

Rethinam (2006) analysed the overall effect of Tsunami on the global coconut oil production. The period of study was from 2000 to 2004. The study found that even though thousands of small holders lost their means of livelihoods, the impact on global coconut oil production has been surprisingly little. The use of virgin coconut oil in the pharmaceuticals, nutraceuticals and cosmeceutical was going up. The study also forecasted that the coconut oil production from 2005-2010 would follow the long-term trend and grow at a rate of 1.25% per year. Global consumption of lauric oils for high value applications in the edible sector and for oleo chemical consumption would continue to grow at the speed of 3.41% per year.\textsuperscript{62}

Herman (2007) studied the statistics of world production and market of coconut and its derived products of Asian and Pacific Coconut Community. The period of study was from 1955 to 2004. He found that the growth of coconut production in each APCC member country was negative, with an exception of Indonesia, Philippines and Somoa. The study recommended the establishment of net works or collaboration among the stakeholders of the coconut industries in the region to strengthen the bargaining power in getting better price of coconut products. The study concluded that APCC should strongly recommend to its member Governments to concentrate on initiatives in promoting free trade zones for coconut and in hastening trade facilitation measures within the region. It is also necessary to eliminate unwanted technical barriers, harmonize standards and conformance measures and simplify and harmonize customs procedures.\textsuperscript{63}

Minnie and Thomas (2007) analysed the recent fall in copra and coconut and coconut oil prices in India. Production estimate of copra, coconut oil and oil cake in India for the last ten years (1990-91 to 2005-'06) was taken into consideration. A comparative study on the price behavior of copra and coconut oil indicated a dismaying trend. The study also examined the important factors
responsible for the recent fall in prices of copra and coconut oil such as demand-supply imbalance, availability of cheaper vegetable oils, import of coconut oil and cake, adulteration and the recently introduced VAT.\textsuperscript{64}

Anithakumari (2008) conducted a study on cluster approach among coconut farmers, impact of adoption of integrated practices for root wilt affected area on income, yield and health of palms as well as improvement in intercropping and allied farm enterprise. The study found that the scaling up of cluster model by various extension agencies resulted in improvement of coconut yield by 90-100\% and intercropped area by 2-4 times. The self income generating activities among the farmers were vermicomposting/coconut basin management with green mature crops, crop diversification, backyard poultry by the women farmers and farm level coconut value addition among women self help groups.\textsuperscript{65}

A study by Magat (2008) on the coconut productivity and production potential in coastal areas of the Philippines aimed at providing a substantial understanding of the nature, strengths, opportunities and technical constraints to be overcome in the coastal lands in the country for coconut production. He introduced a simple and practical classification of coconut lands (areas) into four distinct categories based on the landform namely Coastal flat areas, Coastal upland areas, Inland flat areas and Inland upland areas.

The study found that in recent years, coastal land had an average annual productivity of 55 nuts /tree or 5.500/ha (range:49.7-66.5 nuts), similar to inland areas of 57 nuts/tree, but in terms of copra, coastal lands averaged 13.85/tree (range:11.65-17.41 kg copra/tree). Translated in terms of annual copra/ha.1.38t, it is higher by about 100 kg/ha than inland areas. This 0.10t copra/ha, difference was mainly due to better chloride nutrition of coastal coconuts compared to inland coconuts where natural chloride levels in soils was usually below adequacy levels.\textsuperscript{66}
Mrs. Minnie Mathew (2008) stated that India was one of the leading coconut producing countries in the world with an annual production of 15.84 billion nuts from an area of 1.94 million ha. For the first time in the country, Government of India announced Minimum Support Price for Dehusked Coconut @₹988 per quintal. The year 2008 was favourable for Indian Coconut farmers. The farmers throughout the country received better prices. VAT was removed on coconut, copra and coconut oil in important states. Central excise duty was removed on processed and packaged tender coconut water.  

Palaniswami, Dhanapal, Upadhyay, Manojkumar and Samsudeen (2008) recommended that the coconut yield can be predicted to a higher degree of accuracy by using neural networks and fuzzy membership functions because non-linear relationship between independent (climatic and irregular bearing habit) and dependent (nut yield) variables was mapped. The studies have established that previous 36 months of prevailing weather data influences the coconut yield. By using this approach, we can stimulate the impact of different factors (climate, soil and water conservation practices) on coconut yield. However, the model developed has to be validated.

Pathiraja, Fernando and Jayasendera (2008) analysed the economic viability of virgin coconut oil enterprises in Sri Lanka. The study found that the virgin coconut oil provided the highest net return per 1000 coconuts utilized, compared to the other traditional coconut kernel products. Sensitivity analysis suggested that the crucial factor that determined the economic viability of this enterprise is world market. Virgin coconut oil price and the sensitivity of virgin coconut oil production for the nut price were very low. The study concluded with the need for encouraging the virgin coconut oil production in Sri Lanka, given the longer brighter outlook of the global virgin coconut oil industry.

Shyijumon and Michel Raj (2008) studied the crisis in the coconut sector in Kerala in the context of economic Liberalisation and related free trade agreements of India with some trade blocks. The study has analysed the trends in
the share of Kerala in all India production and area of coconut. The study states
that there was a decline of about 41 per cent in prices and it badly affected the
coconut economy of Kerala. This fluctuating trend continued and the prices
increased by 107 per cent to ₹ 582.73 during the period 1991-92 to 2004-05.
Shift in consumer preference for other edible oils has squeezed the demand for
coconut oil for edible purposes in the state where coconut oil was traditionally
used in the kitchen. The major shift started when coconut oil prices shot up to
₹ 65-75 per kg in 1995-96, at a time when palm oil was available at ₹ 20-25 kg.
This price difference compelled consumers to switch to palm oil.70

Babu, Jaisal, Satheesh and Laly (2009) have assessed the price behaviour
in coconut and its derivatives in India. Remunerative and stable price for any
agricultural produce helps in increasing the production of that commodity. The
coconut-based industry in India revolves around the price of coconut oil, which is
influenced by the price and overall availability of other vegetable oils. It is
against this background that the study aimed at segregating the secular trend,
seasonal, cyclical and irregular components in the price of coconut and major
coconut products like copra and coconut oil in India using the classical time
series analysis. The study is based on month-wise price data for the period from
1976-77 to 2004-2005. The prices showed an increasing secular trend. The
domestic price of copra and coconut oil was found to be higher than the
international price. It was also found that the domestic markets were well
integrated among themselves and with the international market. There were
marked seasonal variations in the prices of coconut and its products, with coconut
prices remaining low during the months of peak production in March to April;
and high when production was low during July to August. Price cycles of three to
four years were observed for all the considered products. Widespread irregular
movements were found to contribute to higher price fluctuations.71

Durgamani, Jayalakshmi and Sunathy (2009) stated that coconut oil
works wonders as a moisturizer for all skin types. Coconut oil has been proved to
stimulate our metabolism, improve thyroid function and escalate energy levels, all of which help decrease our unwanted fat, while increasing muscle.  

Mathew and Thomas (2009) with recent data attempted to analyze the present dynamism of coconut cultivation in Kerala. Coconut cultivation and industry plays a vital role in the sustainability of the rural economy of many states in the country in general and the economy of Kerala in particular. The agrarian distress on account of global warming, opening of the domestic market for global players for market exploitation, acute shortage of labour inputs and the high cost of production supplemented by monthly and annual nature of price fluctuations are the major factors causing considerable damage to these sectors. The sudden price crash at the time of peak production coupled with the surge in cheap import substitutes often jeopardizes the coconut market in the country. The study mentions that to boost farm investment, capital formation and to enhance the gross income and productivity the Coconut Development Board adopted a new strategy of consolidating the fragmented and scattered individual holdings. The consolidation of holdings to bring in a scale of economy has paved the way for a thriving agriculture in a coconut based farming system. The intervention of the Coconut Development Board with technology disseminations and financial support has paid rich dividends.

Susan and Flordeliza (2009) examined the market integration and efficiency for Philippine copra trading. The Sim’s test on the seasonal ARIMA pre-filtered copra mill gate price series was used to determine the casual relationships among ten regions. Though the study revealed an improvement in pricing efficiency in the mill copra, inefficiencies in price formation were also evident. The study recommended that there should be an increase in coconut production, productivity and demand creation, increase investment to improve market infrastructure and facilities for improving the spatial integration and efficiency of copra in the Philippines.
Swapna and Thomas (2009) in their study on the impact assessment of cluster approach in integrated coconut management mentioned that coconut was essentially an oilseed crop providing all amenities for human life, which include food, energetic beverage, medicine, fibre, wood and a variety of raw material for the production of an array of wares of commercial importance. Even though India occupies the third place in coconut production in the global scenario, the coconut economy has suffered from many constraints. More than 90 per cent of the five million holdings in the country are less than one hectare in size.

The study was undertaken in Alappuzha district of Kerala as the cluster programme was implemented by Coconut Development Board for the first time in 2005-06 in the three panchayats in the district. Simple random sampling technique was adopted for the selection of respondent farmers from the study areas. The incidence of pests and diseases was another pernicious problem affecting the development of coconut sector in the study area. The study concluded that coconut being one among the important commercial crops linked with the livelihood of millions of the people in the country, the success of programmes like cluster approach to integrated coconut management has a direct bearing on a large number of farmers engaged in coconut management. It could make a positive impact on cropping intensity, improving crop productivity and enhancing farm income.75

Proceedings of COCOTECH meeting (2010) contain 20 research papers which were presented by different coconut experts in specific fields. The presentations were grouped into different sessions covering policies, development interactions and marketing promotion program for sustainable and competitive industry, product research and development updates on coconut varietal improvement, conservation and replacing, coconut processing value addition and product diversification.

The meeting recommended that coconut sector be included in the national priority agenda: Greater investment, budget allocations by national governments
and the private sector be pursued. It was recommended that the National Coconut Replanting and Rehabilitation Programmes must be given priority and financially supported by national governments. It held the view that the national governments in APPC member countries should encourage joint ventures by foreign and national stakeholders with appropriate tax incentives and regulations.76

Martin Patrick (2010) suggested that with health awareness growing among consumers and state governments banning pesticide residues in bottled drinks, a healthy and refreshing natural drink like tender coconut water has greater potential and scope in the country as well as overseas. Adequate means should be taken by the government and agencies to promote the consumption of tender coconut water. The tender coconut water market has become dynamic in recent years especially after 2000.

A sample of 7 districts of Kerala and an interviewing of 1026 respondents constituted by sellers, suppliers, farmers and consumers were taken for the study. The major findings of the study stated that the sellers are largely composed of middle aged persons as their average age was worked out as 42-50 years. The total number of outlets remains the same, but all of them do not function for the whole year at a particular location. Kerala accounts for sales up to 95-96 percentage and 3.3 percentage from Tamil Nadu and 1.1 percentage from other neighbouring states. The study reported that the simple system of value added products of tender coconuts has to be developed and propagated.77

Singh (2010) held the view that understanding of dynamics and co-kinetics of coconut research and development was essential to prepare for the future challenges, as it influences the socio-economic prosperity of small and marginal farmers. Diversification to horticulture through technology, investment and enabling environment has paid dividends in terms of production, profitability, availability and export.78
Rajmohan (2011) suggested that coconut mission with community approach was the most suitable mission to bring about a radical change in tribal economy. This was because of the reason that the tribal groups possess greater sense of cohesion and homogeneity. He stated that the test of survival was that all the hands should be kept fully occupied in gainful employment and the fruits should be returned to the toiler.\footnote{149}

Most of the above studies concentrated much on the area, production and productivity trends of coconuts and how to increase its productivity. Namasivayam and Richard (2004) analysed the trend in area, production and productivity for the period from 1971-78 to 2001-02 using the trend analysis. The major problem relates to the widespread infestation of mite which was also highlighted in some of the studies. The fascinating uses of coconut were also dealt with the above studies. Singh and Subburaj (2002) conducted a study on the normal price trend of coconut oil in Tamil Nadu over a period of 12 months during 2001.

The price mechanism assists in allocating commodities to different uses, to achieve efficiency in the production and distribution. In the light of this, it would be necessary to study the various aspects of the prices of coconut products. The real challenge of our agricultural economy is to enhance the capabilities of this sector to meet the challenges posed by trade liberalisation and convert the weakness into opportunities for the entire growth and increasing the farm income. Remunerative and stable price for any agricultural produce helps in increasing the production of that commodity and this study is to bridge the gap showing how much price fluctuations influence farmers.

1.11 Research Gap

In the earlier studies conducted, only a few studies have made a comprehensive and systematic approach to the problems faced by the Indian coconut industry. Many of the studies has analysed the area, production and productivity trends of coconut. The reviewed studies also highlighted the varied
uses of coconut products and the major thrust area was to find out how to attain gainful employment in this sector. But the present study made an attempt to analyse the price fluctuations during the pre and post-Liberalisation periods.

The present study is significant especially in Kerala, a state more exposed to foreign trade and international economic environment. In order to study the impacts of changing trade policy, economic environment and India’s intensive and deep engagement with regional trade blocks on perennial crops in India have very relevant academic and social importance. As Kerala is a leading producer of many cash crops like rubber, tea, coffee, pepper and perennial crops like coconut, the present study has limited the scope of study only to coconut products.

1.12 Chapter Scheme

The study is divided into seven chapters. The contents of each chapter are explained as follows:

Chapter one starts with the introduction, research issues, objectives of the study, hypotheses, data sources and methodology, importance of the study, chapter scheme, conceptual framework and social relevance of the study. Review of earlier studies and limitations of the study are also presented in the first chapter.

Chapter two gives an overview of coconut and the important coconut products.

Chapter three explains the area, production and productivity of coconut in India with special reference to Kerala.

Fourth chapter deals with the analysis of the prices of coconut products such as copra, coconut oil and coconut oil cake. The price level of three markets (Kochi, Alappuzha and Kozhikode) has been presented and analyzed during pre and post-Liberalisation period.
Fifth chapter presents the foreign trade of coconut products during the study period. Chapter Six uses the average monthly prices of coconut products of the Kochi market from 1\textsuperscript{st} January 1995 to 31\textsuperscript{st} December 2010 and forecasts the future prices of coconut products.

Seventh chapter concludes the study and makes some policy suggestions.

1.13 Limitations of the Study

The study ‘Economics of Coconut Products-An Analytical Study’ has been conducted based on secondary data. All the limitations and drawbacks of a study while using secondary data can be seen in this study also.

The study has selected the period of analysis only from 1974-75 to 2007-08. The impact of global warming and climate changes are other factors which have led to changes especially in production and productivity. This study has not made any attempt to understand their impact on the study.

Only three coconut products such as copra, coconut oil and coconut oil cake have been considered for the purpose of study.

The study is limited to three markets, viz. Kochi, Alappuzha and Kozhikode. In two or three markets also in India there is trading in coconut products. But that has not been considered.

The nature of marketing channels, price spread and the coconut cultivators share in the consumer price of coconut are not explained in the thesis.

Cost of cultivation is an important factor which determine the acreage response but this aspect is not given due importance in the study because the study focuses on price variation.
Notes and References:


6. Ibid.


10. Food and Agricultural Organisation (2009), UNO.


Rathinam, P (2005), Coconut: Steps for Yield Increase, The Hindu Survey of Indian Agriculture, (ed), N.Ram, Kasthuri and Sons Ltd, Chennai, India.


“New Technological Developments for a Sustainable and Competitive Coconut Industry” (2010), Proceedings of the XLIV COCOTECH Meeting 5-9 July, Samui Islands, Thailand, Published by APPC.

