

भारत में नारियल का उत्पादन एवं विपणन PRODUCTION AND MARKETING OF COCONUT IN INDIA

KALPAVRIKSHA

TREE OF HEAVEN

TREE OF ABUNDANCE

TREE OF LIFE

KING OF PALMS

NATURES SUPER MARKET

GODS GIFT TO MANKIND



भारत सरकार
कृषि मंत्रालय
कृषि और सहकारिता विभाग
विपणन एवं निरीक्षण निदेशालय
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BRANCH HEAD OFFICE
NAGPUR

2008

MRPC-86

*“Coconut is the king of vegetables with its sap,
Fruits, leaves, stem, root and all parts to feed, appease,
Shelter, cure and carry mankind”*

Joao Maria de Silva (LISBON)

PREFACE

The Directorate of Marketing and Inspection made reverend effort by publishing first report on Marketing of Coconut and Coconut Products in India, in the year 1943, to ascertain the role of coconut and its products, played in the agricultural economy of the country. Since then the production and marketing of coconut in India witnessed a significant development with regard to domestic production, consumption and industrial utilization of coconut and coconut products. Subsequently, the first report was revised and updated in the year 1962 to make appraisal of changes that had occurred in the plantation crop pattern, development of coconut trade and industries in the country. Subsequently, abundant research and development activities taken up by the Government and non-governmental agencies have not only resulted in increased production and productivity of coconut, but also made the beginning of development and diversification of coconut products and by-products for better marketability of coconut.

The coconut is a benevolent tree, a nature's gift to mankind, as it is a source of food, beverage, oilseed, fibres, timber, health products and also associated with mystery and omen in the life of people. The coconut tree provides clothing utensils and dwellings, therefore, is an important source of earning livelihood to 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 people.

The coconut crop is grown in 12.5 million hectares of land which constituted about 0.7 per cent of net crop area of the world. The crop is grown in the coastal lowlands of continental South Asia and spread along the Indian and Pacific Ocean, the cultivation is mostly done by small and marginal farmers. According to FAO statistics 2007, about 57.9 billion nuts were produced, which was equivalent to 7.3 metric tonnes of oil. The coconut oil ranks sixth among the eight major vegetable oils of the world. India contributes about 15.46 per cent in area and 21 per cent in terms of production of coconut in the world. The coconut crop is grown in eighteen States and three Union Territories covering an area of 1.935 million hectares of land, with a production of 12,833 million nuts in the country. The major coconut crop acreage is concentrated on the West Coast region of the country comprising the states of Kerala, Karnataka and Maharashtra, followed by East Coast of Tamil Nadu, Andhra Pradesh, Orissa and Pondicherry. The coconut cultivation areas also traditionally located in the coastal region of Gujarat, Goa, West Bengal, Islands of Andaman & Nicobar and Lakshadweep. About 90 per cent of the area of coconut cultivation and equally the same per cent of production of coconut are from the four Southern states, viz. Kerala, Karnataka, Tamil Nadu and Andhra Pradesh. Kerala is considered as the land of coconut and holds the key for the development of coconut production and marketing in the country.

In the present scenario the trend in processing of coconut products is slowly setting in the country, but the domestic market is not ready to lift the coconut in product form. Moreover, the coconut processing industries have to compete with the international market players in the world

market. Consequent to the globalization of Indian economy, the domestic coconut market economy has also been pushed towards a situation of competition, where coconut oil had to compete with the other low price vegetable oil and fats in the international market. In spite of the changes in international and domestic market, the price of coconut oil has been steadily increasing since 2002, and reached to record level of Rs.7224 per quintal at Kochi market, the price of milling copra in Alleppy market was also recorded at the premium price of Rs.4893 per quintals and the price of ball copra was at Rs.7500 per quintal in Tiptur market in the month of December, 2004. This favourable market behavior appeared to have been due to culmination of concerted efforts of the implementing agencies, developmental policy of the Government to provide minimum support price to copra and coconut oil and the future trade.

Since, the production and marketing scenario of coconut in the country has witnessed a phenomenal development, particularly in the field of production such as development of improved high yielding dwarf varieties of crossbred coconut palm, traditional, non-traditional, commercial and industrial coconut product, it was decided to study the current status of developments that have taken place on production and marketing front of coconut and its products in the country. Therefore, a fresh survey on production and marketing of coconut and coconut product in India was undertaken. This report attempt to study the present scenario of coconut industry and the problems faced by the producers and traders involved in the marketing process of coconut and to focus on the inadequacies prevailing in the marketing system of coconut and coconut product in the country. The finding of the study may benefit producers, traders, consumers and other developmental agencies involved in formulating better strategy for development and transformation into a meaningful and rational marketing system for coconut and coconut product in the country.

The completion of the report has been possible due to whole hearted cooperation of the field officers of the Directorate, Coconut Development Board, Kochi, State Governments and Private agencies engaged in production of marketing of coconut and coconut products. The field survey and drafting of the report was carried out by Dr.R.V.Kothe, Senior Marketing Officer and Dr.R.R.Karpate, Marketing Officer under the guidance of Late Shri H.P.Singh, the then Jt.Agricultural Marketing Adviser and the report was finally completed under the guidance and supervision of Shri Har Prasad & Dr J. Shanmugam, Jt. Agricultural Marketing Adviser, Branch Head Office, Nagpur

The Government of India should not be regarded as assuming responsibility for any of the statements contained in this report.

Faridabad

Dated :02nd February 2009

Sd/-

Agricultural Marketing Adviser
to the Government of India

PRODUCTION AND MARKETING OF COCONUT IN INDIA

CONTENTS

	<u>PAGE NO.</u>
1. INTRODUCTION	1 - 3
2. WORLD COCONUT SCENARIO	4 - 8
3. COCONUT SCENARIO IN INDIAN PERSPECTIVE: SUPPLY AND DEMAND	9 - 36
4. COCONUT SITUATION IN TRADITIONAL AND NON –TRADITIONAL COCONUT PRODUCING STATES AND UNION TERRITORIES	37 - 55
5. MARKETING PRACTICES	56 - 76
6. PRICES	77 - 101
7. COCONUT PRODUCT / BY PRODUCT: UTILIZATION AND DIVERSIFICATION	102 - 111
8. STATUS OF FURTHER PROCESSED, VALUE ADDED COCONUT PRODUCTS	112 - 113
9. SUMMARY AND CONCLUSION	114 - 119
10. RECOMMENDATIONS	120 - 122
ANNEXURES	
TABLES	
PLATES	
FIGURES	
REFERENCES	

LIST OF ANNEXURES

Annexure – I	–	WORLD AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT (FAO 2004)
Annexure – II	–	AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN APCC COUNTRIES
Annexure – III A, B, C	–	AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN INDIA (GROWTH RATE)
Annexure – IV A, B	–	STATE-WISE AREA AND PRODUCTION OF COCONUT IN INDIA
Annexure – V	–	ARRIVALS OF TENDER AND MATURED COCONUT IN DELHI MARKET
Annexure – VI A	–	COCONUT GRADING AND MARKING RULES
Annexure – VI B	–	VEGETABLE OILS GRADING AND MARKING RULES
Annexure – VI C	–	VEGETABLE OIL CAKES (EXPRESSED OR SOLVENT EXTRACTED) GRADING AND MARKING RULES
Annexure – VII A & B	–	SCENARIO OF COCONUT MARKETING IN INDIA
Annexure – VIII	–	MONTHLY AVERAGE PRICE OF COCONUT AT ARSIKERE MARKET
Annexure – IX	–	MONTHLY AVERAGE PRICE OF COCONUT AT KOZHIKODE MARKET
Annexure – X	–	MONTHLY AVERAGE PRICES OF COCONUT AT KANGAYAM MARKET
Annexure – XI	–	MONTHLY AVERAGE PRICES OF COCONUT AT ALAPPUZHA MARKET
Annexure – XII	–	MONTHLY AVERAGE PRICES OF COCONUT AT KOCHI MARKET
Annexure – XIII	–	MONTHLY WHOLESALE PRICE INDEX
Annexure – XIV	–	MONTHLY AVERAGE WHOLESALE PRICES OF UN-HUSKED COCONUT IN INDIA
Annexure – XV	–	MONTHLY AVERAGE WHOLESALE PRICES OF SEMI-HUSKED COCONUT IN INDIA
Annexure – XVI	–	MONTHLY AVERAGE WHOLESALE PRICES OF HUSKED COCONUT IN INDIA
Annexure – XVII	–	MONTHLY WHOLESALE PRICES OF HUSKED AND UN HUSKED IN SELECTED MARKETS
Annexure – XVIII	–	MONTHLY AVERAGE PRICE OF COCONUT (WITH HUSK) AT THIRUVANANTHAPURAM MARKET
Appendix – XIX	–	MONTHLY AVERAGE PRICE OF COCONUT (WITH HUSK) AT QUILON MARKET

Appendix – XX	–	MONTHLY AVERAGE PRICE OF COCONUT (WITH OUT HUSK) AT ALAPPUZHA MARKET
Annexure – XXI	–	AVERAGE MONTHLY WHOLESALE PRICES OF DRY AND TENDER COCONUT IN SELECTED MARKETS DURING THE YEAR 2002-03
Annexure – XXII	–	SEASONAL INDICES OF COCONUT PRICES AT SELECTED CENTERS (QUINQUENNIAL AVERAGE)
Annexure – XXIII	–	MONTHLY AVERAGE PRICE OF COCONUT AT ARSIKKARE MARKET
Annexure – XXIV	–	MONTHLY AVERAGE PRICE OF COCONUT AT KOZHIKODE MARKET
Annexure – XXV	–	MONTHLY AVERAGE PRICES OF COCONUT AT KANGAYAM MARKET
Annexure – XXVI	–	AVERAGE MONTHLY WHOLESALE AND RETAIL PRICES OF TENDER COCONUT IN SELECTED MARKETS DURING 2002-03
Annexure – XXVII	–	YEARLY WHOLESALE PRICE INDEX OF COCONUT, COCONUT OIL AND COPRA
Annexure – XXVIII	–	MONTHLY AVERAGE PRICE OF COPRA IN INTERNATIONAL MARKET
Annexure – XXIX	–	DOMESTIC PRICES OF COPRA IN JAVA- INDONESIA
Annexure – XXX	–	DOMESTIC PRICES OF COCONUT OIL IN PHILIPPINES
Annexure – XXXI	–	DOMESTIC PRICES OF COPRA IN SRILANKA
Annexure – XXXII	–	DOMESTIC PRICES OF COPRA IN INDIA
Annexure – XXXIII	–	MONTHLY AVERAGE PRICE OF MILLING COPRA AT KOZHIKODE MARKET FOR THE LAST TEN YEARS
Annexure – XXXIV	–	MONTHLY AVERAGE PRICE OF MILLING COPRA AT KOCHI MARKET
Annexure – XXXV	–	MONTHLY AVERAGE PRICE OF MILLING COPRA AT ALLEPPEY MARKET
Annexure – XXXVI	–	MONTHLY AVERAGE PRICE OF MILLING COPRA AT KANGHYAM MARKET
Annexure – XXXVII	–	MONTHLY AVERAGE PRICE OF MILLING COPRA AT MANGLORE MARKET
Annexure – XXXVIII	–	MONTHLY AVERAGE PRICE OF MILLING COPRA AT ALAPUZZHA MARKET
Annexure – XXXIX	–	MONTHLY AVERAGE PRICE OF BALL COPRA AT KOZHIKODE MARKET
Annexure – XL	–	MONTHLY AVERAGE PRICE OF BALL COPRA AT TIPTUR MARKET
Annexure – XLI	–	MONTHLY AVERAGE PRICE OF BALL COPRA AT ARISEKERE MARKET

Annexure – XLII	–	MONTHLY AVERAGE PRICE OF EDIBLE GRADE COPRA (DILPASS GRADE) AT KOZHIKODE MARKET
Annexure – XLIII	–	MONTHLY AVERAGE PRICE OF EDIBLE GRADE COPRA (RAJPUR GRADE) AT KOZHIKODE MARKET
Annexure – XLIV	–	SEASONAL INDICES OF COPRA PRICES AT KOZHIKODE, KOCHI, ALLEPPEY, KANGHYAM, MANGLORE AND ALAPUZHA MARKETS (QUINQUENNIAL AVERAGE)
Annexure – XLV	–	MONTHLY WHOLESALE PRICE INDEX OF COPRA
Annexure – XLVI	–	INTERNATIONAL VEGETABLE OIL PRICES
Annexure – XLVII	–	INTERNATIONAL PRICE OF COCONUT OIL
Annexure –XLVIII	–	INTERNATIONAL PRICE OF SELECTED VEGETABLE OILS
Annexure –XLIX	–	DOMESTIC PRICES OF COCONUT OIL IN INDIA
Annexure – L	–	MONTHLY AVERAGE PRICE OF COCONUT OIL AT KOCHI MARKET
Annexure – LI	–	MONTHLY AVERAGE PRICE OF COCONUT OIL AT ALEPPEY MARKET
Annexure- LII	–	MONTHLY AVERAGE PRICE OF COCONUT OIL AT KOZHIKODE MARKET
Annexure- LIII	–	MONTHLY AVERAGE PRICE OF COCONUT OIL AT KANGAYAM MARKET
Annexure- LIV	–	MONTHLY WHOLESALE PRICE INDEX OF COCONUT OIL
Annexure – LV	–	YEARLY WHOLESALE PRICE INDEX OF COCONUT OIL
Annexure – LVI	–	SEASONAL INDICES OF COCONUT OIL PRICES AT SELECTED CENTRES
Annexure- LVII	–	SEASONAL VARIATIONS OF COCONUT OIL PRICES
Annexure – LVIII	–	INTERNATIONAL: MONTHLY PRICES OF COPRA MEAL
Annexure – LIX	–	AVERAGE MONTHLY WHOLESALE PRICE OF COCONUT OIL CAKE
Annexure – LX	–	MONTHLY AVERAGE PRICE OF COCONUT OIL CAKE AT KOCHI MARKET
Annexure – LXI	–	MONTHLY AVERAGE PRICE OF COCONUT OIL CAKE AT ALAPPUZHA MARKET
Annexure – LXII	–	MONTHLY AVERAGE PRICE OF COCONUT OIL CAKE AT KOZHIKODE MARKET
Annexure – LXIII	–	SEASONAL INDICES OF COCONUT OIL CAKE PRICES AT SELECTED CENTRES
Annexure – LXIV	–	AVERAGE PRICE SPREAD OF COCONUT TRADING IN ORISSA
Annexure – LXV	–	COCONUT YIELD FOR ANNUM IN INDIA
Annexure – LXVI	–	STATE LEVEL INFORMATION (CULTIVATION)

- Annexure – LXVII – DIFFERENCE BETWEEN ANNUAL AVERAGE WHOLESALE PRICES
AND MINIMUM SUPPORT PRICES OF MILLING COPRA AND BALL
COPRA
- Annexure – LXVIII – BALANCE OF PAYMENT IN INDIAN EXPORT AND IMPORT OF
COCONUT PRODUCTS
- Annexure – LXIX – NUTRITION CONTENT OF TENDER COCONUT

LIST OF TABLES

1. AREA, PRODUCTION AND YIELD OF COCONUT IN MAJOR COCONUT GROWING COUNTRIES IN THE WORLD.
2. WORLD SCENARIO : AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT
3. WORLD : PRODUCTION OF COPRA AND COCONUT OIL
4. STATE-WISE AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN INDIA.
5. AREA UNDER COCONUT CULTIVATION IN INDIA
6. COCONUT PRODUCTION IN INDIA
7. SALIENT FEATURES OF RELEASED INDIAN COCONUT HYBRIDS.
8. HIGH DENSITY MULTISPECIES CROPPING SYSTEMS UNDER EVALUATION AT COORDINATION CENTERS.
9. QUANTITY OF COCONUTS RETAINED BY PRODUCERS
10. ESTIMATED MARKETABLE SURPLUS OF COCONUT.
11. EXPORT OF COCONUT PRODUCTS FROM INDIA.
12. NET AVAILABLE SUPPLY.
13. ESTIMATED UTILIZATION OF AVAILABLE SUPPLY OF COCONUT IN INDIA.
14. FUTURE PRICE V/S. ACTUAL PRICE V/S DELIVERED PRICE OF COCONUT OIL AT KOCHI MARKET.
15. TOTAL VOLUME OF COCONUT OIL TRADED AND DELIVERED UNDER FUTURES TRADING.
16. AVERAGE WHOLESALE PRICES OF COCONUT AT ARISEAKARE, KOZHIKODE AND KANGAYAN MARKETS
17. INTERNATIONAL PRICE OF SELECTED VEGETABLE OILS
18. MARKETING COST, MARGINS AND PRICE SPREAD OF COCONUT IN REGULATED AND UNREGULATED MARKETING CHANNELS.
19. MARGINS AND COSTS OF VARIOUS INTERMEDIARIES FOR COCONUT MARKETING IN CENTRAL KERALA.

LIST OF PLATES

1. COCONUT TREE.
2. COCONUT FRUIT.
3. COCONUT GROWING COUNTRIES IN THE WORLD.
4. COCONUT GROWING STATES IN INDIA.
5. CHOWGHAT ORANGE DWARF
6. MALAYAN YELLOW DWARF
7. DXT HYBRID.
8. TXD HYBRID.
9. MULTISTORIED CROPPING SYSTEM.
10. HIGH DENSITY MULTISPECIES CROPPING SYSTEM.
11. COCONUT HARVESTING.
12. TENDER COCONUT SALE.
13. TENDER COCONUT SALE.
14. TENDER COCONUT SALE.
15. TENDER COCONUT SALE.
16. BOTTLED TENDER COCONUT WATER.
17. PARTIALLY DEHUSKED TENDER COCONUT
18. PACKED TENDER COCONUT WATER.
19. SNOW BALL TENDER COCONUT.
20. EGG COCONUT.
21. COCONUT VINEGAR.
22. NATA-DE-COCO.
23. VIRGIN COCONUT OIL.

LIST OF FIGURES

1. WORLD SCENARIO IN AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT.
2. TRIENNIAL AVERAGE OF AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN INDIA.
3. AREA UNDER COCONUT CULTIVATION IN INDIA.
4. PRODUCTION OF COCONUT IN INDIA.
5. YEARLY WHOLESALE PRICE INDEX OF COCONUT
6. AVERAGE ANNUAL WHOLESALE PRICES OF COCONUT IN PRINCIPAL MARKETS OF INDIA.
7. AVERAGE ANNUAL WHOLESALE PRICES OF COCONUT IN SELECTED STATES IN INDIA.
8. MONTHLY WHOLESALE PRICES OF UNHUSKED AND HUSKED COCONUT IN SELECTED MARKETS IN INDIA.
9. AVERAGE MONTHLY WHOLESALE PRICES OF DRY AND TENDER COCONUT IN SELECTED MARKETS.
10. SEASONAL INDICES OF COCONUT PRICES AT SELECTED CENTRES IN INDIA.
11. SEASONAL VARIATION OF PRICES OF COCONUT IN SELECTED MARKETS IN INDIA.
12. AVERAGE MONTHLY WHOLESALE AND RETAIL PRICES OF TENDER COCONUT IN SELECTED MARKETS.
13. YEARLY WHOLESALE PRICE INDEX OF COCONUT OIL, COPRA AND COCONUT
14. MONTHLY AVERAGE PRICES OF COPRA IN INTERNATIONAL MARKET.
15. YEARLY AVERAGE PRICES OF COPRA IN VARIOUS WORLD MARKETS.
16. YEARLY AVERAGE PRICES OF MILLING COPRA IN SELECTED MARKETS.
17. YEARLY AVERAGE PRICES OF BALL COPRA IN SELECTED MARKETS.
18. YEARLY AVERAGE PRICES OF DIFFERENT VARIETIES OF COPRA AT KOZHIKODE.
19. SEASONAL INDICES OF COPRA PRICES AT VARIOUS MARKETS.
20. COMPARISON OF PRICES OF COCONUT OIL WITH OTHER VEGETABLE OIL.
21. INTERNATIONAL PRICE OF COCONUT OIL.
22. QUINQUENNIAL AVERAGE PRICE OF SELECTED VEGETABLE OIL.
23. AVERAGE ANNUAL PRICE OF COCONUT OIL IN INDIA AND INTERNATIONAL MARKETS.
24. WHOLESALE PRICE INDICES OF COCONUT OIL
25. AVERAGE ANNUAL PRICE OF COCONUT OIL AT KOCHI, ALLEPPY, KOZHIKODE AND KANGAYAM MARKETS.
26. SEASONAL INDICES OF COCONUT OIL PRICES.
27. INTERNATIONAL YEARLY PRICES OF COCONUT OIL CAKE.
28. AVERAGE YEARLY WHOLESALE PRICE OF COCONUT OIL CAKE.
29. YEARLY AVERAGE PRICE OF COCONUT OIL CAKE AT DIFFERENT MARKETS OF INDIA.
30. SEASONAL INDICES OF COCONUT OIL CAKE.

CHAPTER - I

INTRODUCTION

1.1 Historically, in the medieval period the coconut was known as *Nux indica*, the Indian nut, during the same period it was also referred as Nargil tree, “*the tree of life*”.

Plate – 1



Coconut Tree

Western literature mentioned the Malayalam name “*Tenga*” for the coconut palm which related to Tamil ‘*Tennai*’ and believed to have been introduced from Shri Lanka. Its geographical dispersion around the world was aided by waves of sea, travelers migrating and trading between homeland countries and even to more distant islands, from Asia to American coasts. Botanically, the coconut palm is a *monocotyledon* and belongs to the order *Arecaceae*, family *Palmae* and the specie is known as *Cocus nucifera* Linn.

1.2 Since ancient times, coconuts are ceremonially associated with worship of Gods and Goddess in Hindu religion. Its antiquity in Indian mythology is well established from its mention in *Kishkinda kand* and *Aranya kand* in *Valmiki Ramayana*. References also have been mentioned on coconut in *Raghuvansha* of Kalidasa and Sangama literature. Coconut, in its natural form, decorated with gold or silver formed a part of offerings on many religious occasions and social gatherings. The coconut is a benevolent crop and a perfect gift to mankind. It has during the span of history represented not only the source of food, beverage, oil seed, fibers, timber and health products but also associated with magic, mystery, medicine and omen in the life of people. The coconut palm tree provides clothing, utensils and dwellings and therefore, remains an important source of earning livelihood to the inhabitants of the coconut producing states in costal areas. The inhabitants therefore, affectionately eulogized the coconut plant with reverence as “*Kalpavriksha*”, because of its manifold virtues. Even today the omen and mystery of coconut symbolism appears in day to day life of people and therefore this nature’s most precious gift continue to be explored, scientifically, economically and artistically in the world traditions to adorn coconut.

1.3 Among the oilseed palm trees, coconut palm hardly needs any emphasis on its multi-utility significance. The economic importance of this tree crop is evident from the fact that it is grown in more than 90 countries across the world in an area of 14.231 million hectares producing about 57.514 billion nuts or 10.52 million tonnes of copra.

However, Philippines, Indonesia, India and Sri Lanka account for 78 per cent of the area and production.

1.4 India ranks third on world coconut map and in recent times became the largest producer of coconut with the production of 16.9 billion nuts from acreage under plantation of about 1.89 million hectares. Even though India is among the largest producer of coconut with a distinction of having the highest productivity of 7779 nuts per hectare as against 3630 nuts per hectare in Indonesia and 3859 nuts per hectare in Philippines, the per capita annual availability of coconut estimated to have been 10 nuts only which is quite low compared to 222 of Philippines, 145 of Sri Lanka and 55 nuts of Indonesia.

1.5 The most important and economically valuable produce of coconut palm is its fruit popularly known as *'nut'*. It is made up of an outer exocarp, a thick fibrous fruit coat known as husk; underneath lies the hard protective endocarp or shell. Lining the shell is a white albuminous endosperm or *'coconut meat'* and the inner cavity is filled with a clear sweet refreshing liquid called *'coconut water'*. The kernel of a matured nut is the most precious product used for edible purpose. The dried kernel or copra is the richest source of edible oil and a by-product coconut oil cake, a source of vegetable protein used as an ingredient for livestock feed. The shell as such is used for fuel purpose, shell gasifier as an alternate source of heat

Plate – 2



Coconut fruit

energy, making handicrafts, ice-cream cups and other commercial products like shell powder, shell charcoal and activated carbon. The husk yields fibres, which is converted into coir and coir products viz., coir carpets, coir geo-textile, coir composite, coir safety belts, coir boards, coir asbestos and coir pith. Coir pith a secondary by product obtained during defibring process is used as soil conditioner and mending all types of soils. The spongy nature of pith helps in disintegration of clay soil and allows free drainage. Its sponginess helps to retain water and oxygen and also prevents loss of vital nutrients from soil.

1.6 The food processing sector has not paid due attention to diversification and value addition to coconut, coconut products and by products. The coconut processing therefore traditionally remained confined to copra production, oil extraction, manufacturer of desiccated coconut, coir and coir products.

1.7 Even though, India is the third largest coconut growing country in the world, its contribution to international market remains insignificant. In spite of the slow growth in

coconut industry, all round efforts made for integrated development of coconut sector in the areas of production, processing and marketing after establishment of a statutory body, the Coconut Development Board, by the Government of India in the year 1981, are appreciable. During past two decades the coconut plantation crop has received ample research and development attention in the country and the result of these concerted efforts are well exhibited in terms of increased in area, production and productivity of coconut in the country.

In view of the changed scenario in the coconut sector, it was felt necessary to revise the report on production and marketing of coconut and make fresh appraisal of the changing pattern of coconut production, trade and its ancillary industries. The present study was taken up as per the decision taken at the instance of the Steering Committee to monitor the progress of implementation of projects sanctioned under the Central Sector Scheme for Technology Mission for Coconut Development.

CHAPTER - III

WORLD COCONUT SCENARIO

2.1 The coconut, having originated in South East Asia including Australasia appears to have dispersed eastwards towards 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 travelers were also responsible for 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, the Portuguese introduced it to Bahia and other parts of Brazil, Polynesians Sea-Farers further spread it to different Islands of 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.

Plate – 3



Coconut Growing Countries in the World

2.2 The most eminent countries exploring coconut palms for commercial production are located in Asia, Oceania, West Indies, Central and South America, East and West Africa. According to FAO-2004 citation on coconut data (**Annexure –I**), the coconut crop is grown in about 90 countries across the World in an area of 14.231 million hectares producing 57.514 billion nuts or 10.52 million tons of copra. Out of World's total area under coconut, 16 major coconut producing countries accounted for 93.75 per cent (Table-1). Among the Asian and Pacific Coconut Community (APCC), mainly six

Production and Marketing of Coconut in India

countries i.e. Philippines, Indonesia, India, Sri Lanka, Thailand and Malaysia together accounted for 80.65 per cent of the total area under coconut cultivation and about 82 per cent of world production.

Table No.1

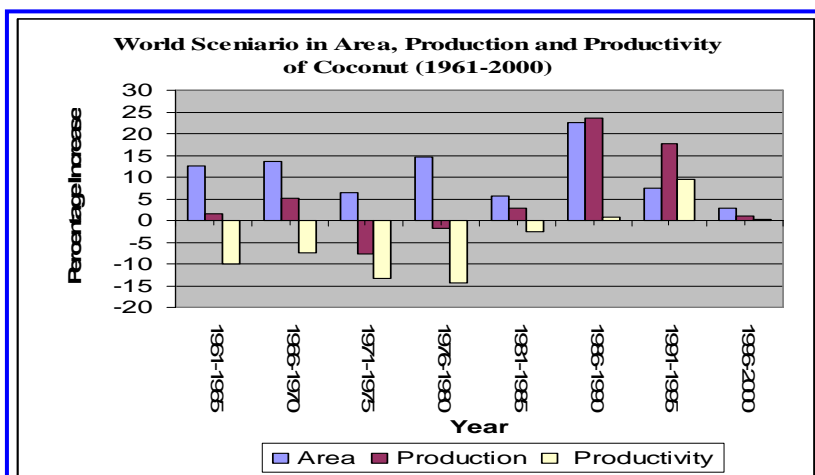
Area, Production and Yield of Coconut in Major Coconut growing Countries in the World

(Quinquennial Average, Year 1999 - 2003)

Sl. No.	Country	Area (in 000 hectares)	Percentage Share	Production (M.T.)	Percentage Share	Productivity or Yield (kg./Ha.)
1.	Philippines	3321812	30.65	13145372	25.48	4018
2.	Indonesia	2648844	24.44	15394400	29.84	5806
3.	India	1809620	16.70	9392200	18.20	5151
4.	Shri lanka	443642	4.09	2054872	3.98	4632
5.	Thailand	328184	3.03	1402901	2.72	4275
6.	Papua New Guinea	222000	2.05	779000	1.51	3455
7.	Malaysia	188000	1.73	731520	1.42	3894
8.	Vietnam	151300	1.40	943280	1.83	6254
9.	Vanuatu	73600	0.68	224200	0.43	2049
10.	Fiji Island	53888	0.48	170240	0.33	3159
11.	Brazil	267256	2.47	2323833	4.50	8668
12.	Ghana	54600	0.50	313120	0.60	5735
13.	Jamaica	51000	0.47	170000	0.33	3333
14.	Mexico	161642	1.50	1051800	2.04	6506
15.	Mozambique	76200	0.70	298800	0.58	3900
16.	Tanzania	310000	2.86	366000	0.71	1181
17.	Others	675348	6.25	2833560	5.50	4196
	WORLD TOTAL	10836916	100.00	51595098	100.00	4761

Source : F.A.O. Coconut Statistics 2004.

2.3 During the last four decades, there has been tremendous expansion in area and production of coconut in the World. The increase in area under coconut since 1961 to 2003 was slow but steady. The production also showed a steady trend of increase during the decade under reference. However, during the period between 1971 and 1980, there was a declining trend in production in spite of area expansion, due to declining trend in productivity. The productivity declined from 5,407 nuts per hectare in the year 1901, to 4,545 nuts/hectares during the year 2000. There was an increase of 145.39 per cent in area and 106.29 per cent in production whereas during the period the productivity had a negative trend i.e. 15.94 per cent (**Table-2 & Annexure –II**).



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Table No.2

World Scenario : Area, Production and Productivity of Coconut (1961 to 2000)

Sl.No.	Period	Percentage increase		
		Area	Production	Productivity
1.	1961 – 1965	12.67	1.56	-9.88
2.	1966 – 1970	13.39	5.05	-7.35
3.	1971 – 1975	6.45	-7.75	-13.33
4.	1976 – 1980	14.69	-1.87	-14.43
5.	1981 – 1985	5.55	2.93	-2.48
6.	1986 – 1990	22.69	23.56	0.72
7.	1991 – 1995	7.42	17.70	9.57
8.	1996 – 2000	2.85	0.99	0.19
	Growth over the period 1961-2000	145.39%	106.29	-15.94

Source : Coconut Development Board, ICJ, 2001.

2.4 Nearly 50 per cent of the World production of coconut is processed into copra, depending upon the consumption patterns the share of coconut processed into copra varies from country to country. In Philippines and some of the South Pacific countries, about 90 per cent of their coconut production is converted into copra, and in India and Sri Lanka, it ranges between 25-30 per cent.

Table No.3

World : Production of Copra and Coconut oil
(Quinquennium Average for the period from 1970-74 - 1995-99)

Year	COPRA			COCONUT OIL		
	Production In (M.T.)	Increased in (M.T.)	Increased in %	Production in (M.T.)	Increased in (M.T.)	Increased in %
1970-74	3866200	--	--	2436000	--	--
1975-79	4735200	869000	22.47	2983176	547176	22.46
1980-84	4432722	- 302478	- 6.39	2629021	- 354155	- 11.87
1985-89	4726620	293898	6.63	2977770	348749	13.26
1990-94	4877318	150698	3.19	3072271	94501	3.17
1995-99	5030650	153332	3.14	3169310	97039	3.16

2.5 Coconut economy in the World is often susceptible to the pressure from cheaper oil seed and increased availability of cheap oil sources like palm oil, soybean oil and sunflower oil. Coconut oil being the source of lauric acid and myristic acid, which are considered as important item for industrial applications and always enjoy a premium price. However, substitutes from petro-chemicals have restricted the growth of industrial demand for coconut oil. The growth of edible oils viz. soybean oil, palm oil and mustard/rape seed oil industries have kept supply of vegetable oils more than adequate for domestic consumption and therefore, restricted the growth of coconut oil industries.

The present trend in world production of vegetable oils indicates that the total production of vegetable oil has increased to 93.66 million M.T. in 2001-2002 from the level of 38.19 million M.T. in 1980-81 with an increase of 145.25 per cent. Among the major vegetable oils, the growth in production of palm oil, rape seed oil and soybean oil was significantly higher due to low cost of cultivation. Countries like Indonesia, Malaysia, Papua, New Guinea, etc. have switched on to palm cultivation. As a result, the palm oil production has gone up substantially. Its share in the world production has significantly increased to 26.43 per cent from the level of 13.54 in 1980-81. However, the share of soybean oil remained stable during the same period in spite of increase in the production. The coconut oil, however, recorded the lowest rate of growth of 0.48 per cent only and the percentage share of coconut oil among the total vegetable oil pool reduced to 3.43 per cent in 2001-2002, from the level of 7.59 per cent during the same period. Thus, the coconut oil in the world has become a minor oil compared to other competitive oils and fats. Though, the production of vegetable oils has been increasing steadily, the supply of coconut oil remained constant due to inelastic demand in cosmetic, pharmaceuticals and paint industries on account of easy availability of cheaper vegetable oils.

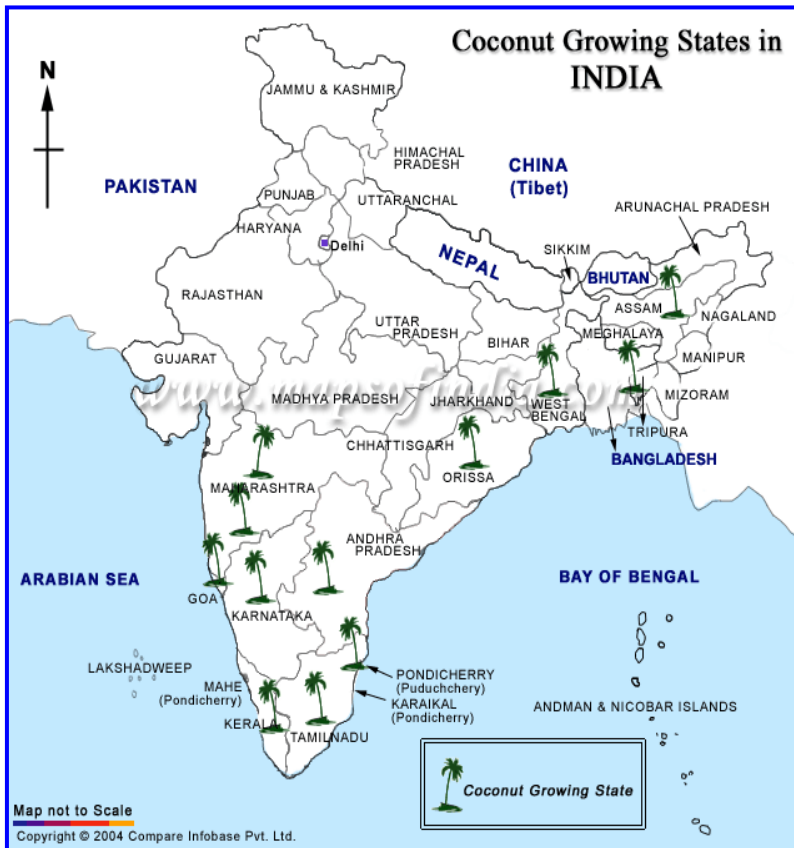
2.6 The world-wide trend in value addition, product development and diversification in several coconut producing countries for international trade lead to establishment of copra processing facilities. As a result, the availability of copra for export declined resulting in increasing share of coconut oil in export market. The coconut producing countries realized that copra processing alone would not be economical in their interest. Accordingly they embarked upon product diversification and by-product utilization through value addition. The countries which were processing coconut shell charcoal graduated to activated carbon. Philippines and Indonesia commenced coco chemicals. The APCC countries have diversified in to processing of coconut cream, nata-de-coco, which has got demand in Japan and Taiwan. Export of fresh nut is becoming more lucrative than copra or oil. The traditional coir industry is finding geo-textiles, carpets and rugs fetch better price than mattress fibers.

The thrust in product development value addition, product diversification and quality improvement gradually resulted in diversification of coconut market. Ironically due to increasing competition from substitutes, the demand for coconut oil and copra meal came down. Further, the malafide campaign against coconut oil and EEC regulations on aflatoxin contamination of animal feed, which include copra and copra meal resulted in decline in volume and value of these products in export market.

CHAPTER - III

COCONUT SCENARIO IN INDIAN PERSPECTIVE: SUPPLY AND DEMAND

3.1 The coconut is not only significant in socio cultural needs of our society, but also has gained considerable importance in the national economy as a potential source of rural **Plate – 4**



employment and income generation among the plantation crops. The countrywide demand for coconuts both for edible and non-edible purpose, the adaptability of coconut palm to grow under varying soil and climatic conditions has generated keen interest among the people of even non-traditional zones in the country to plant a few saplings in their homestead gardens. The coconut palm requires a warm climate without greater diurnal variation of temperature. The ideal mean temperature is usually at 27⁰C and the average diurnal variation between 5⁰C and 7⁰C. The

Source : Maps of India

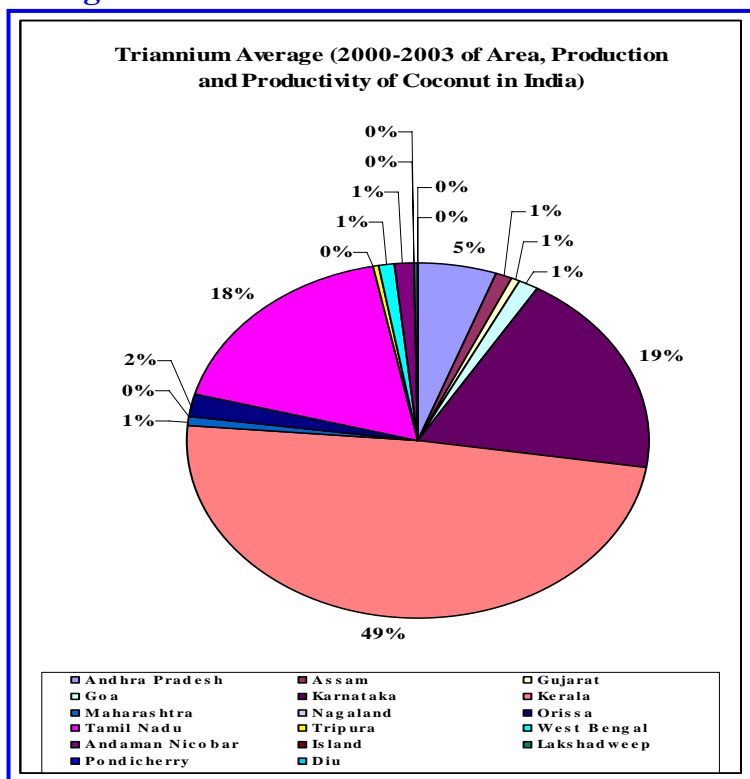
palm grows best under a well distributed rainfall between 1,300 mm and 2,300 mm, throughout the year. Even higher precipitation up to 3,800 mm is tolerated, provided that soil drainage is good. The palm requires plenty of sunlight and does not flourish in cloudy regions. The young palms do grow under shades of old palm during replanting but requires sufficient room for roots and light for growth. Therefore, it makes desirable to remove old palms when palm trees attain the age of eighth year. The growth of palms towards the light or their heliotropism could be noticed on the seashore plantations. The coconut palms flourish well on sandy soils along the sea coast, but also grow on various types of soil, provided there is free-drainage and allow unrestricted root development and aeration, viz Alluvial soils (Godavari delta), Lateritic soils (Red loam) in West Coast. Based on climate, soil, physical and chemical characteristics and the length of

Production and Marketing of Coconut in India

growing period, India is broadly delineated into 20 agro-eco regions, 60 eco sub regions. The coconut palms are grown in most of the zones, except sub tropic and temperate regions, which includes 19 states and 3 union territories in the country. However, they are favourably adapted to coastal Agro ecosystem-having coastline of 8129 km. and its Peninsular region bounded by the Arabian sea on the West, the Bay of Bengal on the east and Indian ocean on the south. Andaman and Nicobar Islands in the Bay of Bengal and Lakshadweep Islands in Arabian sea are unique inland eco-system where coconut plantation is widely grown.

3.2 The distribution of area under coconut cultivation shows that the major portion of coconut production in the country **Figure – 2**

rests with the Western plains and Ghat regions comprising the states of Kerala, Karnataka and Maharashtra followed by Eastern coast plain and hilly regions comprising Andhra Pradesh, Orissa, Tamil Nadu and Pondicherry. Andaman & Nicobar, Lakshadweep Island and states of Gujarat are the other traditional coconut growing areas. Certain tracts of Tamil Nadu, Karnataka and the states of Assam, Tripura, West Bengal, Bihar and Madhya Pradesh are the non-traditional areas where coconut cultivation has made in roads rapidly. In the North Eastern belts, state like Mizoram, Manipur, Nagaland



Source : Table No.4

and Arunachal Pradesh are also experimenting coconut cultivation successfully. However, the triennium average for the year (2000-2001 to 2002-2003) showed that Kerala's contribution to total area under coconut was 48.79 per cent, followed by Karnataka 18.90 per cent, Tamil Nadu 17.70 per cent and Andhra Pradesh 5.50 per cent, which together accounted for 91 per cent of the total area in the country.

Table No.4

State-wise Area, Production and Productivity of Coconut in India

(Triennium Average 2000-2001 to 2002-2003)

(Area – ‘000’ Hectare, Production – Million Nuts, Productivity – Nuts / Hectare)

Sl. No.	State	Area	% of total Area	Production	% of total Production	Productivity
1.	Andhra Pradesh	104.0	5.50	1125.4	8.90	10821
2.	Assam	21.1	1.11	154.4	1.22	7317
3.	Gujarat	12.6	0.67	100.5	0.80	7976
4.	Goa	25.0	1.32	124.1	0.98	4964
5.	Karnataka	357.8	18.90	1587.1	12.57	4436
6.	Kerala	923.6	48.79	5539.3	43.86	5997
7.	Maharashtra	16.7	0.88	206.3	1.63	12353
8.	Nagaland	0.9	0.05	3.8	0.03	4222
9.	Orissa	38.1	2.01	174.5	1.38	4580
10.	Tamil Nadu	335.1	17.70	3115.4	24.67	9297
11.	Tripura	3.2	0.17	7.0	0.06	2187
12.	West Bengal	24.8	1.31	326.3	2.58	13157
13.	Andaman Nicobar Island	25.2	1.33	91.1	0.72	3615
14.	Lakshadweep	2.7	0.14	47.7	0.38	17666
15.	Pondicherry	2.3	0.12	23.7	0.19	10304
16.	Diu	0.1	Neg.	3.4	0.03	34000
	All India	1893.2	100.00	12630.0	100.00	6671

3.3 The coconut palm indeed is a traditional plantation crop grown in India over the past 3000 years with longest mythological and historical record. In spite of the great antiquity attached to coconut crop in the country, organized efforts to develop the crop were made only about a century back and actual systematic efforts for development of coconut palm as a commercial crop begun in 1940s. The enquiry commission set up by the Government of India in 1943 recommended establishment of a statutory body at central level. The Indian Central Coconut Committee was formed in February, 1945, under the Indian Coconut Committee Act 1944, with the objective to encourage horticultural, technological and economically viable development of coconut industry through adoption of improved methods in coconut cultivation to enhance production, improvement in marketing of coconuts and coconut products in the country and abroad. The subsequent institutional arrangement made by the Government for development of coconut industry in the country included, creation of Directorate of Coconut Development with head quarter at Cochin under the Ministry of Agriculture, Department of Agriculture and Cooperation, Government of India in 1966. The Directorate carried forward the functions of planning, co-ordination of development programme for

production, processing and marketing of coconuts in the country. In 1966, the Indian Coconut Council, an advisory body was constituted to review coconut situation in the country and suggest measures to accelerate the growth of coconut industry.

3.4 In 1981, the Directorate of Coconut Development was abolished to pave the way for establishment of Coconut Development Board in the year 1981, under the Coconut Development Board Act. 1979 enacted by the Parliament. The major functions earmarked for the Coconut Development Board were adopting measures for the development of coconut industry, recommending measures for improving marketing of coconut and its products, imparting technical advice to those engaged in coconut cultivation and industry, providing financial and other assistance for expansion of area under coconut, encouraging adoption of modern technologies for processing coconut and its products, recommending measures for regulating imports and exports of coconut and its products, fixing grades, specifications and standards for coconut and its products, financing suitable schemes to increase the production of coconut, assisting, encouraging, promoting and financing agricultural, technological, industrial or economic research on coconut and its products, collecting statistics on coconut and its products and publishing, undertaking publicity activities and publishing books and periodicals on coconut and its products. Further, the Development Programme implemented by the Board are (i) Integrated Development of Coconut Industry in India and (ii) Technology Mission on Coconut which covers the following component programme: a) Development, demonstration and adoption of technologies for management of insect pest and disease affecting the coconut gardens. b) Development and adoption of technologies for processing and product diversification. c) Market research and promotion and d) Technical support, external evaluation and emergent requirements.

3.5 The developmental activity during the First Five Year (1951-56) was carried out by the Indian Central Coconut Committee as its normal developmental work. However, the coconut development programme received real impetus when at the first time, it was brought under the preview of 2nd Five Year Plan (1956-61). The distinguished achievements during this plan periods were the establishment of large number of coconut nurseries in some major coconut growing states, biological control laboratories for pest control, popularizing scientific methods of coconut cultivation and crop protection measures through publicity and extension programme. The developmental activities viz. production and distribution of seedlings, laying out demonstration plots in grower's gardens, plant protection measures, etc., during the First Five Year Plan period resulted in increased production from 3282 million nuts in 1950-51 to 4224 million nuts in 1955-56 and area under crop increased from 626.5 thousand hectares to 647.6 thousand hectares.

3.6 The production and productivity oriented developmental projects implemented during 2nd Five Year Plan were expanded and continued during the 3rd Five Year Plan (1961-66). There was steady increase in area and production during this plan period i.e. 883.7 thousand hectares and 5035 million nuts respectively. The 3rd Five Year Plan period was followed by a plan break for three consecutive years up to 1968-69 in which programme were continued as annual plans, as result, coconut production touched the level 5546 million nuts and the area under coconut increased to 990 thousand hectares in 1968-69.

3.7 During the Fourth Plan (1969-70 to 1973-74) various short term and long term programme were envisaged to achieve an additional production of 1000 million nuts by the end of plan period. The short term measures included laying out demonstration plots, expansion of irrigation facilities and plant protection, the long term measures covered production and distribution of hybrid planting material in states of Kerala, Karnataka, Tamil Nadu and Andhra Pradesh, establishment of elite seed farm for Tall X Tall (TxT) progenies in Karnataka and subsidized supply of quality planting material in Gujarat. By the end of this plan period, the area under coconut increased to 1102 thousand hectares with production of 5851 million nuts.

3.8 The production and productivity improvements programme were continued during Fifth (1974-76 to 1979-80) and Sixth Five Year Plan (1980-81 to 1984-85). More emphasis was laid on hybrid planting material production and rejuvenation of the diseased coconut holdings affected due to root wilt disease. The formation of Coconut Development Board in 1981, coincided with commencement of Sixth Plan during 1980-81. The developmental programmes of coconut were given wider dimensions, by identifying thrust areas for development. A decade prior to the formation of Coconut Board, witnessed either declining trend in production and productivity with area under coconut cultivation remained almost stagnant. However, by the end of Sixth Plan period the area under coconut cultivation increased to 1.83 million hectares and the production to 6913 million nuts. Expansion of area under coconut cultivation to increase the future production potential, by extending coconut cultivation in the traditional and non-traditional states, technical guidance and liberal financial assistance to the tune of Rs.8000/- per hectare, were some of the measures adopted by the Coconut Development Board to achieve the goal after 1980.

3.9 The development programme further expanded during the Seventh Five Year Plan (1985-86 to 1989-90) by starting technology development center for coconut, laying more emphasis on development of new products like coconut cream, packed coconut water, coir pith briquette, timber utilization etc. With the concerted efforts made by all agencies, the area under coconut reached to the level of 1.47 million hectares and

Production and Marketing of Coconut in India

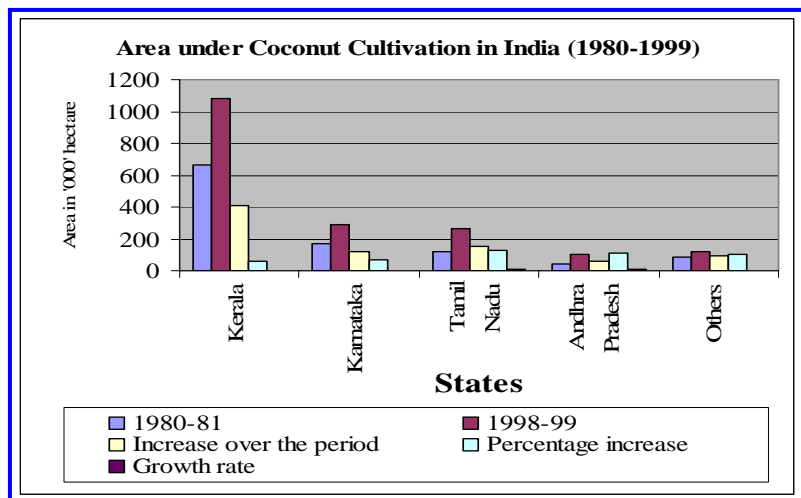
production to 9359 million nuts as per the target. During this Plan period, an apex body in cooperative sector “**KERAFED**” came into existence in 1987, to implement an integrated coconut production, procurement, processing and marketing projects. Initially about 900 Primary Agricultural Credit Societies were brought under the purview of kerafed with financial assistance from National Cooperative Development Corporation.

3.10 In the Eighth Five Year Plan (1992-93 to 1996-97), the development programme for coconut received further boost with enhanced financial budget allocation to the tune of 79.29 crores, for implementing several production and productivity oriented programme. During this plan period, about 46,000 hectares was brought under the Area Expansion Programme.

The development programme along with area expansion and Integrated Diseases Control Programme were continued in the Ninth Five Year Plan (1997-98 to 2001-2002). The production at

Figure – 3

national level touched 14925 million nuts from an area of 1.91 million hectares by the year 1999-2000, due to harmonious efforts made by the institutional research and development work. Priority was given to bring additional area in traditional coconut growing belts and introduction of the crop in non-traditional areas. The productivity improvement



Source : Table No.5.

programme in coconut producing areas by introduction of disease eradication, weeding out unproductive diseased palms and replanting with quality seedlings, development of irrigation sources and micro-irrigation system, integrated farming in coconut holdings etc. resulted in increased productivity in coconut belts.

3.11 The impact was seen from the improvement in area, production and productivity by 1999-2000. The increase in area over the period of last 20 years was 0.82 million hectare i.e. from 1.08 million hectare in 1980-81 to 1.91 million hectare in 1998-99. The increase in production during this period was 8983 million nuts with a growth rate of 5.25 per cent raised the production to 14925 million nuts in 1998-99 from the base level of 5942 million nuts in 1980-81.

Table No.5

Area under Coconut Cultivation in India (1980-1999)

(Area in '000' hectare)

Year	Kerala	Karnataka	Tamil Nadu	Andhra Pradesh	Others	All India
1980-81	666.2	171.5	116.0	42.4	87.2	1083.5
1998-99	1078.2	287.8	266.5	98.2	117.5	1908.2
Increase over the period	412.0	116.3	150.5	55.8	90.3	824.9
Percentage increase	61.8	65.9	129.5	108.9	102.3	75.6
Growth rate	2.711	2.918	4.729	4.776	4.028	3.195

Table No.6

Coconut Production in India (1980-1999)

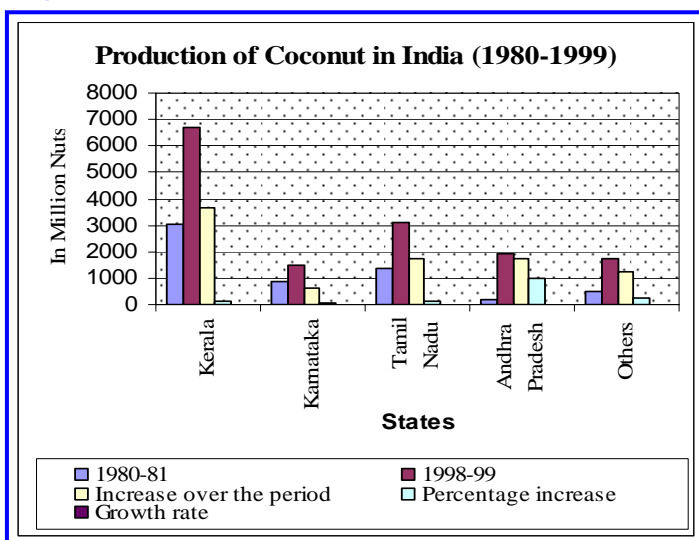
(in million nuts)

Year	Kerala	Karnataka	Tamil Nadu	Andhra Pradesh	Others	All India
1980-81	3036.4	890.0	1354.4	175.3	485.9	5942.0
1998-99	6672.0	1495.1	3096.7	1922.1	1738.9	14924.8
Increase over the period	3635.6	605.1	1742.3	1746.8	1253.0	8982.8
Percentage increase	121.0	65.9	125.7	976.4	227.2	151.2
Growth rate	4.471	2.924	4.701	14.229	7.340	5.250

Source : Coconut Development Board.

3.12 The impact of developmental activities was more prominent in the four southern states viz Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, where higher area coverage and increase of production was achieved over the period from 1980 to 1999.

Figure – 4



Among these states, Kerala contributed to the extent of 0.4 million hectare with the maximum production of 3636 million nuts followed by Tamil Nadu 0.15 million hectare with 1742 million nuts, Karnataka 0.12 million hectare with 605 million nuts. However, the area coverage in Andhra Pradesh

Source : Table No.6.

was about 0.06 million hectare but in production, it was next to Kerala i.e. 1747 million nuts. In growth rate, Andhra Pradesh recorded highest percent increase in area by 4.77 percent and in production 14.23 percent, followed by Tamil Nadu, 4.73 percent area and 4.70 percent production; Karnataka, 2.91 percent area and 2.92 percent production and Kerala with 2.71 per cent area but higher growth rate in production with 4.47 per cent. The All India growth rate recorded was 3.195 percent in area coverage and 5.250 percent in coconuts production.

However, a review on coconut area, production and productivity in the country for the last decade revealed that there was a positive growth rate for area in all the coconut growing states in India except Kerala, which showed negative growth rate of -0.15. The coconut production and productivity showed a variable growth rate. It was positive in Kerala and other non-traditional coconut growing areas, however, it had recorded a negative growth rate in Karnataka, Tamil Nadu, but Andhra Pradesh showed a negative growth only in productivity. The all India growth rate, however, was on negative side i.e. production -0.36 and productivity -1.56. (**Annexure-III A & III B**)

3.13 Though there was significant improvement in area expansion and coconut production, during the past five decades, but the improvement in productivity was not satisfactory. The productivity increase during the same growth period was 2583 nuts, i.e. increase of 49.32 percent and the growth rate of 0.84 percent. The productivity during 1950-51 was 5238 nuts per hectare which had increased to 7821 nuts per ha. in 1998-1999. The principal coconut growing states like Kerala and Karnataka had very little improvement in productivity or rather a negative trend was observed in Kerala at different periods of time. However, the states like Andhra Pradesh, Maharashtra, Tamil Nadu, West Bengal and Pondicherry have recorded increased productivity during the same period. The reasons attributed to the decreasing trend in productivity were prevalence of root wilt disease, high plantation density, small size holdings and lack of integrated approach for development of coconut industry in earlier decades.

3.14 Factor Affecting Production And Productivity :

3.14.1 Coconut Varieties and Hybrids Evolved for Commercial Cultivation: Since ancient times, the coconut palm is widely distributed and hence large number of varieties are classified on the basis of characters such as Tall or Dwarf cultivars, early or late maturity, colour, size, shape of the fruit including other properties of the fruit like thickness of husk, shell, water content of tender nuts and kernel thickness of matured nuts, etc.

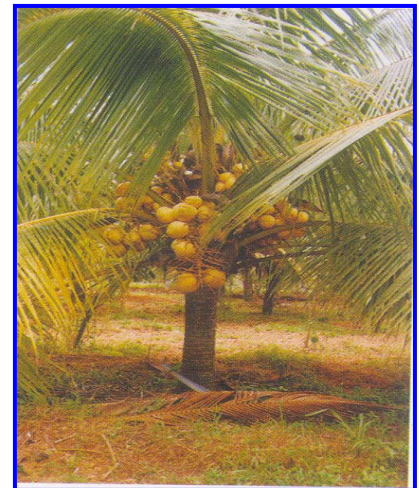


Chawghat Orange Dwarf (COD)

and large area requirement for experimental research, a significant development in the coconut farming has been made in the country. The selective cross breeding has evolved hybrids from the tall and dwarf palm giving higher yield, combining the nut and kernel size or copra characteristics of tall with early maturity and fruit bearing characteristics of dwarf varieties. Primarily, there are two groups of coconut cultivars known as tall and the dwarf cultivars. Tall varieties are common type found through out the world. The life spans of tall varieties extend from 60 to 80 years and grow to a height of 15 to 18 meter. Coconut palms attain bearing in 6-7 years and steady bearing in about 12 to 15 years. The nuts are medium to big in size with colour varying from green, greenish yellow to brown. Such coconut palm produces good quantity with quality copra with fairly high oil content as compared to dwarf cultivars. Dwarf Cultivars are shorter in stature and life span. It grows to the height of 5-7 m. with an average life span of 40 to 50 years and start bearing from 3-4 years after planting. The nuts are smaller and the copra is soft, leathery and low in oil content. The nuts of dwarf cultivars have orange, yellow or green colours. The tall palms are not true to type as they are cross pollinated, whereas dwarf palms are self pollinated and hence true to type.

3.14.2 In spite of limitations in improving productivity of coconut crop due to its perennial nature, tall stature, long pre-bearing period, prolonged period for development of nuts, heterozygous nature

Plate – 6



Malayan Yellow Dwarf (MYD)

3.14.3 The Central Plantation Crop Research Institute, Kasaragod has the World's largest collection of germplasm of coconut consisting of 241 cultivars of which 101 are

exotic and 140 are indigenous types. The varieties of germplasms were evaluated for morphological, yield and quality characteristics, pest and disease resistance in multilocation trials at coordinating centers and All India Coordinated Research project on Palms. Based on their performance superiority, they are released for cultivation. Systematic evaluation and selective breeding over the past several years resulted in selection of four high yielding varieties viz Lakshadweep Ordinary, Benaulim Green Round, Philippine Ordinary and West Coast Tall for coconut growing tracts of India.

3.14.4 Selection of right variety and quality of seed material is important as the quality

Plate – 7



DxT Hybrid

of planting material has got a direct bearing on production and productivity of coconut. The investment incurred by the farmers during the pre-bearing period and there after, would be in-fructuous, if the quality planting material is not made available to them. It was assessed that, there had always been dearth of quality planting material creating a huge gap between demand and supply of coconut seedling. The demand would further increase, when an integrated coconut farming system has to be implemented, in which cutting down disease affected coconut trees especially in root (wilt) affected areas and planting of fresh disease resistant quality seedlings becomes a necessity. It is, therefore, necessary to select a consistently yielding elite variety of coconut seeds for plantation.

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3.14.5 Varieties of Tall and Dwarf Coconut Cultivars :

Sl. No.	Cultivars	General Characteristics
1.	2.	3.
A	Tall Variety	
i.	West Coast Tall (WCT)	Extensively cultivated in the West Coast region. Life span 75 years. Regular bearer producing 12 inflorescences per year. Start bearing in about 6-7 years. Average annual yield 40 to 100 nuts per tree. Average copra content 176 gms. Oil content 68 per cent. Recommended for cultivation in coastal region of Kerala and Karnataka.
ii.	East Coast Tall (ECT)	This is common cultivars grown extensively in the East Coast of India, morphologically similar to WCT. The palm takes 6-8 years to start bearing. The average annual yield is 70 nuts per palm. It has mean copra content of 125 gms. per nut and oil content of 64 per cent.

Production and Marketing of Coconut in India

1.	2.	3.
iii.	Tipton Tall	This is popular tall cultivars of Karnataka. Morphologically similar to WCT. Average yield is 86 nuts per palm per year. Mean copra content of 178 gms. per nut with an oil content of 68 per cent.
iv.	Benaulim Tall (Pratap)	Palms are predominantly occurring in Goa, Konkan region of costal Maharashtra. Morphologically similar in appearance to WCT but nuts are smaller and round and closely grow in heavy bunches. The variety starts bearing in about 7-8 years. Average annual yield is 150 nuts per palm with copra content of 152 gms. per nut and 64 percent oil content. The variety is cultivated by name Pratap in Maharashtra state.
v.	Lakshadweep Ordinary (Chandra Kalpa)	The variety is indigenous to Lakshadweep Islands and resembles to WCT except in nut size which is smaller with prominent three ridges on triangular nuts. The palms are good source for tapping toddy. Average yield of 100 nuts per palm, copra content 176 gms. with 72 per cent oil content. The variety is released as Chandra Kalpa by CPCRI in 1985 for cultivation in Kerala, Karnataka and Andhra Pradesh.
vi.	Andaman Ordinary	The variety is largely grown in Andaman & Nicobar Islands. The palms are tall massive and more vigorous than WCT in vegetative growth. The nuts are fairly large in size with average yield of 94 nuts per palm per annum. Copra content is 169 gms. per nut with 66 percent oil content.
vii.	Sevvelanir	This is a tall cultivar found in Pondicherry, tender nut water has high medicinal value. The nuts are green in colour, tender nut water is sweet in taste. The mean annual yield is 40 to 45 nuts per palm.
viii.	Kamrupa	The variety was originally known as Assam Green Tall, a selection from the local germplasms, one of the most promising cultivars of this region. It has high yielding capacity i.e. 106 nuts per palm per year. Copra yield: 16.34 kg. per palm per year, with oil content : 64.50 per cent. In tender nut the water content is 253 ml. Tolerant against major coconut pests and diseases commonly affecting coconut palm.
B.	Exotic Cultivars	
i.	Philippines Ordinary	As name indicates it is an exotic cultivars from Philippines, palms grow up to the height of 10-12 m. Annual average yield is 110 nuts, with copra content 183 gms. per nut and oil content 66 percent. The variety is found suitable for cultivation in the West Coast, Konkan region of Maharashtra, Andhra Pradesh and West Bengal.

Production and Marketing of Coconut in India

1.	2.	3.
ii.	Philippines laguna.	Annual average yield 88 nuts, per palm, per year, with copra content of 258.9 g per nut and oil content 66.5 percent.
iii.	Fiji longtongan.	Annual yield of 104 nuts, per palm, per year, copra content 210.5 g per nuts and oil content 66 percent.
iv.	Fiji tall.	Annual yield of 106 nuts, per palm, per year, copra content 199.1 g per nuts and oil content 65.2 percent.
v.	S.S. Green.	Annual yield of 108 nuts, per palm, per year, copra content 186 g per nuts and oil content 67 percent.
vi.	Sanramon.	Annual yield of 64 nuts, per palm, per year, copra content 349.6 g per nuts and oil content 68 percent.
C. Indigenous Dwarf Cultivars		
i.	Chowghat Orange Dwarf	The variety is an indigenous dwarf cultivars particularly in Chavakkad area of Trissur district in Kerala. It is also known as Gaurigathram or Chenthengu and Kenthali in Karnataka. The palm has thin stem, small and compact crown with orange coloured leaf, petioles, inflorescence and nuts. The Palm starts bearing from 3-4 years. Average annual yield is 65 nuts per palm, mean copra content 150 g. with 66 percent oil content. The variety is ideal for Tender coconut water purpose. The variety is recommended for cultivation in Kerala and Karnataka.
ii.	Chowghat Geen Dwarf	These dwarf cultivars have one thing in common that they are shorter in statures and life span. They bear nuts with orange, yellow and green colours as in their names. Mostly cultivated for tender nuts, ornamental value and for production of hybrids.
iii.	Malayan Yellow Dwarf	
iv.	Malayan Orange Dwarf	
v.	Malayan Green Dwarf	
vi.	Ganga Bondam	
vii.	Kentholi Orange Dwarf	This cultivar is from Karnataka State, having high medicinal value for its tender nut water.
viii.	Chitta Gangapani	These dwarf cultivars are found in Arsikere and Tiptur area in Karnataka with green, medium sized round fruits. Tender nut water is very sweet.
ix.	Udha Gangapani	

3.14.6 Hybrid Varieties : Hybrids are evolved by artificial inter varietals crosses of two morphological forms of coconut and they exhibit improved inherited characteristics for which their parents were crossed such as early flowering, high yielding, higher quantity and better quality of copra and oil when compared to the parents. Hybrid vigor in coconut was reported for the first time in India by Patel in 1932 from artificial crossing West Coast Tall (WCT) as mother palms and Chowghat Green Dwarf (CGD) as male parent. In Dwarf x Tall (D x T) hybrids, Dwarf is the female and tall is the male parent and inter varietals hybrids like Tall x Tall and Dwarf x Dwarf are produced. More than 80 hybrid combinations have been evaluated over the years in India and so far eleven coconut hybrids were released for commercial cultivation and establishing seed gardens.



TxD Hybrid

cultivation and establishing seed gardens.

Table No.7

Salient Features of Released Indian Coconut Hybrids

Sl. No.	Name of Hybrid	Parentage	Yield No. of nuts per palm per year	Copra mean per nut (g)	Yield mean per palm (kg)	Oil content (per cent)	Name of state recommended for commercial plantation
1.	Chandra shankara	COD x WCT	222	215	24.9	68	Kerala
2.	Kera shankara	WCT x COD	211	187	20.2	68	Kerala coastal - Maharashtra coastal Andhra Pradesh
3.	Chandra Laksha	LCOT x COD	171	195	21.3	69	Kerala
4.	Laksha ganga	LCOT x GBGD	186	195	21.1	70	Kerala
5.	Ananda Ganga	AODT x GBGD	95	216	20.5	68	Kerala
6.	Keraganga	WCT x GBGD	100	201	20.1	69	Kerala
7.	Kerasree	WCT x MYD	130	216	28.0	66	Kerala
8.	Godavari ganga	ECT x GBGD	140	150	21.0	68	Andhra Pradesh
9.	Kera Sowbhagya	WCT x SSA	116	196	22.7	65	Kerala
10.	VHC-1	ECT x CDG	98	135	13.2	70	Tamil Nadu
11.	VHC-2	ECT x MYD	107	152	16.3	69	Tamil Nadu
12.	VH-3	ECT X MOD	156		25.2		Tamil Nadu

3.14.7 Prevalent Cultural Practices : Selection of appropriate varieties of hybrids for plantation depends on the agro climatic conditions prevailing in the area. The quality of the seed nuts is equally important when hybrid varieties are selected for commercial cultivation. If inferior seed nuts are used, the new plantation would be wasteful, causing considerable loss of time as well as finance to the farmers. The productivity of the coconut palms can be increased fourfold by regular manuring right from the first year of planting for good vegetative growth, early flowering and bearing. However, high yield of coconut productivity of palm is adversely affected when the plantation is neglected during early growth period. At later stage, even application of fertilizer would not help in achieving the expected higher level yield.

The coconut palms are prone to the effect of moisture stress which is reflected in the reduction of yield due to reduction in number of bunches, number of female flowers inflorescence bearings and shedding of tender nuts. The size of nut and copra content are also reduced due to water reduction stress on palms. Therefore, efficient irrigation system and water conservation is necessary to make adequate soil moisture available for the coconut palms. Depending upon the area, different methods of irrigation are applied to coconut crop. Drip irrigation has been found more efficient to economize and improve water holding in soil and found favourable in west coast conditions. Sprinkler or perfo irrigation system has more utility in coconut plantation with inter or mixed crops. Mulching with coconut husk, coir dust, green leaves and dried coconut leaves practices are followed to improve water retention in soil and reduce soil erosion. Saline water irrigation has also been found to be effective to enhance the yield of coconut. Use of mixture of sea water and fresh water in 1:2.5 ratio increases coconut yield by 15 per cent over no irrigation.

Cultural practices adopted by coconut growers do influence the growth and productivity of coconut palms. The findings of various research institutes suggested that treatment combinations of inter cultivation combined with organic and inorganic manuring has improved the productivity of coconut palms. Cover cropping has been practiced where a semi permanent vegetation of leguminous creepers are maintained in inter-spaces of palms. Cover cropping apart from helping in prevention of soil erosion and weed growth adds organic matter and acts as thick, much, which in turn improves soil fertility and water holding capacity. The leguminous cover crops enhance the nitrogen status of soil by virtue of nitrogen fixation in symbiotic association with root nodule bacteria Rhizobium.

3.14.8 It has been observed that coconut has been predominantly cultivated by the farmers with small and marginal holdings of the costal areas in the country. Coconut being a mono crop, does not utilize the basic resources such as soil and sunlight fully available on the farms / gardens. The adventitious rooting pattern of coconut palms

actually utilize 25 per cent of land area, therefore remaining area of the farm / garden is exploited for raising subsidiary crop which would co-exist with coconut palms economically and symbiotically. The plant/crops found favourable for raising as inter crops in coconut garden are tuber crops viz. tapioca, elephant foot yam, sweet potato, Rhizome spice crops viz Ginger, Turmeric. Cereals viz. some variety of rice, maize, verger grass, pear millet etc. vegetable viz snake gourd, ridge gourd, bottle gourd, bitter gourd, brinjal are some compatible inter-crops with coconut cultivation. Studies at Central Plantation Crop Research Institute, Kasargod, revealed that among cereals Rohini variety of rice, maize, pearl millet, finger millet and varagu (*Paspalum scrobiculatum*) performed well in inter-cropping with coconut plantation.

Leguminous pulses crops viz cowpea, black gram, green gram, bengal gram, red gram and soybean gave satisfactory yield in intercropping with coconut. Papaya, Banana and Pineapple are most popular fruit crops grown as intercrops in coconut garden. Orchids, anthurium, cut flowers and ornamental nurseries can be successfully grown as inter-crop in coconut garden. Medicinal and aromatic plant viz lemon grass, kocholam, dioscorea, arrowroot, sida, thippali (long pepper) neela amari and adapathiyam are suitable as intercrops in coconut garden. In Kerala, perennial crops in association with coconut palm are preferred for mixed cropping. Cocoa, clove, nutmeg, cinnamon, pepper, betel vine, jackfruit and mango are often raised as mixed crops in coconut garden.

Different cropping combinations have been evolved for coconut based high density multi cropping involving annuals, perennials and combination of both depending

Plate – 9



Multistoried Cropping System upon the availability of resources like type of soils, irrigation facilities, rainfall, labour, finance, farmers needs and market demand. These systems enabled farmers to utilize maximum inter-space, full solar energy and higher income from unit holding. Apart from the agro-based mixed farming in coconut, poultry, piscicultures have been successfully tried by farmers for higher returns. Multi-storied cropping in which cultivation of three or more crops having different morphological characteristics in interspace of coconut palms, so as to intercept sunlight at different level and draw nutrition at different soil depths has been evolved. In this system intensive four crop combination which includes coconut, black pepper, cocoa and pineapple are cultivated in gardens where coconut palms are above 20 years old.

3.14.9 High Density Multispecies Cropping System (HDMSCS) : High density multispecies cropping system was established at CPCRI, Kasaragod in 1983. It involves growing of large number of crops to meet the diverse needs of the farmers having smaller holdings such as food, fuel, **Plate – 10**

timber, fodder and cash. The HDMSCS model was established in 1.2 hectare of 18 years old coconut plantation by interplanting 17 additional species crops. The crops selected were mango, breadfruit (*Artocarpus communis*), jackfruit, nutmeg clove, sapota, acidlime, guava, pepper, subabul, banana, pineapple,



High Density Multispecies Cropping System

papaya, coffee, elephant foot yam, colosia and cassava. As the perennials grew and utilized more and more space, the annuals crops like acid lime, sapota, mango guava, pepper, subabul, papaya and coffee were withdrawn from the system. The HDMSCS systems now consist of clove, nutmeg, banana and pineapple in standing coconut crop. The coconut yield in this system has increased by 176 per cent as compared to the pre-experimental yield as a response to adoption of HDMSCS and irrigation. Some of the HDMSCS models are being evaluated in different coordinating centers in India.

Table No.8

High Density Multispecies Cropping Systems under Evaluation at Coordination Centers


1.	Arsikere (Karnataka)	Model-I	Coconut + Pepper + Sapota + Banana + Clove + Lime + Pineapple.
		Model-II	Coconut + Pepper + Nutmeg + Mango + Guava + Curry leaves + Potato.
2.	Kohikuchi (Assam)	Model-I	Coconut + Pepper + Banana + Assam lemon + Pineapple + Ginger.
		Model-II	Coconut + Betelvine + Banana + Assam lemon + Colocasia + Turmeric.
3.	Veppankulam (Tamil Nadu) gourd.	Model-I	Coconut + Nutmeg + Banana + Seedless lime + Elephant foot yam + Bitter gourd
		Model-II	Coconut + Clove + Betelvine + Banana + Curry leaves + Colocasia
		Model-II	Coconut + Mango + Pepper + Banana + Seedless lime + Bhendi + Sirukizhangu


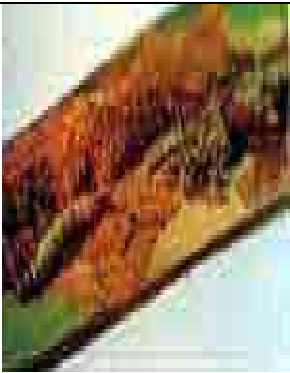

A field experiment was conducted at CPCRI Regional Station, Kayangulam to observe the impact of HDMSCS in root (wilt) affected garden on productivity and economic viability. The study revealed that in the system, productivity was higher and there was increase in the nut yield of coconut from 30 nuts per palm per year in pre-experimental period to 75.0 nuts per palm per year during 2000–2001. The inter-crops / mixed crops like banana, pineapple, pepper, nutmeg and tuber crop performed very well and provided additional income. The adoption of coconut based HDMSCS provided additional employment for the farming family, more stabilized gross income to coconut farmers even during lower price prevailing for the coconut. Moreover, the high density multi species cropping system was economically viable in root wilt affected area (Maheshwarappa, et. al., 2001).

3.14.10 Disease and Pest Management in Coconut : The coconut is considered as prime plantation crop is subjected to vagaries of nature. With modern agricultural practices, the incidence of diseases or pest infestation have been found to occur more frequently on coconut palms and causes substantial losses in their productivity and in some cases even loss of the palm. Though various control measures are used by farmers to tackle some of the major diseases, the efficient technological methods have to be integrated to derive greater benefit.


The basic purpose of Integrated Disease Management (IDM) and Integrated Pest Management (IPM) is to involve utilization of different technologies in a compatible manner to reduce pest population or disease infestation below the economic damage level in coconut based cropping system.

MAJOR INSECT PESTS OF COCONUT IN INDIA

Sl.No.	Pest	Parts affected	Photo	Control Measures
1.	2.	3.	4.	5.
1.	Rhinoceros beetle (<i>Oryctes rhinoceros</i> L.)	Spindle, leaves, Spathe, destruction of inflorescence		Extraction of beetles using hooks during peak period of infestation (June-Sept.) from the crown of palms and treatments of all possible breeding sites of the beetle with 0.01 per cent corbaryl. Disposal of breeding grounds. Biological suppression using the microbial agents like Baculovirus of Oryctes and Metarhizium anisopliae.
1.	2.	3.	4.	5.



2.	Red Palm Weevil <i>(Rhynchophorus ferrugineus Fab.)</i>	Terminal bud, upper portion of trunk spindle, tender leaves		Avoid injuries on palm. Treat wounds with coal-tar+Carbaryl. Prophylactic crown treatment with 25 g. of Sevidol.8-G in 200 g. fine sand in May-September and December and curative treatment with 0.1 per cent endosulfan / dichorvos or 1 per cent carbaryl. Trapping of floating population of the weevil using coconut logs treatment with fermented toddy. Removal and burning of dead palms.
3.	Leaf eating Caterpillar <i>(Opisina arenosella wik.)</i>	Attack leaves, particularly lower leaves surface during summer months from February to June		Disposal of badly infested outer leaves and leaflets by cutting and burning during out break of epidemic. Spraying Dichlorvos 0.02 per cent insecticide when the pest is in active larval stage and subsequent release of stage parasitoids like – Apanteles taragamae, Elasmus nephantidis. Brachymeria noscitoi and Xanthopimpla punctata. to control the job.
4.	White grub <i>(Leucopholis coneophora Burm.)</i>	Roots affected palms develop sickly pale yellow leaves, exhibits Button shedding and tapering of crown region.		Deep ploughing and digging of soil during pre and post monsoon period. Destroy adult beetles during peak emergence period in May – June. Application of insecticide phorate 10 G @ 100 g. per palm during the same period and September – October.




1.	2.	3.	4.	5.
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<p>5.</p>	<p>Eriophyid mite (<i>Aceria guerreronis</i>)</p>	<p>The mite infests the soft coconut by sucking sap from tissues of buttons. Triangular patches close to perianth due to sucking sap. The mite causes death of meristematic tissues resulting formation of brownish patches on the surface of nuts causing warting and longitudinal fissures. Prevents growth of nuts, reduction in shell and kernel. Affects quality and quantity of fiber content of husk.</p>		<p>Improve the nutritional status of coconut palm through application of fertilizer in two split application along with neem cake at 5 kg. per palm and organic manure (FYM) 50 kg. per palm. Spraying mixture of 2 percent neem oil, garlic and soap mixture and 1 percent Azadirachtin (Neemazal) @ of 4 ml. per litre of water or root feeding or stem injection at 7.5 ml. with same water proved beneficial in controlling infestation.</p> <p>Spraying of wettable Sulphur at 0.4 percent per litre of water Carbosulphan at 2 ml. per litre of water and Triazophos at 5 ml. per litre of water.</p>
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3.14.10.1 Like any other plantation crop, coconut palms are prone to many fungal, phytoplasma diseases and pest infestation which causes substantial loss in productivity of coconuts. Majority of coconut palm disease reported from various parts of the coconut growing areas are caused by fungi or phytoplasma viz Bud rot, Root (wilt), Leaf rot, Thanjavur wilt, Stem bleeding and Tatipaka causing significant decline in yield and even death of the palm. The incidence of diseases differs in different cropping system and eventually the disease control methods. The loss caused by the fungal diseases to coconut crop in the country ranges from 0.1 to 10 per cent in Kerala and upto 13 per cent in Tamil Nadu. The farmers are adopting available control measures in all the states such as observing phyto-sanitation for timely prophylactic and curative measures to prevent crop losses and to increase production and productivity.

Important Fungal Diseases Of Coconut


Sl. No.	Disease	Causative Organism	Parts affected	Photo	Control Measures
1.	2.	3.	4.	5.	6.
1.	Bud-rot or Fruit rot (Mahali)	<i>Phytophthora Palmivora</i>	Yellowing of younger leaves. Withering of spindle. (0.1 to 10% incidences)		Removal of infected tissues at early stage of infection. Application of Bordeaux paste 10%. Spray 1% Bordex mixture on spindle leaves and crown. Bordex mixture should not be used in Dwarf variety as they are sensitive to copper injury. 2-3 g. of Indofil.M..45 in perforated sachet is used to control bud rot in dwarf variety.
2.	Basal stem rot or Thanjavur wilt	<i>Ganoderma lucidum</i> <i>G.aplanatum</i>	Decay of roots system, flaccidity of spindle leaves browning of outer leaves. Arrest fruit setting, appearance of bleeding patches on basal region on the stem. Ultimately death of diseased palms. (2.6 to 13 % incidences).		Isolation of disease palm. Application of neemcake and Auveofugin or Calixin (0.1%).

1.	2.	3.	4.	5.	6.
3.	Stem bleeding	<i>Thielaviopsis paradoxa</i>	8 – 9 per cent Exudation of dark reddish brown liquid from the longitudinal cracks in bark at the base of the trunk. The bleeding patches spread, dries and turns black due to necrosis of tissues. Leaves in outer whorl turns yellow at premature stage, drupes and dry. The trunk tapers at the apex and crown size becomes reduced. Production of bunches and nut fall is noticed.		Application of coal tar Bordeaux paste to affected part. Application of neem cake and / or 0.5% Calixin to the affected part.
4.	Leaf rot	<i>Colletotrichum gloeosporioides</i> <i>Exserohilum rostratum</i> <i>Fusarium solani</i>	Blackening and shriveling of distal ends of leaflets in central spindle and younger leaves.		Removal of rotten portion of spindle. Spraying Hexa Consol (Contab 5EC) or Mancozeb (Indofil M-45) or Dithane (0.3%) Calixin 1%.
5.	Leaf blight or Grey leaf spot	<i>Pestalotia palmarum</i>	Necrosis of mature leaves causes extensive leaf blight leading to complete drying of leaf blade and shrivels off.		Spraying 1% Bordeaux mixture.

Important Phytoplasma and Viroid Disease of Coconut

Sl. No.	Disease	Causative organism	Symptoms	Photo	Control measures
1.	Root (Wilt) Disease (Kerala)	Phytoplasma Transmitted by Vector Stephanotis typicus bug and plant hopper proutista moesta.	Flaccidity bending of leaves, yellowing and marginal necrosis of leaflets. Smaller nuts and thin kernel.		Improved Integrated Management Practices of Coconut plantation. Eradication of affected palms.
2.	Tatipaka disease (Andhra Pradesh)	Phytoplasma	Development of abnormal large crown with dark green inner leaves and subsequent shrinking of crown producing shorter leaves. Affected trees produce smaller bunches with atrophied barren nuts.		Infected trees cannot be cured. Removal of affected palms and prohibiting use of planting seeds from affected area.

Deficiency Disease of Coconut Palm

Sl. No.	Disease	Deficiency	Symptoms	Photo	Control measures
1.	Crown Choke Disease (Assam & West Bengal)	Acute deficiency of boron.	Deformed leaves severe tip necrosis choked appearance of frond.		Soil application of Borax @ 50 g. per palm at half yearly application (Feb.- March and August – Sept.)

3.14.10.2 Large number of insect pests also causes considerable losses to coconut crop. It has been reported that the losses in the yield due to Rhinoceros beetle infestation were to the extent of 5 to 10 per cent and about 10 per cent reduction in yield in Kerala State alone. The red palm weevil has damaged the coconut crop in Tamil Nadu up to 11 to 12 per cent and dropped the yield to the extent of 10 to 25 per cent.

The Eriophyid mite, a lately reported deadly pest, which is responsible for heavy damage in almost all coconut growing, states in India in recent years. The gravity of problems could be assessed from the study conducted at location in Coimbatore, Tamil Nadu, wherein it was observed that the estimated loss in copra was to the tune of 52.4 per cent in the infected nuts (Ramaraju *et al* 2005).

3.14.10.3 Besides, these disease causing etiological agents belonging to Fungi, Phytoplasma and the pests, the coconut palms are also damaged by rodents and nematodes. The damage caused by rats in India to coconut was estimated to be 5 to 10 per cent of the total production. House rats enter the crown of the palm, consume the water and soft meat of the nuts and thus damaged nuts fall from the trees. The burrowing rats bore through the root system and uproot the seedlings causing damage to young palms. It has been reported that about 15 to 20 per cent tender coconuts are damaged by house rats, the intensity of damage was even up to 28 to 30 per cent in coconut cocoa mixed cropping system. The rats can be controlled by using poison bait with zinc phosphate / warfarin. Entry of rats on the trunk can be prevented by fixing mechanical barriers up to 2 meter height from ground level using 40 cms sized galvanized sheets. Furrows should be fumigated using Aluminium phosphate tablets and by placing wax block containing poison bait.

Plant parasites belonging to Nematode species namely Radophol-us-similes a borrowing nematode and Meloidogyne incognita, root-knot attack roots of palms causing rotting of roots, loss of vigour, stunted growth, delayed flowering yellowing of leaves, button shedding and thus reduction in yield. The integrated management of nematodes in coconut plantation includes (i) Application of phorate 10 G @ 100 g per palm twice in a year during May- June and September-October months. (ii) Use of nematode free seedlings or tolerant cultivars or hybrids of coconut and intercrops in infested areas. (iii) Avoid use of banana as shade crop in coconut nurseries.

3.15 Harvesting Practices:

Plate – 11



Coconut Harvesting

3.15.1 Coconuts are harvested at varying stages of development depending upon their consumption and commercial utility in the producing states. The nuts must be fully matured when maximum quantity of good quality copra is to be obtained. It is desirable to allow the nuts to fall naturally, so as to have fully matured nuts for good quality ball copra and seed purpose. Besides, coconut oil, desiccated coconut is also an important commercial product for which fully ripped nuts are essential. Usually, 11 to 12 months old nuts are harvested at varying intervals in about 6 to 10 times in a year depending upon the yield of palms.

3.15.2 In southern states, particularly in the tracts where husk is utilized for manufacture of coir fibers, nuts which are 11 months old are harvested to meet the requirement of coir manufacturers. The best quality of coir fiber is obtained from the husks of green nuts i.e. nuts somewhat immature from the point of view of copra quality nuts. In the states like West Bengal, Assam and Orissa where coconuts are mainly harvested for consumption of coconut water for dinking purpose, the green coconuts or tender nuts are harvested at about 5 to 7 months old. However, in a study conducted to identify cultivars suitable for tender nut purpose in West Bengal, it was observed that at seventh or eighth month after fruit set in it was considered as the month of harvest for use as tender nut so as to get better volume of coconut water along with sugar and minerals. (Poduval et al 1998). With the increasing consumer demand for tender coconut, special care has to be taken while harvesting the tender nuts. The bunches from the tall palms required to be lowered to the ground with the help of rope by the skilled climbers. Since the natural, healthy and clean appearance of green nuts are appreciated and preferred by the elite consumers, it should be free from dirt, discolouration and patches due to injury. The maturity of the bunches has to be ascertained before harvesting. The tender coconuts when meant for water consumption, only 6 months old nuts are harvested. If gelatinous kernels are required along with water, the bunches of 7 months old nuts are harvested. The coconut bunches harvested at 8 months old maturity would provide both kernel and water preferred by some section of consumers.

3.15.3 The periodicity and frequency of harvesting coconuts vary from area to area, depends on the yield of the tree, variety and finally the purpose for which the crop is utilized. In highly productive gardens, nuts are harvested once in a month i.e. on west coast, harvesting of nuts may be possible 6 to 12 times a year. The gardens having low productivity usually harvest the coconuts only 6 times i.e. once in every two months. The areas where husk of nuts for retting is priority, in that area about 10 to 12 harvests are obtained. In Andhra Pradesh 8 to 10 harvests are common in Godavari belt and once in two months in Vishakhapattanam and adjoining districts. In Karnataka state the harvesting of coconut is carried out once in three months and major portion is harvested in the month of March and April every year. In Maharashtra and Gujarat states, matured nuts are harvested about 3 to 6 times in a year and tender nuts are harvested as and when required through out the year. In West Bengal traditionally 80 to 90 per cent of nuts are harvested as tender nuts in about 4 to 6 harvests. In Orissa, harvesting of matured nuts is carried out once in two month's period i.e. 6 times in a year.

3.15.4 Usually all over the country, farmers practice conventional harvesting method in which coconuts are picked by specially trained, skillful and experienced climbers. Knife sickle or iron hook attached to the plucking end of long bamboo poles are also used for picking nuts. In some gardens in Kerala 2-3 meter long ladders are used for climbing

coconut palms for harvesting nuts. It has been reported that a simple coconut palm climbing device has also been used by the climbers for harvesting nuts. The climbers, on reaching the crown examines the maturity of the bunches and pick the mature ones. Power tiller operated telescopic ladder for coconut harvesting was developed by the College of Agricultural Engineering, Tamil Nadu Agricultural University Coimbatore.

3.16 Storage of Coconut :

3.16.1 Though the storage is an important function to create utility and regular supply of the commodity through out the year, due to variation in the consumption pattern of the coconut, there is wide variation in storage practices and that too for a short duration. The type of storage practiced in the coconut trade is actually for the seasoning and to facilitate husking, shelling, drying to reduce the moisture content of the kernel so as to get the desirable thickness of the meat (kernel) and to increase the yield of copra and oil content. The quality of copra produced after storage is also superior to that is obtained from the freshly harvested nut. The storage of harvested nuts is always beneficial when the nuts are fully ripe. Good quality of copra can only be harvested from fully matured green coconuts. The storage of coconuts which have been harvested, comparatively at immature stage may help in obtaining higher copra content per nut but such nuts are prone to spoilage on storage.

3.17 Supply:

3.17.1 Retention at Farm Level : The entire quantum of coconuts produced are not sold in the market. The farmers generally retain a portion of their farm produce for meeting seed requirement, direct consumption and payment of climber's wages etc. The quantity of coconut converted to copra for milling purpose varies from state to state depending upon the consumption pattern of coconut and its products. It may be negligible in the coconut producing states, where coconuts are mainly harvested for consumption of tender coconut water and matured nuts for direct consumption as kernel. It may be 90 per cent in the Southern state where the coconuts are exclusively harvested for conversion to copra for extraction of coconut oil. The quantities and percentage share of coconuts retained for various purposes are furnished below.

Table No.9

Quantity of Coconuts retained by Producers (Quinquennial Average Year ending 2004-05)

Sl. No.	Purpose of retention	Quantity (Million Nuts)	Percentage
1.	Total Production	12537	100.00
2.	Retention for seed	267	2.13
3.	Direct consumption	666	5.31
4.	Oil Milling	--	--
5.	Payment of Wages	154	1.23
	Total Retention :	1087	8.67

Source : Field survey.

3.17.2 Marketable surplus: The marketable surplus of coconut after deducting quantities retained by the producers has been worked out and furnished in table No.10

Table No.10

Estimated Marketable Surplus of Coconut

(Quinquennial average production Year ending 2004-05)

Quantity : Million Nuts.

Production	Total retention	Marketable Surplus	
		Quantity	Percentage of total production
12537	1087	11450	91.33

3.17.3 Export/Import: The Export and Import of coconut products reveal grim situation in the country. However, it has been reported that India's exports earning from coconut products is increasing at the compound growth rate of 20.71 percent per annum and the import of coconut and its products increases the trade deficit in the export earning of the country. Since the rate of growth on the import of Coconut products, during the same period was 33.50 percent per annum (Thomes, 2004), (**Annexure - LXVIII**).

Table No.11

Export of Coconut Products from India

(Quantity in Tones)

Year	2000-01	2001-02	2002-03	2003-04	2004-05	Average
Export	319.93	247.33	473.45	610.32	935.34	517.27

Source : Directorate of General of Commercial intelligence and Statistics, Kolkata.

In fact the increasing export trend of coconut products is on account of the export of the “Coir and Coir products”. However, coconut oil and other coconut product comprise a negligible share in the export market on account of large-scale domestic consumption of coconut and coconut products. However, owing to the medicinal and cosmetic value of coconut oil, virgin coconut oil and tender coconut water value addition to these products has bright future in the international markets.

3.17.4 Net Available Supply of Coconut: The net available supply consists of the total marketable surplus, supplemented by imports, less exports. The net available supply has been worked out on the basis of five years average production ending 2004-2005 (Table No.12)

Table No.12

Net Available Supply

Quantity : Million Nuts.

Marketable Surplus	Imports	Exports	Net Available Supply
11,450	Nil	3*	11,447

(* Quinquennium Average on year ending 2004-2005)

Source : Field survey.

3.17.5 Utilization: The entire coconut production in the country is utilized for internal consumption. However, very little quantity of coconut products are exported to other countries. The internal consumption comprises mainly for oil extraction, direct consumption for edible purpose, religious offerings and retention for seed purpose and negligible quantity for payment of wages to climber / pluckers. Thus, the estimated quantities of coconut available for utilization during the quinquennium ending 2004-05 is as given in table No.13.

Table No.13

Estimated Utilization of Available Supply of Coconut in India

(Quinquennium average production ending 2004-05)

Quantity : Million Nuts.

Supply	Utilization				Total
	Seed Purpose	Direct consumption and other purpose	Oil Extraction	Export	
12537 (100 + Nil)	267 (2.13)	820 (6.54)	11267 (89.87)	3 (0.02)	12537 (100)

Figures in parenthesis indicate the percentage.

3.17.6 Demand: The demand for coconuts in the country is mainly for the purpose for which they are utilized in the various form for consumption. It could be seen from the above table that the demand comprises of requirement for seed purpose, direct consumption for edible purpose and milling purpose for extraction of oil for the internal market. The demand for seed and for direct consumption comes to 2.13 per cent and 6.54 per cent per annum; however the bulk quantity, 89.87 per cent goes for milling for extraction of coconut oil and edible copra.

CHAPTER - IV

COCONUT SITUATION IN TRADITIONAL AND NON – TRADITIONAL COCONUT PRODUCING STATES AND UNION TERRITORIES

4.1 The coconut palm being a small land holder's plantation crop grown in 1.89 million hectare area in the tropical belt of the country extending from Kerala, Karnataka, Tamil Nadu, Andhra Pradesh in south, Gujarat, Maharashtra in west, Orissa and West Bengal in the east, Assam and Tripura in the North Eastern region of India and is a means of living for millions of people inhabiting in the traditional and non traditional coconut growing states and union territories. The islands of Andaman and Nicobar and Lakshadweep are other traditional coconut areas. Since the coconut crop has a national acceptance due to country wide demand either for edible, non-edible or religious purpose, it has triggered keen interest among people of even the non-traditional states to try few saplings in their home stead gardens.

The major socio-economic feature of this plantation crop is that it is predominantly cultivated in small and marginal holding and with medium resource to poor farm environment having less marketable surplus. It has been reported that the national average productivity of coconut in India is very low i.e. around 40 nuts per palm per year. The low productivity of coconut crop in the country has been on account of several reasons, i.e. lack of adoption of scientific cultivation practices to enhance productivity, which helps in bringing down the cost of production. In most of the small coconut holdings, the soil nutrients and water are limiting factor in crop production. The unique nature of Indian coconut sector is the rain fed nature of crop cultivation coupled with practicing subsistence farming which often leads to low level returns from the holding. It can be seen in the foregoing paragraphs that there is distinct difference in the pattern of distribution of this crop in the country. Kerala, the southern most state situated along the West coast is a major coconut growing state. Except in Kerala and a few small states and union territories, coconut is not grown contiguously but limited to only congenial belts accounting to an insignificant portion of the total arable agricultural area. Kerala, Karnataka, Tamil Nadu and Andhra Pradesh are therefore the four major coconut producing state, sharing 90.8 per cent of the total area, whereas the contribution of other states / union territories is only 9.2 per cent. (**Annexure-IVA & IVB**)

4.2 Andhra Pradesh : Coconut is an important plantation crop in Andhra Pradesh grown along the coastal belt and adjoining districts. The major coconut growing districts are East Godavari, West Godavari, Sri-Kakulam, Vishakhapattanam, Vijyanagaram, Prakasm, Guntur, Chittore, Krishna Khamman, Nellore, Ananthapuram, Kurnool, Guddapah, Ranga Reddy and Medak.

Andhra Pradesh is one of the major coconut growing state which accounts for 5.5 per cent in area and 9.5 per cent in production of coconut in the country. It is grown in an area of 1.053 lakh hectares with annual production of 1158 million nuts and productivity of 11003 nuts per hectare, which is significantly high when compared with other major coconut producing states in the country. East Godavari, West Godavari and Srikakulam alone contribute for 80 per cent of coconut production in the state. In Andhra Pradesh, coconut is grown mainly under irrigated conditions, and Godavari water is the main source for irrigation. Since the major areas under coconut production are irrigated lands, the productivity is on the higher side and higher productivity is mainly attributed to high density planting especially in coastal districts. The East Coast Tall (ECT) variety commercially called as “*Desavali*” is extensively grown in Andhra Pradesh. The other varieties which are grown are Ganga boundan which is a dwarf variety, Godavari Ganga (ECT x Ganga boundan) a semi dwarf variety, Laccadive-ordinary and Philippine ordinary.

In Andhra Pradesh, coconut palms are infested by many pests and diseases. As a result, considerable reduction in yield was found, evidently by the attach of black headed caterpillar, Rhinoceros beetle, Red palm weevil, Eriophyid mite and diseases such as leaf-rot, stem-rot, stem bleeding, bud rot and Boron deficiency.

Coconuts in Andhra Pradesh are marketed throughout the year as matured coconuts, which are used mainly for domestic consumption and religious purpose. However, about 20 to 25 per cent of production is consumed as tender coconuts and only 5–10 per cent of produce is converted to copra manufacturing. Even though Andhra Pradesh is one of the major producers of coconut, it is lagging behind in respect to production of various value added products. The milling units of coconut oil are small and unorganized in nature. There are no units producing packed tender coconut water, vinegar, milk powder and other value added products in the state. Some of the existing desiccated coconut powder manufacturing units are also non-functional, only few units are established for the coir manufacturing.

4.3 Andaman And Nicobar Islands : The Union Territory of Andaman and Nicobar Islands have longest history of coconut cultivation possibly next to the Kerala state in the country. The total area in Andaman and Nicobar Islands is about 24746 hectares with a

production of 86.56 million nuts. Though the major area under coconut is in Nicobar district, but it is mostly grown as self propagating crop rather than planned plantation.

The climatic conditions in Andaman and Nicobar islands are congenial for cultivation of coconut but the production and productivity of the crop in these islands is very low. The productivity of coconut is about 3500 nuts per hectare, against 7821 nuts/per hectare, of the national average. Productivity of the crop has remained more or less stagnant since last three decades. The average productivity of 23 nuts per palm in the Union Territory is reported to be very low. It has been observed that factors responsible for the low yield in the coconut plantation in Andaman and Nicobar islands are due to unproductive and senile palms, inferior genetic base, poor soil conditions, rain fed nature of crop, high palm density, poor management and inadequate disease control measure.

The local varieties of cultivars like Andaman Tall and Katchal Tall yield about 30 to 31 nuts per palm per year. The coconut crop has been grown in variety of soils in Andaman and Nicobar islands from costal sandy loams to black fertile soil. The coconut cultivation system observed in Andaman and Nicobar islands was individual holding having 0.37 hectare to 5 hectare land on which coconut is grown along with other horticultural crops. Cooperative societies have undertaken coconut cultivation on 475 to 500 hectares land and government coconut plantations have been leased out to tribal agencies on long term basis and mostly are located in Andaman district. The Nicobar district has coconut plantation owned by tribal head of the community known as chief or captain. Number of intercrops and mixed plantation are grown in coconut gardens. The common intercrops grown are vegetables like cowpea, snake gourd, radish, okhra, brinjal etc., sweet potato, yam, ginger, turmeric and chillies are cultivated as cash crops. Pepper, pineapple and banana are also planted as mixed crops.

Post harvest processing of coconut in Andaman and Nicobar islands is confined to primary processing of coconuts into copra and manufacture of coconut oil by using traditional techniques. Copra is manufactured mainly in the unorganized way on home scale using sun drying process and local drying arrangements during rainy season. It has been reported that there could be nearly 500 small copra making units manufacturing about 7500 metric tones of copra annually. The quality of copra produced is very poor and does not fetch remunerative price. However, kiln types of copra units do manufacture a small quantity of quality copra. There were 17 coconut oil extraction units as per the record of the Directorate of Industries of which 4 units used expeller for oil extraction. The others were using rotary units or locally known as '*ghani*'. All units put together produced only 500 to 700 metric tones of coconut oil which is $\frac{1}{4}$ th of the total capacity of these oil producing units. The reasons attributed for low production of oil are the non-availability of quality copra, at reasonable price, price fluctuation in the

market, low yield of oil on rotary type of units, lack of technical skill and inability to stock the raw material through out the year.

4.4 Bihar : Even though coconut palm is adaptable to wide range of soil and climatic conditions, Bihar was not considered favourable for coconut growing. However, Kosi region in North Bihar has gained momentum in 1987 which comprises places on either sides of the Kosi river. Coconut is grown upto the Nepal border in North Bihar mainly in Katihar, Krishanganj, Purnea, Fabisganj Araria, Madhepura, Saharsa, Khagaria and Supanl districts in Kosi belt. Coconut is grown in Muzzafarpur, Darbanga, Vaishali and Saran districts in North Bihar, situated outside Kosi region. Coconut is also grown in Patna, Gaya, Bhagalpur and Dhumka districts in South Bihar. It has been reported that the coconut is grown in 10,595 hectares producing 33 million nuts in the state. In Jharkhand state, the erstwhile South East Bihar, coconut is mainly grown in Chaibasha near Ranchi.

According to Coconut Development Boards estimate nearly 50,000 hectares of potential area in Bihar is available for coconut cultivation, mainly in North Bihar and Ranchi areas of Jharkhand under irrigated condition. However, it has been observed that coconut cultivation on commercial scale is not advisable. Since the minimum temperature prevailing during winter season is not congenial for coconut plantation as it causes injury to inflorescence and leaves of coconut. However, considering the local demand for the nuts for religious and culinary purposes, coconut can be grown as home stead crop under proper care, as the coconut palms in many districts in Bihar and Jharkhand states have the potential to yield about 100 nuts per annum.

4.5 Goa : Goa is the smallest state situated in the Western Coast of Indian Peninsula having Terekhol river on the North-Western Ghat, Arabian Sea on the west. The humid warm climate with little variation in temperature (21-32⁰ C) is favourable for the growth of coconut. The state is divided into North and South Goa. The main crop grown is coconut covering an area of 25068 hectare with annual nut production of 122 million nuts. The productivity of coconut in the state has been estimated at 4868 nuts per hectare and the state average per palm per year is about 30 nuts. The popular coconut cultivars of Goa are Benaulim, Calangut and Nadora. The Benaulim also known as Banawali is mostly cultivated in the southern part of Goa. The colours of fruit varies from yellow, green to red and therefore are known as Benaulim green round, Benaulim red round, Benaulim green long and Benaulim yellow long. The yield varies from 82 to 190 nuts with a mean of 151 nuts per year. The copra content is 143 gms. per nut, and the oil content of copra is about 65 percent. The Nadora cultivar has derived its name from Nadora, the village from where it has been originated. The palm is taller than Banaulim and reaches upto the height of about 9 to 10 meters, average yield is 104 nuts per palm with a range of 50 to 152 nuts per palm. The fruits are bigger than that of

Banaulim. The copra content is 174 gm. per nut and oil content of copra is 64.5 per cent. The Kallingut, like Nadora is grown mainly in Northern part of Goa. The fruits are oblong and green, with annual yield varying from 60 to 120 nuts per palm. The copra content is smaller than that Nadora but higher than that of Banaulim with 148.5 gm. per nut and the oil content in copra is 68 per cent.

4.6 Gujarat : Though Gujarat is traditional coconut growing state, its contribution in area, production and productivity of coconut has been insignificant compared to other major coconut producing states in the country. It contributes only 0.67 per cent area and 0.80 per cent in production at all India level. According to an estimate, Gujarat state has 369.8 thousand hectare land under coconut cultivation with total production of 2.4 million nuts and productivity of 2667 nuts per hectare was reported in the year 2002-03. Junagad, Valsad, Bhavnagar are the major coconuts producing districts in Sourashtra region. Jungagad also contributes 38.13 per cent in area and 37.90 per cent in total production of coconut, followed by Valsad 27.40 per cent in area and 27.09 per cent in production, Bhavnagar district 20.40 and 20.17 per cent, other major districts such as Porbander, Kutch, Surat, Navsari, Jamnagar, Amerely and Baroda also have coconut cultivation and contribute 13.8 per cent area under coconut cultivation and 14.62 per cent in coconut production.

Important varieties of coconut grown in Gujarat state are West coast Tall, Pratap, Kamandala, Andaman Tall, Rangoon Khubhasi, etc. Manila, Panaora Tall, yields big size nuts. Cylone Tall, Harmania produces medium size nuts and varieties such as African Tall, schychellius Tall are also grown which produce small fruits. The average yield of coconut has been reported to be 60 to 70 nuts per tree for tall varieties, 100 to 125 nuts in hybrid dwarf varieties.

Coconuts after harvesting are brought to the APMC/Markets for sale either through cultivators or co-operatives societies. In some areas of Gujarat such as Navasari, Surat, etc., the cultivators do not bring their fruits to the markets. They directly sale the nuts outside the APMC yards. Producers who bring their coconuts for sale in the market yard dispose them through open auction system. There are no big units manufacturing coconut products in Gujarat. The units producing coconut products are very small in terms of production and sale of coconut by products.

4.7 Karnataka : Karnataka accounts for 15 per cent of area under coconut cultivation and 10 per cent of total production of coconut in the country. Coconut is the second largest and important horticultural crop of the Karnataka state, occupying 31 per cent of the total area under horticultural crop. The crop is grown in all the districts of the state. The total area under coconut in the state is around 3.33 lakh hectares and the annual production of coconut is 1754 million nuts. The productivity of coconut in the state is

considered as lowest when compared to other neighbouring states. The varieties which are grown are chowghat orange dwarf, chowghat green dwarf, Malayan green dwarf, Malayan orange dwarf, malayan yellow dwarf and Gangabondam. The dwarf variety is grown mainly for tender coconut purpose. The Tall varieties which are grown are West Coast Tall, Coconino, Laccadive ordinary, Laccadive micro, Tiptur Tall, Kappadam, Karradam, etc.

Nearly 60 per cent of the coconut produced in the state is utilized as raw nuts for domestic culinary purposes, social cultural and religious purposes. About 25 per cent of the nuts are converted into edible ball copra, desiccated coconut powder and the remaining 15 per cent is utilized as tender coconut for drinking purpose. Prominently, 60–70 per cent of the arrival of coconut is exported to other states i.e. Uttar Pradesh, Punjab, Maharashtra, Rajasthan, Madhya Pradesh, Jammu & Kashmir, etc., about 60 per cent of coconut production in Karnataka is used in domestic items and remaining is dried as copra, most of the copra arriving to the markets is dispatched to other state, where the Karnataka copra is in great demand. The coconut utilized for commercial product preparation is only to the extent of 35-40 per cent, while 55-60 per cent is consumed for food and beverage purposes. Milling copra continues to be the major coconut product in Mangalore market. Where as Arisikere and Tiptur markets cater to the ball copra which is exported to North India. Maddur market is mainly trading the tender coconuts which are sent to other states for consumption of tender coconut water.

The trade in tender coconut in the state is very popular, as tender coconuts have fairly good demand in most of the cities apart from the demand from the upcountry buyers. It has been observed that along the busy state highways and national highways like Bangalore – Mysore, Bangalore – Pune, etc, temporary retail sales outlets for tender coconut have been established at different points to meet the demand of tourist and other travelers. A large number of cycle hawkers are also involved in the retail selling of tender coconuts. Tender coconuts of Tiptur Tall variety is normally used for this purpose.

The coir industry is an important cottage industry in the rural areas of the state, providing gainful employment to many villagers. There are 330 units registered with coir board manufacturing coir products in Karnataka which are located in Tuymken, Chitoradnya, Bangalore, Hassan, Mandya. Out of these 330 units, 50 units are fibre extraction units, 30 units make curved ropes and 30 units make yarn, remaining units are manufacturing coir products.

4.8 Kerala : Kerala, literally meaning the land of coconut which alone occupies 50 per cent of the arable land and accounts for 44 per cent of production. Over a long period, there has been continuous expansion in area under coconut cultivation. During

the period 1981-82 to 1991-92, the acreage grew at a rate of 3.57 per cent per annum followed by an increase at a rate of 2.03 per cent per annum during 1991-92 to 2001-02. A distressing factor on the productivity front has been deceleration of yield at the rate of 0.25 per cent per annum in the nineties at the aggregate level. During the period 1991-92 to 2001-02, the yield improved slightly by 1 per cent per annum. However, its contribution of 44 per cent indicates low productivity as compared to National average. The largest coconut producing state occupies only the 9th place in terms of yield in the country. It is one third of the yield of 19667 nuts per hectare recorded in Lakshadweep which is placed in a similar agro climatic condition. Coconut is widely cultivated in all the 14 districts of the states. The concentration areas of production are the districts of Kozhikode, Thiruvantahapuram, Kannur, Malapuram, Thisiur, Kolliam, etc. During the year 2005-2006, the total area under coconut in the state was 900 thousand hectares with total production of 5895 million nuts per hectare and productivity was 40 nuts per palm per year.

The most popular varieties of coconut cultivated in Kerala are West Coast Tall (WCT), TxD and DxT. Farmers in the state make use of both rain fed and irrigated systems in coconut plantation. However, a few progressive farmers follow irrigated farming and good management practices. Though the scientific recommendation is for 180 coconut trees per hectare, farmers generally plant more seedlings per hectare. Mixed farming practice is very common in Kerala. Inter cultivation practice, with Tapioca, sweet potato, yam, colocasia, ginger, turmeric, pulses, banana, pineapple, pepper, spices etc., is followed. Normally, farmers sell coconut immediately after harvest but few farmers store them for 2 to 3 months. It has been reported that the loss in storage is about 1 to 2 per cent due to sprouting and quality deterioration.

In Kerala, tender coconut harvesting is very less. It is estimated that less than 2 per cent of the total nuts produced are marketed as tender nuts. Major portion of tender coconut marketed in towns, cities, tourist and pilgrimage centers comes from Tamil Nadu and Karnataka, where special varieties suitable for tender nuts are cultivated commercially, which is not the practice in Kerala, and therefore, harvesting of tender coconut in Kerala is negligible.

Harvesting of matured coconut is a traditional practice in Kerala. Since, copra making, oil extraction and coir making are principal activities of industrial importance. About 70 per cent of matured nuts are converted into copra and out of the total copra produced; about 85 per cent is milling copra and 15 per cent in the form of edible ball copra. About 30 per cent of the nuts are utilized for culinary and other purposes, including dispatches to other States. About 80 per cent of the milling copra is converted into oil and the rest along with the ball copra is dispatched to other States.

The coconut based economy of Kerala can expect a revival from the negative impact of liberalized imports only when the profitability of coconut farming is declined from the price behavior of coconut oil. The average size of coconut holding in Kerala is only 0.25 hectare. Mono cropping models practiced do not support the livelihood security of the dependent families. It has been observed that Kerala has not achieved noticeable progress in the utilization of the multiple products of coconut palm for value addition both at the farm-household and community levels.

Possibilities are being explored by the authorities in Kerala state for the export of nuts of Chughat Orange Dwarf variety. Demand for fresh tender coconut is also high in many states within the country. Marketing of tender coconut will create opportunities for enhancing on-farm income of farmers and employment at different levels. These products find acceptance not only in the markets of the respective countries but in the international markets too and shall constitute one of the major sources of export earnings. The coconut products made use of by skilled artisans are wood, shell, fibre and spate and some of the artifacts are valued for their aesthetic quality and also for their utility as household appliances. In Kerala many rural artisans are engaged in handicrafts for their livelihood. Although manufacture of coconut based handicraft has been in existence as a traditional activity in the State, its development into a viable and flourishing enterprise has been inhibited because of the absence of facilities for design, training and organized marketing. New designs in accordance with changing consumer preference and training in the production of modern artifacts are essential prerequisites for competing with quality products emanating from other countries. Equally important is the opportunity for marketing the products in the domestic and export markets.

The coconut products which show potential, for organized production in the State are desiccated coconut, partially defatted coconut flour and coconut water and milk based products. Sweet toddy or 'neera' can be harvested / tapped as a health drink, the product is capable of fetching great monetary gain for the state. It has been reported by a local researcher that, even if just 1 per cent of the palms are subjected to tapping, it would give toddy worth Rs 10,000 crore. Introduction of canned fresh toddy for domestic and export marketing will prove to be a viable activity. Technologies for the canning of fresh toddy are available which are only to be pilot tested for adopting the most appropriate one under local situations. The farmers' co-operatives, which organize toddy tapping and sugar production or even individual entrepreneurs, may be permitted to undertake the activity under proper control. In Kerala, income from coconut holdings will register a sharp increase with the direct involvement of registered farmers' organizations in toddy tapping and the subsequent processing of sweet toddy. Apart from the production and marketing of different forms of sugar, these organizations could

also serve as the supply source of toddy to the local toddy parlours. Coconut cheese is another product made from skim milk in combination with non-fat dry dairy milk powder. This has already evoked consumer interest in the international markets and the opportunity could be exploited profitably by Kerala. Coconut oil has great economic importance for the state of Kerala but there is a declining trend of coconut oil production in the state from 1998–99 to 2002–2003. During 1998-99, the production of edible coconut oil was 34,000 thousand tonnes. During 2002-2003, it has declined to 28,900 thousand tonnes. Though copra is made out of coconuts and coconut oil from copra, the price of coconut is fixed on the basis of prices of coconut oil in the market and as such, the economy of coconut based farming in Kerala till date is mainly dependent on a single coconut product i.e. coconut oil.

Traditional industries manufacturing items as coir, handlooms, and handicrafts which employ around one million people. Around 1.8 lakh small-scale industries provide employment to 909,859 Keralites, while some 511 medium-and-large-scale manufacturing firms are located in Kerala. Kerala, hails coconut as the 'tree of heaven' but so far it has failed to exploit its most potential produce. The main reason for the comparatively low material balance of finished coconut products in Kerala is the small size of nuts and the low turn out of kernel of the West Coast Tall (WCT) variety which occupies over 85 per cent of the area in the state.

4.9 Lakshadweep : Lakshadweep, the smallest union territory of Indian Union, is a group of islands in the Arabic sea with a total area of 32 km. consisting 22 islands and 5 attached islets out of which only 10 are inhabited. These coral islands lie about 225-450 km. away from the Kerala coast. The climate in the island is almost similar to the west coast of Kerala with an average annual rainfall of 1600 mm and temperature varies from 24⁰C to 30⁰C.

Coconut is an important plantation crop of all the islands since centuries. The islanders do not follow definite pattern for planting coconut seedlings as far as spacing is concerned. The farmers practice closed planting and strikingly plant more seedlings on the boundary of their field which has resulted in the over crowding of palms on the islands. It has been reported that on an average 400-500 palms of all ages are grown in 1 hectare of land as against 172-200 palms recommended for optimum yield.

Andrott is the largest island inhabited with an area of 4.84 sq.km., of which 464 hectare are under cultivation. Coconut is a major crop grown in about 450 hectare of the cultivated area. On this islands coconut cultivation is practiced at a very high density of about 100-200 plants in an acre. The coconut palm population in Lakshadweep islands is about 0.6 million with production of about 30 million nuts per annum. The average annual yield per bearing palm in the island is about 58 nuts. The average per hectare

yield of nuts is estimated to be 12718. There are two varieties of coconuts cultivars widely grown in these islands i.e. Laccadive ordinary and Laccadive micro. The high density plantation affects the productivity and utility of coconut palm.

The Laccadive ordinary variety gives an average yield of about 100-140 nuts per year and Laccadive micro variety yield about 280 nuts per year. Though Laccadive micro variety has high yield but has alternative bearing tendency and therefore, has low market value as compared to Laccadive ordinary. Therefore, the farmers are not keen about the palm of Laccadive micro variety owing to low productivity on account of alternative bearing. The situation could lead to low plantation of this variety from the existing bio-diversity of the island. Besides, these two varieties, green dwarf and yellow dwarf are the other cultivar grown in these islands. It has been reported that the use of chemical fertilizer has been banned in Lakshadweep islands to prevent chemical contamination of ground water. The emphasis is on the organic manuring of coconut palms. The products of coconut used by islander for their daily consumption are coconut oil, jaggery, vinegar, copra and sweet toddy. The common pest and diseases affecting these organically cultivated coconuts are Rhinoceros beetle, mealy bugs, nuts crinkler, and rats. Apart from these pests, coconut palms from the island are infested by the diseases like bud rots and stem bleeding diseases. Coconuts on islands are harvested during the seven months in the non-monsoon period from October to April. There is no definite time for harvest as in the case of main land where nuts are harvested once in 45 days. It has been observed that non availability of climbers could be the reason for irregular harvesting. Similarly, nuts are not harvested during the monsoon due to lack of facilities for drying the copra, However, during the dry season, 3 to 4 harvests are made and nuts are utilized for copra making by sun drying and taken to the main land for selling.

4.10 Maharashtra : Coconut is primarily a small holder's plantation crop in Konkan region in Maharashtra State. It is cultivated as an allied crop in varied crop-mix. About 92 per cent of the total area in Konkan region is under coconut farming. The climate and the soil of the region favour abundant cultivation of coconut. The coconut crop is grown in cluster farming and not on a contiguous manner. In spite of agro climatic compulsion and cluster farming of coconut in Konkan region, Maharashtra ranks sixth in cultivation of coconut covering 0.02 million hectares of land which contribute 1.13 per cent of the total area under cultivation in the country, with an average yield of 11350 nuts per hectare and ranks second in yield per hectare.

In Maharashtra State, Konkan region is the major coconut growing belt and about 92.34 per cent of the total area and production of coconut is concentrated in this region. Konkan region is the coastal plain of Maharashtra state in the Western India with Arabian sea on the West and Western ghats on the East. The region composes of

Ratnagiri, Raigad, Sindhudurg districts and greater Mumbai and has hilly terrain and extensive sea coast of 720 kms. Sindhudurg district accounts for 58.44 per cent of the total area under the coconut crop among the major four coconut growing districts, with 42.24 per cent production and stand 1st, whereas Ratnagiri stands second. It has been reported that though Sindhudurg and Ratnagiri district tops in area and production, the productivity of coconut in the region is highest in Thane followed by Raigad district. The productivity of coconut is 82 nuts per tree in Thane and only 45 nuts in Sindhudurg. The reason for higher productivity of coconut per tree in Thane district is attributed towards fertility of soil, assured irrigation and symbiotic benefit from complimentary inter-crops.

Most of the established coconut plantations in Konkan region are of the variety West Coast Tall (WCT). However, on the basis of superior morphological, inflorescence and fruiting characteristics accompanied by high yield potential, the Konkan Krishi Vidyapeeth, Dapoli in Ratnagiri district released the cultivar '***Banavali Green Round***' during the year 1987 named as '***Pratap***' for commercial cultivation in the Konkan region. Since then the Pratap variety is cultivated on large scale in Ratnagiri, Sindhudurg, Raigarh and Thane districts. Besides these varieties, the dwarf varieties like Andaman Dwarf, Nicobar Dwarf Laccadive tall and dwarf, and hybrid varieties TxD, DxT and VHC-1 are also planted in the region. The other districts in Western Maharashtra state like Ahmednagar, Nasik, Dhule and Jalgaon district in North Maharashtra have also taken up coconut plantation on small scale, where canal water for irrigation is available. In the Marathvada and Vidarbha region of Maharashtra, the coconut palms are grown as an ornamental plant on very small scale.

Matured coconuts are used for edible, social and religious purposes in the entire State, whereas 95 per cent of the total productions of coconut in Thane district alone goes for tender coconut consumption to Mumbai Market. The traders mostly from Malbar area of Kerala, take the plantation on lease basis for 15 months at one time contract. The nuts are harvested at 45 days interval and sold through their outlets in Mumbai. In Raigad and Ratnagiri districts about 80 per cent of the production is used as mature nuts for edible and socio-religious purpose and only 20 per cent as tender coconut water. Toddy tapping is also popular in the region for Mumbai market. The coconuts producer takes the produce to APMCs for sale. The cooperative societies are also functioning in the region and trade the coconuts in APMCs. Direct sale of coconut by the farmer has also been reported in the interior areas of the region. In APMC yards in these districts, open auction system is in vogue.

4.11 Orissa : Coconut is one of the most important plantation crops of Orissa. The area under coconut production in the State is about 43.3 thousand hectares producing 296.05 million nuts. The present productivity of the crop has been reported to be 8741 nuts per hectare. About 85 per cent of the area and production of coconut comes from the undivided coastal districts of Puri, Cuttack, Balasore and Gunjam. In coastal coconut growing belt of Orissa 17 full and dwarf varieties were identified based on size, shape and colour of nuts. Sakshigopal Tall, a distinct member of East Coast Tall group is found in most of the areas. The other important local variants are Bana reported to be superior yielding i.e. more than 80 nuts per palm per year. Oddisi Giant Dhila and Tahaji were recorded to be the largest and heaviest nut with higher husk percentage. Dhanei and Surya Bana are dwarf variety with ivory skin colour. The Sakshi Gopal Regulated Market for coconut in Puri district is the most important market for matured nuts and accounts for nearly 70 per cent of the total arrival of the matured nuts. However, recently Behrampur, Sambalpur, Raurkela, Bhubaneswar and Balasore have also developed the independent assembling and marketing centre of coconut in the state. It has been reported that about 20 per cent of the total coconut product in the state are consumed as tender nuts and 5 per cent are retained by the farmers for household and seed nut purpose. About 42 per cent of the coconut production is consumed in the state itself and 33 per cent are exported out of the state to Bihar and Madhya Pradesh.

Since, the tender nuts are available through out the year, they are sold all over the state along highway junction, bus stand, railway station and rural market centres. The demand increases to the maximum during March to June. It has been roughly estimated that about 52 to 200 nuts are sold by each retailer. The size of the tender nut is smaller as compared to the coconut produced in other states. However, tender coconut water is quite sweet and palatable. It has been observed that normally 4 to 6 month old nuts are harvested as tender nut in the state. Even though Orissa is a coconut producing state, it has been reported that there are no coconut oil producing unit operating in the state. However, there is a good market for coconut oil for toiletry use with annual consumption of about 8 thousand tonnes per year.

Puri and Gunjan district have many small scale nut fibre and coir manufacturing unit in the state. There are about 30 small unit producing coir and coir products in Orissa. The consumption of edible copra is not much in the state and confined mainly to Cuttack, Bhubaneswar and other industrial township. According to an estimate, around 500 tonnes of edible copra is consumed per annum. The demand is maximum during the festival season. The desiccated coconut is mainly consumed by the biscuits, bakery and sweets manufacturing industries. About 45 tonnes of desiccated coconut is consumed in the state. There are few manufacturing unit in private and cooperative sector located in Puri and Bhadrak district. Orissa has a very good potential for production and post harvesting processing of coconut in the state, but due to wide spread disease like aphid

mites has brought down the productivity of old plantation to a miserable situation. Moreover, lack of integrated development approach for production of coconut has stalled the further expansion and development of coconut industries in the state.

4.12 Tamil Nadu : Coconut is produced in all the 28 districts of Tamil Nadu state. The area under coconut in Tamil Nadu is about 3.52 lakhs hectares with a production of 4357 million nuts whereas, the productivity of coconut is 12382 nuts per hectare and stand next to West Bengal with 12601 nuts per hectare at the national level. Though the coconut is produced in all the district of Tamil Nadu, highest production has been reported in the districts of Coimbatore (96072 hectare 828.7 million nuts), Tanjavur (24822 hectare, 307.9 million nuts), Dindigul (22801 hectare, 273.8 million nuts), Kanayakumari (22589 hectare, 252.8 million nuts), Dharmapuri (21515 hectare. 218.9 million nuts).

Two distinguishable varieties of coconut i.e. tall and dwarf are cultivated in the state of Tamil Nadu because of cross-pollination in tall, variations do occur within the same variety. The varieties, which are more suitable for Tamil Nadu states, are East Coast Tall (ECT), West Coast Tall (WCT), Veppankulam - 3 (VPM-3), Andaman ordinary, a tall variety was released as VPM 3 during 1994 VHC-2 (ECT x MYD) a hybrid variety comes to bearing in 5 years (43 months - time taken to flowering).

For supply of quality coconut seedlings to the farmers, various coconut development programme have been taken up in Tamil Nadu. twenty seven Coconut Nurseries to produce Tall and TxD seedlings and two mother palm gardens for the production of Tall nuts are functioning to fulfill the needs of farmers. The seedlings thus produced are sold to farmers @ Rs.12 per tall seedling and Rs.20 per TxD seedling. Area Expansion under Coconut scheme is implemented in the State with the aim to increase the area under Coconut plantation with 100 per cent assistance from the Coconut Development Board. The Coconut Development Board is providing a sum of Rs.4000/- per hectare as subsidy towards the cost of seedlings, digging pits, planting and other expenditure for establishing new plantations in the first year. In the second year another Rs.4000/- is provided to meet the cost of maintenance. Total Rs.8000/- per hectare is extended as subsidy for two years as direct funding by Coconut Development Board, Kochi. The Coconut Development Board has extended assistance for area expansion of 300 hectare with the financial allocation of Rs.18.60 lakhs during 2006-2007. To encourage establishment of private coconut nurseries in the state, the Coconut Development Board is also extending assistance at the rate of Rs.3.00 lakhs to small nurseries and Rs.6.00 lakhs for big nurseries. It has been reported that the assistance was being extended on need basis, this programme is proposed to be implemented directly by Coconut Development Board at a cost of Rs.17.00 lakhs during 2006-2007. In order to improve the productivity of Coconut plantation, a Centrally Sponsored scheme of

Integrated Farming in Coconut Holdings for Productivity Improvement is implemented with cent per cent assistance through Coconut Development Board in the state. The Component under the scheme envisages removal of senile and diseased trees, laying out demonstration plots and organic manure units. "*Tamil Nadu Coconut Development Authority*" has been established by the state to solve problems in production, development of value added products and to explore the export potentials.

According to the Coir Board, Tamil Nadu stands first in the production of brown coir fibre in the country, accounting for 43 per cent, but its focus on value added products is almost negligible. The Coir Board grants financial assistance up to 25 percent of the cost of equipment and infrastructure facilities with a ceiling of Rs.1.5 lakh for setting up new Fibre/Spinning rope and Matting / Rubberized coir unit in the private sector. There are 5,567 coir units, 937 Coir marketing centers, 167 coconut oil production units, 2 desiccated coconut powder production units and one charcoal production center in Tamil Nadu. Co-operative organizations and Government agencies have also entered the field of processing and marketing of coconuts. The coconut Development Board is marketing limited quantity of coconut oil and non-traditional coconut based products through its sales counters.

Marketing of coconut, copra and coconut oil is mainly in the hands of private traders in Tamil Nadu. The Government agencies intervene in the market in times of price crash by procuring copra at the support price fixed by the Government of India. The Assistant Director of Agriculture, Department of Agriculture, and Government of Tamil Nadu in different districts/areas where coconut is largely cultivated are issuing identification cards to the coconut farmers. After proper verification and certification by the officials of the Department of Agriculture and Revenue Department the farmers are entitled to sell the copra to National Agricultural Co-operative marketing Federation (NAFED), Government of India through TANFED (Tamil Nadu Agricultural Federation). NAFED procures copra from the farmers through TANFED, which is assisted by other co-operative marketing societies in Tamil Nadu. The coconut farmers sell their dried copra to the NAFED. Quality and quantity of the copra is verified by the NAFED officials. Currently the copra is being procured by NAFED at six different places viz., Pollachi, Udumalpet, Palladam, Thiruppur, Avinashi and Kinathukadavu in Coimbatore district.

Thus increasing the productivity, reducing the cost of production, integrated farming, farm level processing, proper value addition, product diversification and by-product utilization coupled with effective marketing strategies and market promotional activities can definitely make the coconut industry more competitive and sustainable in the state of Tamil Nadu.

4.13 Pondicherry : Union Territory of Pondicherry comprises of four districts, namely Pondicherry, Karaikal, Mahe and Yanam which lie scattered in the South India. Pondicherry, the capital of the Union Territory spread in 219 sq.km area, and bounded on the east by the Bay of Bengal and on three sides by Tamil Nadu. Karaikal is in the east coast spread over 161 sq.km area, Mahe is in the Malbar coast surrounded by Kerala with 9.89 sq.km area and Yanam with 205 sq.km area situated adjoining the East Godavari district of Andhra Pradesh. Nearly 40 per cent of the population of the Union Territory is engaged in agriculture and allied profession. Paddy is predominant crop cultivated in 80 per cent of the area followed by pulses. Though, coconut is not a major plantation crop in this region, it is cultivated as mixed crop alongwith arecanut, condiments and spices. Mahe region contributes major plantation wealth of this Union Territory. The total area under coconut plantation in Pondicherry is 2.3 thousand hectare with a production of 22.3 million nuts and the productivity of 9696 nuts/hectare. As far as the varieties are concerned, the tall and dwarf varieties are grown in Pondicherry. There were 66 registered units involved in the production of coir products but only 40 are functioning at present and two of them are de-fibre units. The Coir Development Board has selected Pondicherry as one the states for an interventional programme to promote and develop the coir industry under the central scheme.

4.14 West Bengal : West Bengal is an important coconut growing state in the eastern region and ranks fifth in terms of area, production and productivity of coconut in the country, having 0.02 million hectares of area under coconut cultivation in the state, i.e. 1.03 per cent of the total area and production of 3.24 million nuts i.e. 2.19 per cent of the total coconut production in the country.

In West Bengal, coconut is mainly grown as homestead land crop and gradually gaining the status of plantation crop in the state. About eighty per cent of the coconut production is harvested as tender nuts due to age old habitual consumption habit of coconut water as natural drink by the inhabitants in general. The high intensity consumption of tender coconut water by the local population in West Bengal may be attributed to the realization of its medicinal and therapeutic uses by the commoners. The main coconut producing area in the state falls under districts of North 24 Paraganas, South 24 Paraganas, Murshidabad, Midnapore, Howrah, Burdwan, Hoogly and Nadia. The coconut plantation has also gained considerable importance in Jalpaiguri and Cooch Bihar districts in North Bengal. North Dingjpur, South Dinajpur and plain areas of Darjeeling in Northern part. Traditionally most of the homestead gardens have tall varieties of palm, viz. ECT, WCT, Philippines ordinary, Jamaica tall and hybrids Malayam yellow dwarf, Malayam orange, Dwarf (MGT). In recent times dwarf varieties are gaining popularity in the state because of there early bearing characteristic and dwarf stature of the palm.

4.15 Coconut in the North Eastern Region : North-Eastern region comprising states of Assam, Arunachal Pradesh, Tripura, Manipur, Meghalaya, Mizoram, Nagaland and Sikkim accounts for nearly eight per cent of the country's geographical area. The topography of the region ranges from hills and mountain to riverine plains and plateaus. The climatic condition in the region varies from temperate to sub-tropical and tropical. The agro-climatic conditions of the region, varied soil types and abundant rainfall are favourable for cultivation of horticultural crops especially plantation crops. Coconut is one of the most popular crop grown for a long time especially in Assam state and in recent times in others N.E. states. The area and production which were 11,000 hectares and 60 million nuts, respectively, during 1985–86, have now increased to 40,000 hectares and about 178 million nuts, in the North Eastern Region. The cultivation which was confined to Assam, Tripura and to some extent in Manipur, has now spread to states like Nagaland, Mizoram, Arunachal Pradesh and Meghalaya due to efforts made by Coconut Development Board.

4.15.1 Assam : Assam is naturally enriched with favourable soil and climatic conditions for coconut plantation, yet the coconut is cultivated as homestead crop in the state. The homestead plantation of coconut has been observed on the northern bank of the river Brahmaputra and selected areas in the southern bank as a homestead crop in sporadic manner. Since coconut is ritually esteemed in the social and religious life of the people in the state, the nuts are used for religious purpose and for consumption as tender nuts.

In Assam coconut cultivation is mainly concentrated in Brahmaputra valley. The coconut production in the state has shown increasing trend in the last two decades. In 1999-2000 the production of coconut was 150.1 million nuts from an area of 20238 hectares, which further increased to about 161 per cent in production and 152 per cent in area as compared to 1985-1986. However by 2004-05, there was marginal increase in area i.e. 21.3 thousand hectares, with total production of 154.3 million nuts. The coconut palms are grown in almost all the twenty three districts of Assam. Among these districts, Nagaon leads in area with 5035 hectares and production of 60.72 million nuts which alone comes to 40 per cent of the total coconut production of the state. Kamrup and Nalbari districts are next to Nagaon in area under coconut plantation. Coconut plants are mainly grown as rain fed crop without much care or crop management system. The other districts in which the coconut cultivation is scattered are Nalbari, Barpeta, Morigaon, Darrang, Kamrup, Sonitpur, Karimganj and Cachar.

The most adopted variety of cultivar grown in Assam is 'Assam Green Tall' named as Kamrupa variety. The other varieties released for cultivation in Assam are Assam Tall, Bengal Hazari, Bengal selected WCT, TxD hybrid 'Chandrasankaran' variety has also been recommended under the agro climatic condition of the state. Coconut being a monocrop is not economical; high-density-multi-species cropping

system is promoted among small holding farmers for maximizing return per unit area of land. Coconut crop in Assam is comparatively free of many diseases. The important disease affecting coconuts are bud rot and stem bleeding. Recently, Gonoderma wilt, has been reported from several parts of Assam. Major pest of coconut are Rhinoceros beetle and Red palm weevil.

The Coconut Development Board had released subsidy for new plantation to about 17800 beneficiaries under the area expansion scheme covering 326 hectares. Further, from 1985-86 onwards, an incentive subsidy @ Rs.8000/- per hectare was provided to individual growers for new planting of coconut.

In spite of the favourable agro-climatic condition for the coconut cultivation in Assam, the growth in this sector has been sluggish on account of planting of sub standard seedlings and non-availability of adequate 'Kamrupa' variety released by the Assam Agricultural University for planting, lack of scientific management practices by the farmers, improper nutrient management, lack of regular manuring and fertilizer application practices. Boron deficiency is very prominent in all the district of the state. Further the outbreak of 'Gonoderma' disease is epidemic in some district, lack of infrastructure for irrigation and absence of post harvest mangement infrastructure facilities for processing, marketing of coconut products, are some of the problems in the way of commercialization of coconut industry in Assam.

4.15.2 Arunachal Pradesh : Arunachal Pradesh is endowed with its undulating topography and varied agro-climatic conditions. The humid and hyperthermic climate in foothill region is quite suitable and congenial for growing coconut. The Coconut Development Board, under the area expansion programme brought an area of 300 hectares under coconut cultivation. The coconut area falls in parts of Changland, Teju and Passighat districts. Besides, these districts, certain area like Mahadevpur, Namsai, Bordumsa Deomali, Roing, Sonpura have been found comparatively suitable for coconut plantation.

4.15.3 Manipur : In Manipur, about 20,000 hectares has been estimated as potential area for coconut cultivation. It has been reported that some area of Chandel district near Moreh, Jiribam of Imphal East district, Tousem Sub-division of Tamenglong and parts of Kamjong and Ukhrul bordering Myanmar are suitable for growing coconut. In 1989-90 with the assistance of Coconut Development Board, 840 seedlings were planted covering 10 hectares of land in the state.

4.15.4 Meghalaya : Meghalaya, states do have certain tracts where coconuts are grown in homestead gardens. In Meghalaya, about 5000 hectares land estimated to have potential to grow coconut. The central plateau of Garo Hills and planes bordering Assam are the coconut growing zones. By the year 1999-2000, the state had 1.70 thousand hectare land under coconut plantation and production of 5.21 million nuts with productivity of 3065 nuts per hectare.

4.15.5 Mizoram : Mizoram has the lowest plantation of coconut i.e. 0.28 thousand hectares producing 0.64 million nuts with productivity of 2857 nuts per hectare. The total estimated potential area has been reported as 5,000 hectares. Parts of Aizwal and Lunglei districts adjoining Assam and Tripura are the coconut growing areas.

4.15.6 Nagaland : Nagaland is a non-traditional area for coconut cultivation, where coconut palms are found as an ornamental plant in the back yard plantation of the local population. The tropical climate in the foot hill area and temperate climate in the hilly region with abundant rainfall spread over seven months offers some scope for coconut cultivation as plantation crop. The foot hill belt of Nagaland bordering Assam state from Jalukie area in Kohima district to Tizid valley in Mon district, Wokha and Mokokchung districts are identified as suitable zones for coconut cultivation.

The Coconut Development Board has created awareness among the farmers of Nagaland and introduced area expansion scheme under coconut cultivation. In the year 1992-93, the area covered under the scheme was 642.94 hectares i.e.47.278 per cent of the total area estimated under coconut cultivation. The scheme covered 733 beneficiaries who received the subsidy of Rs.22.518 lakhs. The Coconut Development Board, Government of India was instrumental in establishing Regional coconut Nursery as State Horticultural Nursery at Dimapur to provide quality planting material to the farmers.

4.15.7 Tripura : Tripura is a hilly state in North Eastern Region of India having suitable soil, hot and humid climate for favourable growth of coconut palm. Coconut cultivation was initiated in the state as homestead garden and on the boundary bunds of ponds. Although, coconut thrives well in Tripura but the productivity is lowest in the country due to planting of poor quality seedlings and lack of adoption of scientific management practices. In Tripura during 1999-2000, the total area under coconut was estimated to 9100 hectares and production of 7.5 million nuts. The numbers of bearing and non-bearing palms were 786820 and 866428 respectively. The productivity of 824 nuts per hectare is lowest in the country. The coconut plantation in Tripura is comparatively free from common disease affecting the coconut palms. The major pests affecting coconuts are Rhinoceros beetle and Red palm weevil, termite, rat, squirrel and others are causing problems in different areas in Tripura.

The Coconut Development Board under the Ministry of Agriculture, Government of India has undertaken expansion of area under coconut in Tripura since 1982, under the programme minimum number of seedlings to be planted was 10 numbers and the maximum limit for availing subsidy was 4 hectares. The present rate of subsidy is Rs 8000 per hectares. The coconut grower, who plants minimum 10 seedlings, can get Rs.250 as a subsidy, in both first and second year. The area covered under expansion programme in 1985-86 was 54.686 hectares with number of beneficiaries 402 by 1994-95, the area covered increased to 172.2 hectares with number of beneficiaries as 2344, in the year 2000-01, in the area expansion programme, it covered 46.049 hectares with the number of beneficiaries as 616. Thus, the total area covered was 1098.694 hectares and the number of beneficiaries were 18,973 with total subsidy distributed was Rs.29, 03157.

CHAPTER - V

MARKETING PRACTICES

5.1 Marketing of coconut like that of any other horticultural commodities, notionally has two aspects i.e. the '*marketing activity*', in which sellers and buyers have mutual coordination in each other's activities, where goods and services from producers move through certain channels by conscious application of marketing tools. The other aspect is the '*marketing promotional activity*', which comprises of gathering information, data, compilation, analysis, interpretation of the data and passing the resulted valid information to farmers, traders, business organizations and other concerned agencies to facilitate marketing functions. The tools used for market promotional activities are marketing research, advertising and effective coordination between producers and consumers. While marketing promotional activities play supporting and strengthening role to the marketing activity, however, the later requires professional and commercial skill.

5.2 Marketing of coconuts differs from that of other fresh fruits due to natural durability of coconuts, which are sold as fresh tender nuts as well as matured water nuts and dry nuts. Since coconut is mainly cultivated in Southern states viz., Kerala, Karnataka, Tamil Nadu and Andhra Pradesh and nominally in coastal area of Maharashtra, Goa, Gujarat, Orissa and West Bengal etc., the Marketing practices followed are more or less similar in nature. It has been observed that they do not differ much except where the post harvest practices change on account of the form of the coconut and coconut products consumed in that area.

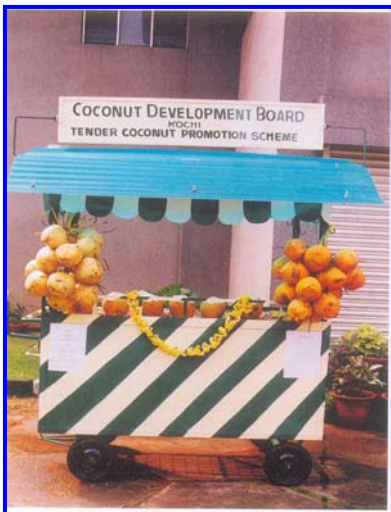
Indirect mode of disposal of coconuts as a strategy is more popular and widely adopted by coconut farmers. This indicates that channels, intermediaries play a major role in both assembling and equalization functions in marketing of coconuts. Coconut farmers who depend on direct channel are those who have comparatively better financial base than other categories of farmers, provided with infrastructure facilities and nearness to marketing centers. This further shows that coconut farmers with their own constraints are forced to depend on marketing intermediaries for disposal of coconuts. If they are to be encouraged to exert influence on the functions of equalization, organized marketing bodies should come forward to tackle the problems of farmers holistically through integrated measures.

5.3 Coconut farmers have two channels for disposal of their coconuts. One is the direct channel and the other one, an indirect channel. Indirect channel is the most prominent channel adopted among coconut farmers. Direct channel is very simple while the indirect channel is very complex. Based on their mode of disposal of coconuts, four types of coconut farmers have been observed. They include lesser farmer, opportune farmers and farmer adopting mixed practices. Nearly half of the coconut farmers in general and two third of marginal and small farmers in particular have been observed adopting leasing as the mode of disposal of their coconuts. The financial crises especially the need for money to redeem prior debts and to meet domestic expenses are the prime reasons for leasing coconut trees. The marginal as well as big coconut farmers with sound financial position are free from any such forces compelling them to lease coconut trees. Adoption of mixed practice for disposal of coconuts is found common among big farmers. Locational differences of the farm and differences in age and productivity of coconut trees are the reasons attributed for following mixed practices of marketing by farmers. Absence of lease holders, low productivity as well as poor protection to trees in the farm, seasonal harvesting etc. are some of the factors forcing coconut farmers to adopt mixed marketing practices.

5.4 Tender Coconut :

5.4.1 The tender coconuts are disposed off by the farmers immediately after harvesting, without giving any kind of dressing or grading. It has been observed that tender coconuts

Plate – 12



are manually sorted out at the time of retail sale, where the husk of the tender coconut is chopped off with a sharp sickle shape knife to make an opening of about 1 inch diameter to facilitate directly drinking of water. De-husking of tender coconut is very difficult due to high moisture content of the husk and delicate nature of immature shell. The discarded nuts are cut into halves before being disposed off by natural degradation.

Tender coconuts are sent to market within a day or two after harvesting as there is no practice of storage for longer period. The tender coconuts are kept in shed on the farm till they are lifted by the wholesaler and/or retailer. The wholesalers and retailers store the tender coconuts only for a few day or week, since, the interval between the harvesting and consumption does not exceed more than 10 to 15 days, even at the distant places of consumption. Moreover, prolonged storage makes the tender coconut water insipid and hence is disposed off for consumption at the earliest possible. Tender coconuts have great demand in most of the towns and cities all over the country.

Kolkata, Mumbai, Chennai, Bangalore and Delhi are the major consumer markets for tender coconuts.

5.4.2 The tender coconuts are sorted out at the retailer level according to their size. Since, bigger the coconut higher the price due to consumer preference and belief that it contain more quantity of coconut water. The assembling and distribution of tender coconut through out the country is almost uniform and involve producer, contractor, itinerarary merchants, wholesalers, retailers and hawkers. Farmers of the main coconut growing areas generally sells tender coconuts at the farm or gardens to itinerarary merchant, wholesaler or retailer. At some places, the producers take the tender coconut to nearby mandi or market. The itinerarary merchant and wholesaler after procuring either through commission agent or even directly, sell to the retailers. The retailer may directly sell to the consumer or through hawker to consumer. The buyers transport the tender coconut nuts to nearby town and market hatts. In Assam and West Bengal, it has been observed that 90 per cent of the tender coconut production is handled by itinerarary merchants. In Orissa, traditionally coconuts are used for religious purpose and for consumption; hence, harvesting of fully matured nuts has been seldom practiced. In most cases, nuts of six to seven months, attaining maturity are harvested. The marketing channel in Orissa state includes village merchants, commission agents / wholesalers, dealers / re-traders, retailers and consumers.

It has been noticed that the major assembly markets for the tender coconuts in the country are located at College Street Kolkata, West Bengal and Maddur in Karnataka State. Tender coconuts in substantial quantity are also marketed in the states of Tamil Nadu and Andhra Pradesh. Chennai, Madurai, Mumbai and Kolkata are the main consuming markets. In Andhra Pradesh, Elluru and Bhimavaram in West Godavari district are the main assembling markets. Though, Kerala is a major coconut growing state, consumption of tender coconut is negligible, but in recent times due to development of tourism industry in the state, large numbers of outlets selling tender coconut supplied from the neighboring Tamil Nadu State have come up in the Kerala State.

5.4.3 Increasing awareness among the consumers about the medicinal properties and health benefits of tender coconut water has increased the demand for tender coconuts. According to an estimate, about 6 to 8 million tender coconuts were in demand in Kolkata market alone. The College Street and other markets in Kolkata used to receive about 20 to 25 million tender nuts in early eighties, which has increased to about 30 million tender nuts per annum by 2000. The **Plate – 13**

Production and Marketing of Coconut in India

reason attributed to this high volume of arrival was that, about 80 per cent of the total production of coconuts is consumed as tender coconuts in West Bengal and neighboring states of the Eastern region. The tender coconut market in College Street Kolkata functions only for 2 to 3 hours in early morning, since the market is held on footpath of the College Street and Shyam Bazar area. Bulk of the tender coconut supplies to these markets come from Bashirhat town of North 24 Paraganas district and small quantity from Diamond Harbour in South 24 Paraganas. The farmers



Tender Coconut Sale

and wholesalers transport the tender coconuts to College Street for auction through commission agent. The lots of tender coconut are unloaded from the vehicles and sorted out into the lots of 150, 200 and 250 nuts according to the size of the coconuts. The commission agent auction each lot and sells to the highest bidder in presence of the farmer or wholesaler. After auctioning the whole produce, the wholesaler or farmer is paid the amount after deducting the six per cent commission and other expenses incurred by the commission agent. During the summer months, nearly 45,000 to 50,000 tender coconuts per day are transacted in this market. The transaction drops to around 25,000 to 30,000 tender coconuts per day during rainy or winter season. However, it was gathered that the arrival in the market has been declined due to large quantities of tender coconuts were being exported to Delhi and other places directly from the villages in West Bengal.



5.4.4 Karnataka is another state where about 20 per cent of the total production of coconut is harvested in the form of tender coconuts. It has been reported that nearly 50 to **Plate – 14**

60 per cent

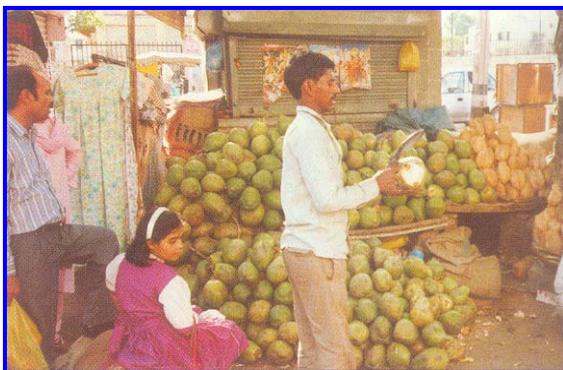
of the coconut production in Mandya, Bangalore, Mysore and Hassan districts is harvested as tender nuts. In Karnataka state, tender coconut is a notified commodity in 14 regulated markets but actual trading is carried out in 6 markets only. Farmers in these districts lease out their gardens mostly to middlemen or sometimes traders and venders. Tender coconuts are traded in regulated markets of Maddur, Mandya, Channarayapatna, Holenarshimapur, Hosdurga and Kadur, but Maddur market is famous for daily trading of tender coconuts. Maddur market is an important regulated market exclusively for marketing of tender coconut. The **Coconut sale at Maddur Market**

regulated market was established in Maddur town, Mandya district, Karnataka State in the year 1992, considering the magnitude of cultivation of coconut crop in Maddur region as the climate in this region is congenial to the production of quality tender coconuts. The market yard is spread over about 12 acre of land with essential infrastructure facilities required for the regulated market. Traders informed that the peak production of tender coconut begins from the month of November and continue up to February which co-inside with the winter season. On the contrary the peak demand is during the summer months of May to June when the supply becomes lean. The market caters to the needs of the coconut farmers cultivating in and around Maddur area. However, during off season tender coconuts do arrive from Kollegal and other surrounding area situated even at the distant places. On inquiry from the traders it was informed that there is no co-relation between quantum of arrival and prices offered by the wholesale traders in Maddur market. Similarly, the price of matured coconut and tender coconut are also unrelated to the seasonal variation. It was gathered that on an average there is demand of around 2 to 3 lakh nuts per day due to the constant demand from the up country market like, Mumbai, Tamil Nadu and Andhra Pradesh. However, among these upcountry markets Mumbai is the leading market with an average demand of around 2 lakhs nuts per day, during peak season. During peak season, about 20 trucks load amounting to about 1.5 lakh coconuts are sent to Andhra Pradesh alone. The quality i.e. size and maturity of tender coconuts differ with the demand from consuming markets i.e. coconut sent to Bangalore, Mumbai city are better in appearance compared to the coconut sent to other market places. The consumer in Andhra Pradesh and Mumbai preferred tender coconuts having better coconut jelly content over the coconuts with water only. It was observed that due to high cost of transport, the traders negotiate to safeguard the interest of consumer by offering competitive prices for the tender nuts. It was learnt that about 25 traders were active in the market. However, only 6 to 7 big traders control 70 per cent of the coconut trading in the market.

The sale in the market takes place through mutual negotiation immediately after entry of the commodity at the market gate and not by open auction system. The representatives of the commission agents offer their prices to seller for the tender coconut brought to the market. The market activities begin in the morning at 10 a.m. and continue till 6 to 7 pm, depending on the arrivals. The market authority collects market

charges @ 1.5 per cent of the turnover or Rs.300/- to Rs.350/- per truck which approximately contains 6000 nuts per truck. The commission agents charge Rs.5/- per 1000 nuts to the farmers-trader or traders. These markets cater to the demand of up country markets like Pune, Mumbai, Nagpur of Maharashtra, Gujarat and Delhi supplying about 8-12 truck loads, with the capacity to load 8000 to 10,000 tender nuts per day. In Bangalore, the wholesale market of tender coconut at Yeshvanthapur, transact about one lakh nuts daily and at Bommannalli market, nearly 200 to 250 farmers bring their supplies and participate in the auction conducted in the market yard with daily transaction of about 50,000 nuts. Tender coconuts from villages to the market are transported by trucks, tempos and matadors. Now days trucks are common means of transport as each truck load carry about 4000 to 10,000 coconuts. Tender coconuts are simply loaded in trucks or other carriers, retailers transport them to different retail centers in tempo, rickshaw cycles, hand carts or even head loads in the cities.

5.4.5 Delhi markets is also an important terminal market for tender and matured coconuts. Arrival of both types of coconut depend not only in the seasonal demand and consumption pattern in the Northern region but influence the supply from the markets in coconut producing areas. Study of the arrival of coconut in Delhi market for the triennium ending 2004-05 shows the arrival of matured coconut as 60.13 per cent compared to 39.08 per cent arrival of tender coconut. Arrivals of tender coconut has been proportionately higher during March, April and May due to higher demand for tender coconut water during summer season and decline in arrival during monsoon months. However, arrival of matured coconut appeared higher during the summer and winter season i.e during August, September and October due to festival. Arrivals of tender and matured coconut in Delhi market during 2004-05 reported to have declined due to drop in coconut production in the country (**Annexure – V**)



Tender Coconut Sale

5.4.6 The Coconut Development Board has sponsored the project of adopting integrated approach for marketing of minimally processed tender coconut to provide a sustainable and enhance income to coconut growers. In marketing practices of tender coconut, it has been observed that the supply chain of tender coconut is simple unlike matured coconut, copra and coconut oil but highly unorganized. In the marketing channel of tender coconut it could be observed that no organized efforts are made to ensure the availability of quality tender coconuts on a continuous basis to meet the consumer demand. A substantial share of coconut production could be traded as tender coconuts, if an integrated approach was adopted for marketing of tender coconuts with

the active participation of various stake holders. This would in turn help in reducing the dependence of coconut price being decided by trends in coconut oil market. (Thamban et al.2007)

5.4.7 It has been observed that on a very small scale, tender coconut water is being sold in bottled form, to serve in processed and chilled form. But the venture has not been so

Plate – 16



Bottled Tender Coconut water

popular on account of high cost involved in sophisticated processing technology to preserve the natural taste and flavour of coconut water and establishing bottling plant. Scientists have suggested a viable option to adopt minimal processing technology of serving tender coconut in its natural container itself at a reasonable cost. In this process the bulkiness of husk on the tender nut is removed the partially

Plate – 17

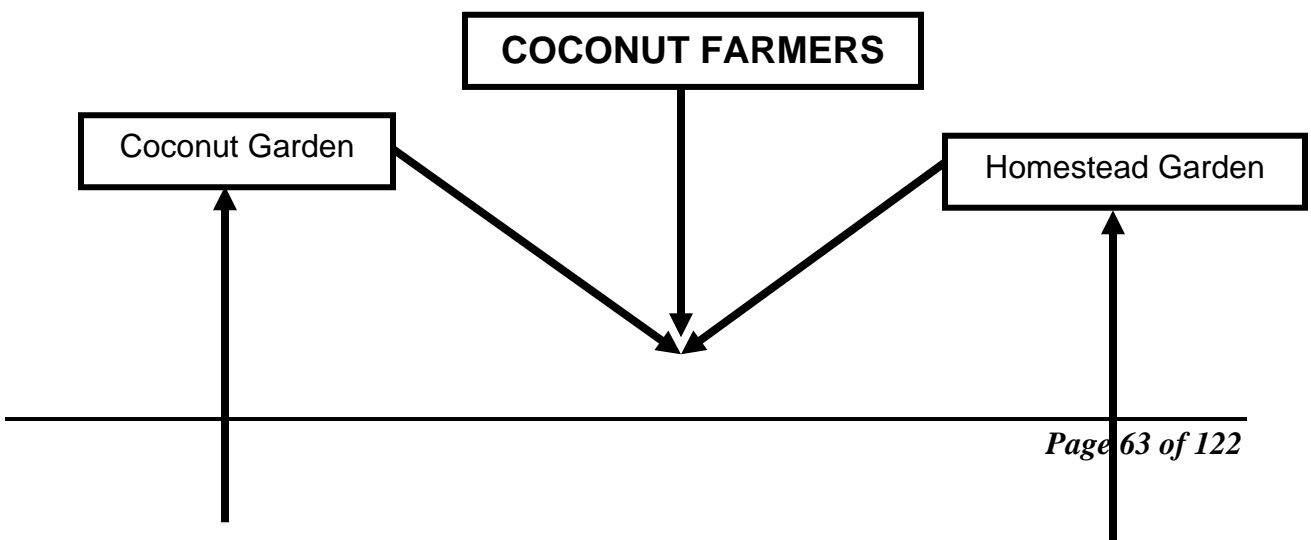
de-husked coconuts are dipped in a solution of 0.5 per cent

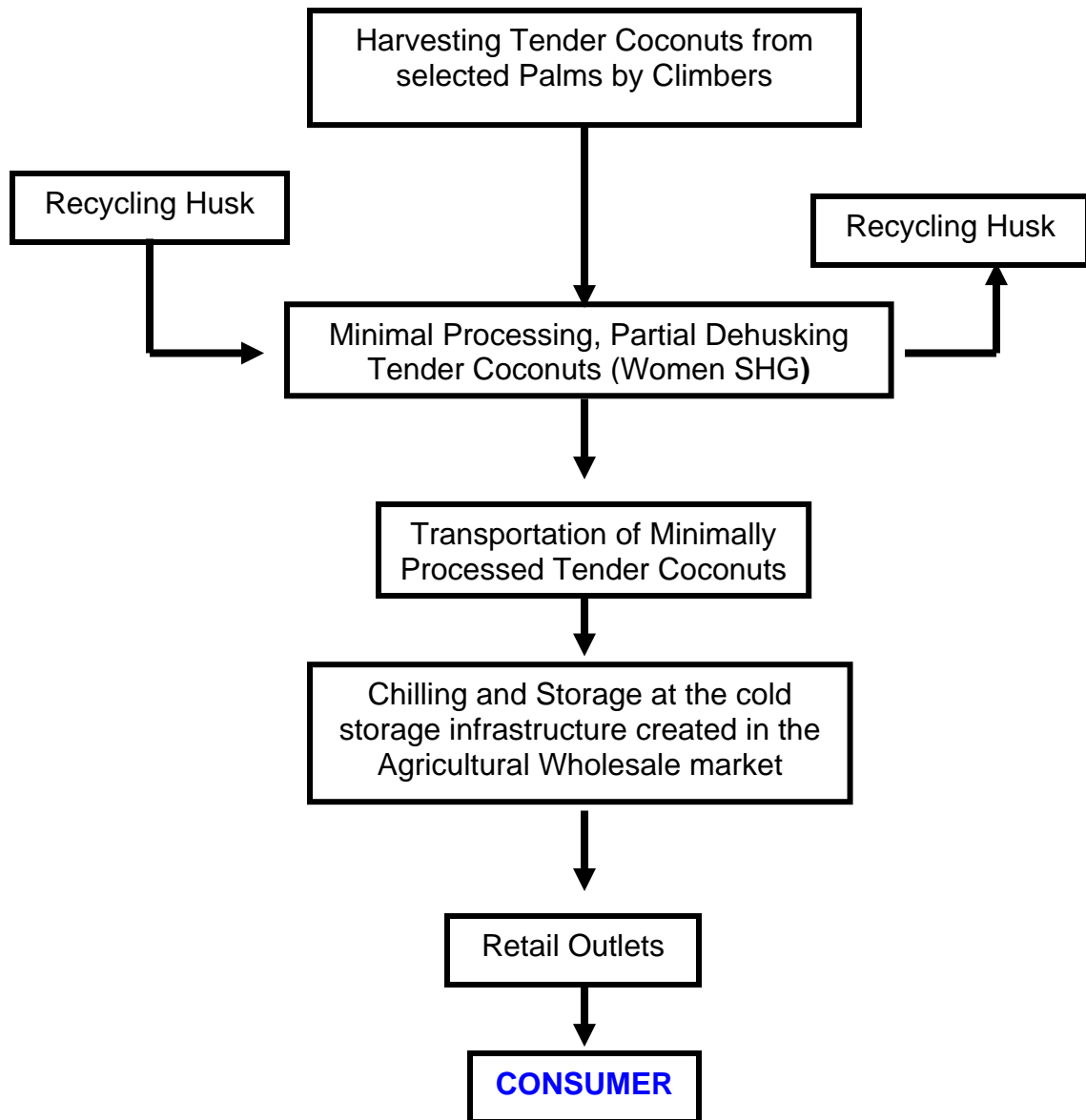


citric acid and 0.5 per cent potassium meta-bisulphate for three minutes to prevent discoloration of the outer covering. The partially de-husked and thus treated coconuts can be stored up to 24 days in refrigerated condition at 5⁰C to 7⁰C temperature without loss of white colour of the minimally processed outer most covering of the tender

coconut, natural taste and flavour of tender nut water **Partially Dehusked Tender Coconut** inside. The tender coconut water can be served chilled like any other soft drink. These processed tender nuts would require plastic crates and insulated chill boxes for transporting and storage. This will facilitate distribution and marketing of tender coconut in different segments of market like, super malls, markets, hospitals, hotels, road side shops, kiosks and vending on railway stations and bus stands.

Integrated Way of Marketing of Partially Processed Tender Coconuts



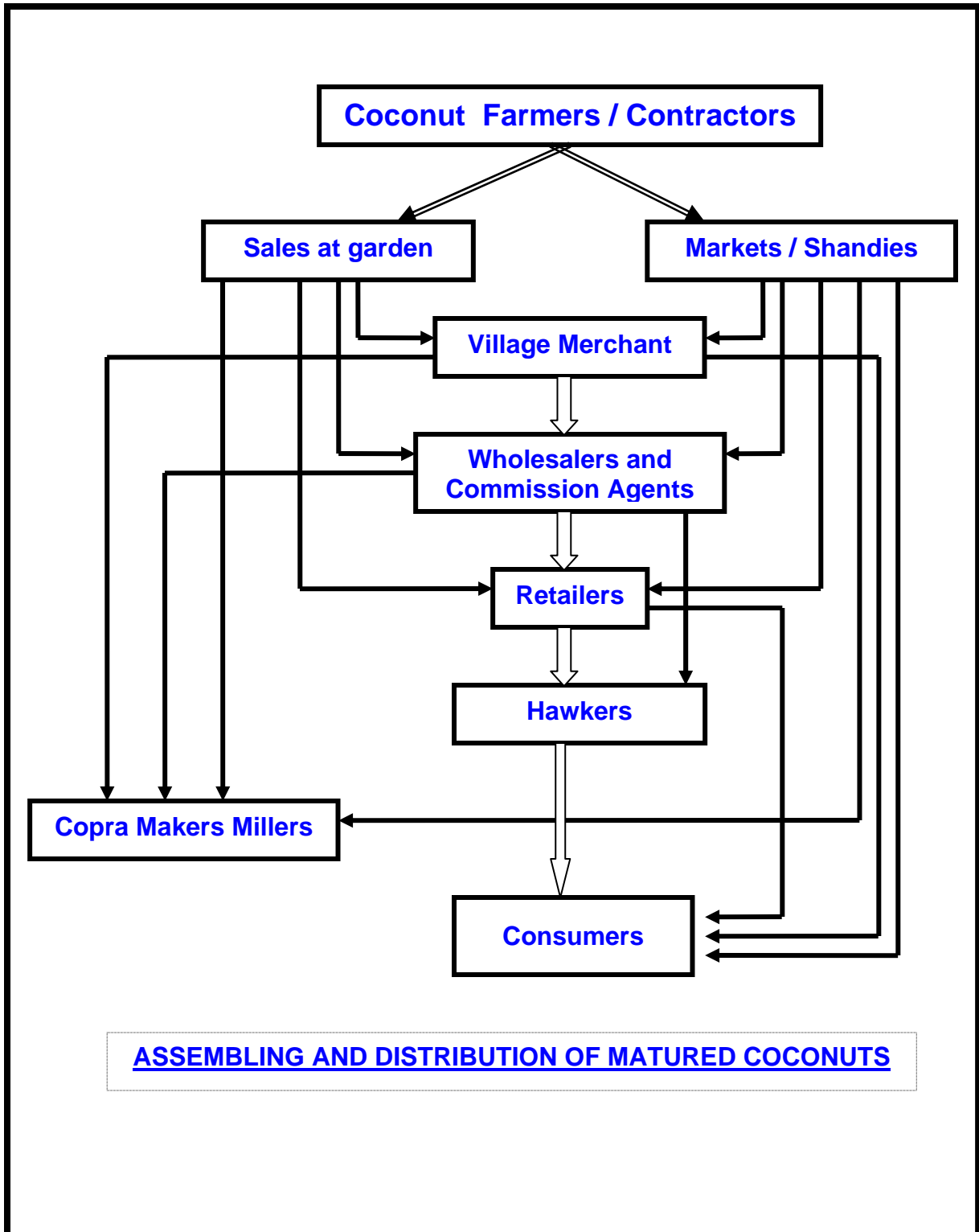


5.5 Matured Coconut :

5.5.1 Matured coconuts are generally disposed by farmers in unhusked form for want of nearby market place. However, farmers located near to market places, dehusk the coconuts and sell them as husked nuts. Farmers, from the areas where the husks is not utilized for retting and coir purpose, store the coconuts for two to three months, particularly the nuts harvested in the monsoon season. In Kerala, Karnataka and Andhra Pradesh farmers keep nuts for several months and sell them as dry nuts for making edible copra. The majority farmers sell the bulk crop as unhusked coconuts, still a considerable quantum of nuts are sold to consumers as husked nuts.

5.5.2 The nuts reaching markets are either partially husked or dehusked as per demand and requirement in distant markets. Coconuts meant for copra making sold in local markets are fully husked; coconuts meant for distant market places are left with some fibres covering the eyes or on all around nuts. Such partially husked coconut minimizes the breakage during transportation and possess longer keeping quality. In Maharashtra state, it has been observed that even when coconuts are fully husked a tuft of husk is left at the end of the nut over the eyes as it is considered to be auspicious and believed to preserve the nuts from spoilage. Some quantities of nuts are slightly husked, only the outer skin is removed and most of the husk is left over the nut- in-shell, and rests are completely husked. Different types of husking in preparation of dry nuts have been reported from the coconut producing areas of Andhra Pradesh, depending upon the trade demand from the consuming markets. The dry nuts which are completely husked except a tuft of fibers left over the eyes are meant for cities and towns of Maharashtra, Madhya Pradesh and some part of Uttar Pradesh and Bihar state. The dry nuts meant for some markets in Madhya Pradesh are typically husked where in three corners of matured coconuts are completely husked and from inter-space the husk is only partially removed to decorate the nuts meant for religious purpose. The nuts meant for Rajasthan market are partially husked, in some cases matured nuts are husked at the bottom only. The husking charges vary in different states and types of husking carried out in producing areas. Therefore, the wages paid to the labour used for husking widely differs from state to state.

5.5.3 The storage practice for matured coconut differs from place to place and in accordance with marketing practice i.e. by the producers, merchants or exporters. The farmers and local village merchants store coconuts in their houses. In markets, coconuts are stored in godowns owned by the wholesalers or commission agents. Since matured coconuts are meant for immediate consumption or crushing for oil, they are not warehoused for longer period. The matured nuts meant for copra making, are stored as unhusked nuts immediately after harvesting, and undergo further ripening to improve the quality of copra obtained. The husk obtained from such nuts loses the quality required for coir making purpose. In places where husks are used for retting and nuts are sold for milling purpose, the matured nuts are not stored but husked immediately after harvesting. The matured nuts meant for consumption of water and kernel, are stored for few weeks to three months by the farmers in their garden itself, as it fetch premium price when the colour of the nuts become brownish. The practice of this type of storage has been observed in some districts of Maharashtra, Karnataka and Kanyakumari district of Tamil Nadu.



It has been reported that storage is practiced for preparation of dry nuts in the Godavari districts of Andhra Pradesh, where the trading of dry coconuts was predominant in the market. The coconuts meant for preparation of dry nuts, immediately after harvest are stored in gardens under shade, initially for 5 to 6 weeks, subsequently they are partially dehusked and further stored for 10 to 15 months, on an attic, a

specially made bamboo platform. The partially dehusked coconuts are dried by applying hot air passed through fire place or hearth underneath the drying platform, especially for the coconuts harvested during monsoon season. The nuts harvested during dry seasons are sun dried and converted into ball copra and cup copra accordingly. The nuts meant for making copra are also stored for 9 to 12 months before being subjected to sun drying on specially made bamboo platform in the Arcot district of Tamil Nadu.

The cost of storage varied from place to place, different conditions prevailing in the producing areas and the form in which coconuts are marketed. When the storage is on the farms the cost of storage might be almost nil. But when stored by the middlemen or wholesalers, near or in the market place, the handling charges and storage cost increase. Obviously, there are certain progressing losses in terms of quality factors and weight loss with the increased period of storage. The losses on storage are influenced by the quality of husk left on the nuts before marketing and processing. The loss in weight is more in unhusked nuts and minimum in completely dehusked nuts.

5.6 The personnel and agencies involved in marketing of coconuts and the marketing practices followed by them have been reported as follows.

5.6.1 Village merchant (Copra maker) : In Kerala State, the village merchants are the first purchaser of the nuts from the producers. Traditionally, the price of coconut is determined by the price of coconut oil prevalent in the market. The accepted norms followed in Kerala are that the price of one quintal of coconut oil is considered equivalent to the price of 1000 nuts i.e. the cost of single nuts is equivalent to 100 gms. of coconut oil. The Copra maker transacts the business on the basis of this conversion. In other part of the state, the prices of coconut are based on two important products of the coconut i.e. husk and the kernel, this practice is followed where the relevance of coir industry is much more and the loss in the sale of copra is compensated by the sales proceeds of husk. In some parts of Kerala, the price is also based on the estimated number of nuts required for making one candy of copra when crushed, assuming 62.5 per cent oil, 35 per cent oil cake and 2.5 per cent waste. The sale proceeds of husk and shell is added and cost of production and transportation of copra is deducted. The delivery of nuts is taken, by the village merchant after the sale, at the coconut gardens itself, generally on credit basis. The nuts are de-husked on the spot and the husk is sold to the netter to process it for coir fibre for the coir unit.

5.6.2 Middle man (Copra Merchant) : The middle men who are also merchants convert the coconut into copra on sun drying or kiln dry or by following both the methods. It takes around 7 days for producing standard quality of copra. In most of the cases, copra is sold at the stage when moisture level is 10 to 12 per cent, commonly known as 'ghatti', for which, corresponding amount is deducted by the traders compared

to the better quality of copra of 6 to 7 per cent moisture. The price of the copra is calculated on the following basis i.e. (a) The price of oil per candy (b) The price of cake per candy (c) Less Sales Tax crushing charges.

Since the Marketing prices of coconut oil always fluctuate specially, the copra makers have to rush to manufacturer of copra by reducing the drying period. In some villages, where drying of copra is carried out in a crude form of copra-kiln, results in manufacture of inferior quality of copra. The small copra makers in village sell their lots to big processors and thus, there would be more than one intermediaries involved before it reaches to the millers.

5.6.3 Traders (Millers) : The copra thus procured is brought for further sale to millers by the traders. The transportation involved is either by country boats or bullock carts. Generally, traders are associated with particular miller but can go to other agency if they have not taken any advance payment from the miller. In Kerala state, most of the units are situated near to the back water, facilitating water transport. The trader take about 10 per cent of the copra procured as sample to the miller for approval and then bargaining starts. The trader moves from one miller to another for final settlement. The trader ultimately sale the product to miller, some times edging price for the copra or some times as a distress sale for crushing the whole thing into coconut oil. Since the major demand of coconut oil is from the up country markets, mainly meant for industrial purpose, specially for soap industry. In some cases, this process of the marketing channel is repeated on the same route on credit basis by paying the amount due for the last transaction.

5.6.4 Hatta System (Under cover) : Though dealing under cover is not a healthy marketing practice but still it is prevalent in copra trade. The copra makers take their produce to market and contact the broker with copra samples, commonly called “*one eda*”, in one basket and moves from one broker to another. The settlement of the price for the produce is determined in secret manner without uttering the price in open. The buyer and the broker engaged by the seller determine the price through pre-determined secret codes of price for every one of the five fingers of their left hand held and hidden under cover of the towel. They touch each finger alternatively by offering the price on their different parts of fingers and position known to both but not to the sellers. When the deal is finalized at the price arrived at secretly, after consultation by the broker with the seller both firmly hold their particular finger under the cover of towel. This practice was in vogue among the copra / coconut oil merchants in Travancore-Kochi. The copra merchant might not get the payment for copra immediately, but get the amount due for the previous consignment, when the next lot is brought to the market.

5.6.5 Deductions : The trader in the trade of matured nuts / copra, practices deductions for immature nuts, mouldy and dis-coloured copra, moisture content etc. The deductions are made arbitrarily by the traders. The same procedure is observed by the traders bringing the lots to the millers and after bargaining with some millers at their site, the lots are sold to the millers. The lots are weighed on beam balance, at this stage also additional copra cups are taken for each weighment. Market charges such as sales tax, cess for coconut committee, brokerage, bonus to cart men / boatmen. Unloading, drying charges etc., are deducted arbitrarily.

It has been reported that the growers and coconut processors are fully exploited by various trade practices such as additional nut for every 100 nuts, popularly known as “Vasi”, bunching of small nuts and counting at par with a single nut, besides irregular and insufficient payment, over estimation of allowances, quality disputes etc., are some of the ill practices prevailing in the market.

5.6.6 Grading : Wholesale traders adopt the practice of grading copra based on the quality factors prevailing in the trade. The coconuts are categorized in the two forms, fresh and dry, while copra into edible and milling. The edible copra is classified as ball copra and cup copra, depending on the quality, edible copra is further graded as copra from dry nuts, copra from semi-dry nuts and copra from fresh nuts. Each grade is again classified into different trade name. Such as Office Pass, Rassi, Rajpur, Moong etc. The office pass grade is generally used for milling purpose and sold to miller. The traders grade the copra in the order of its market value. The grading is mainly based on moisture content with maximum limit of 10 per cent, the foreign matter upto 2 per cent and black copra upto 5 per cent. However, the good quality copra ideally should have moisture upto 6 per cent, oil content 71 per cent, acid value 2.5 per cent, foreign matter 0.5 per cent, mouldy cups 5 per cent, wrinkled cups 5 per cent and black copra 1 per cent. The edible ball copra has different quality parameters to offer price even under price support scheme. (**Annexure – VIA**)

Edible Copra	Milling Copra
Size 75 mm (minimum)	
Foreign matter 0.2 %	1.0%
Mouldy & black kernels 2.0 %	10.0%
Wrinkled kernels 10.0 %	10.0%
Chips 1.0%	10.0%
Moisture 1.0%	6.0%

The edible copra is selected for export to North Indian states and other parts of the country for direct consumption or as an ingredient in spices or culinary preparations.

The demand for edible copra is seasonal and subjected to fluctuations. Therefore, grading is resorted to by traders depending on demand or even the edible copra is sold for crushing.

Several grades and classification of edible copra are prevalent in the market. The 'vadagara' variety is referred to as 'Calicut Gola' in the trade. In 'vadagara', the balls are classified into 5 types according to the size. In Karnataka state, four grades of ball copra according to size are designated as "Mysore", "Madras" "Ras" and "Barik". The sizes of different grades are not defined in any measurable unit but the balls are classified into the different grades by visual assessment / observation only. Ball copra from Godavari district is referred to as Madras copra which is not as good as Karnataka or Vadagara varieties. The ball copra from vadagara and kozhikode areas is considered slightly inferior to that of Tiptur area of Karnataka.

The three main grades of edible cup copra in Kozhikode are known as 'Rajpur', 'Madras' and 'Dilpass'. "Rajpur" copra is considered as the best edible cup copra and is prepared by cutting the copra balls and further drying the halves in the sun for two to three days. It is sorted out into two or three grades according to the whiteness of the kernel. The Rajpur variety comes to the market from September to June. The Madras copra is somewhat inferior to the Rajpur copra and is prepared from nuts in which water has not been fully absorbed. Rejections from Rajpur quality also go as Madras. According to the colour of the skin (testa), Madras copra is classified into two grades. Dilpass is inferior to Madras variety in quality and is prepared from partially dried nuts, stored for three to four months or from fresh nuts.

In Alappuzha the best cups of sun dried copra with good colour and clean appearance are separated out and classified as edible copra. There are different grades according to the size, colour and outer skin etc. which are locally known as Rai, Murgi, Dala etc.

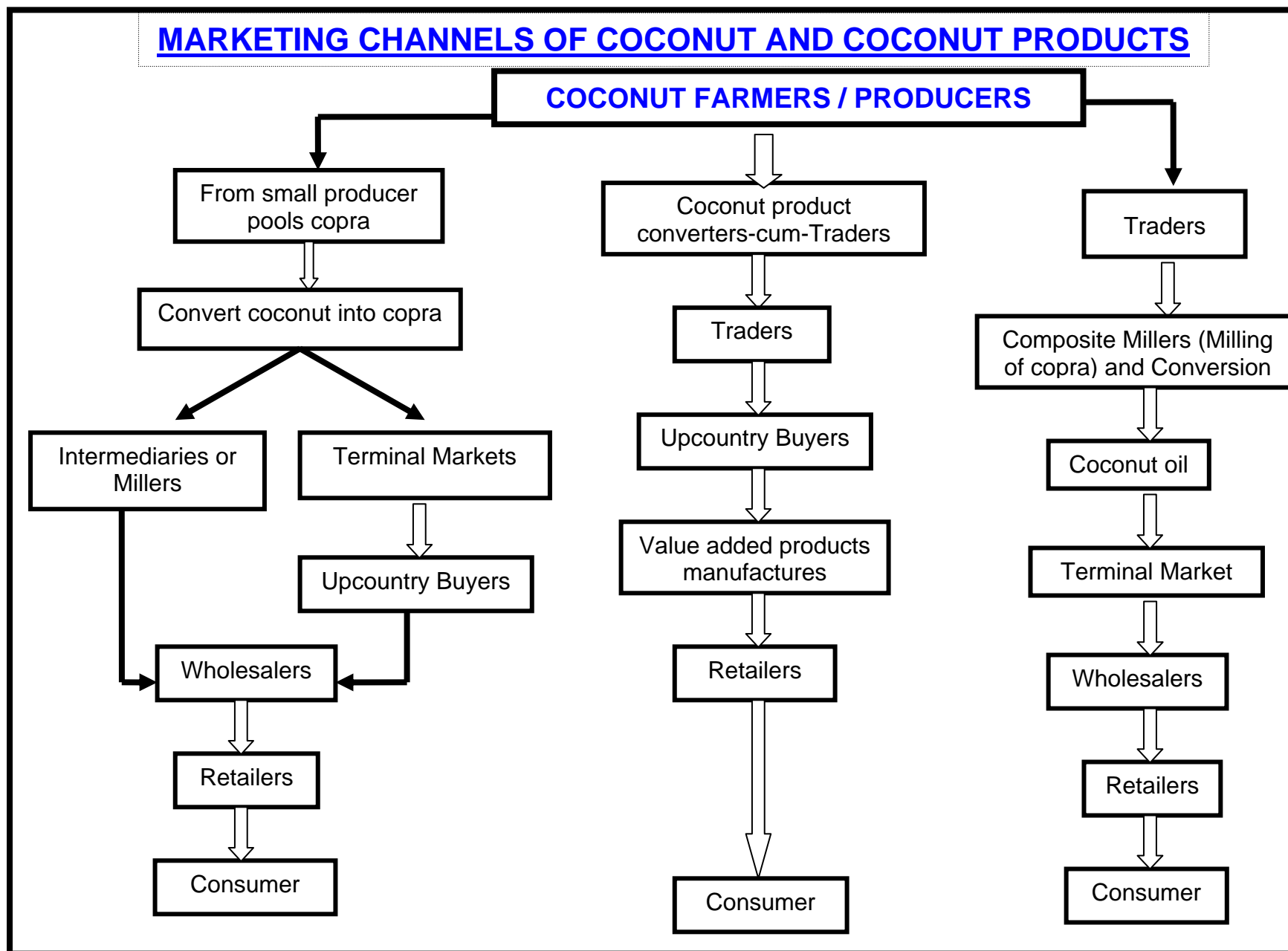
In Kerala state, the best grade of milling copra is known as 'office pass'. All other inferior quality copra is known 'Rasi'. 'Rasi' is sometimes classified as 'Thirurassi' and 'Kazhippu'. In Tiptur copra rejected from edible copra is called 'kavathu'. Moisture is an important factor for judging the quality; hence millers sometimes differentiate copra on the basis of number of days taken for drying such as 4 day drying, 7 days drying etc. The term "cutter" dry is used to indicate fully dried copra.

5.7 It has been observed that presence of intermediaries at different stages of marketing of coconut, copra and coconut oil. The structure of coconut trade varies from traditional coconut growing state to non-traditional coconut growing state and region to region. It is a common practice among big farmers to pool his produce alongwith

produce of small farmers of his village/area, convert into copra and sell it to intermediaries or miller directly. The miller in turn sells it to wholesalers in terminal market or to upcountry buyers. Sometimes farmers sell their produce to converters cum traders, who directly sell copra to upcountry buyers for manufacturing of value added products. The number of intermediaries in the marketing channel critically differs in Kerala and Tamil Nadu state. The marketing channel for copra in Kerala is characterized by presence of intermediaries at multiple stages, which is conspicuously lesser in Tamil Nadu and Andhra Pradesh. It has been observed that some farmers sell coconuts to traders who in turn sell the coconut to composite mills, where conversion, drying of copra and its milling into coconut oil is carried out.

The major coconut oil trading centers are functional in the zones where more number of coconut oil mills are located. They are mainly at Kochi (Cochin), Trichur and Trivandrum in Kerala; Kankeyam and Vellakovil in Tamil Nadu and North Kanara, Udipi and Mangalore in Karnataka. Though Kochi has been a terminal market, it has been reported that it has been experiencing decline in trading of coconut oil. The reasons attributed to this decline are high labour wages, grading and transportation cost. The traders in Kochi who have the capacity, started to pool the minimum quantity up to 50 drums of coconut oil in short period of 11 days to economize the loading, grading and transportation cost. The small traders in Kochi, unable to adopt pooling practice, have been suffering from a low turnover. Further, the buyers have been forced to accept substandard coconut oil deliveries with more than permissible impurities, which the dealer have to purify at their own cost and in their establishment before dispatching it to upcountry buyers or industrial end users.

From the marketing practices followed in the coconut and coconut product trade, it has been revealed that innumerable intermediaries, channels, functionaries, brokers, assemblers, traders, merchants, wholesalers, institutions and retailers are involved directly or indirectly in the movement of coconut from the point of production to the point of consumption, performing various activities in the flow process, enabling movement of coconut and its products until placed in the hands of consumers. The distribution systems in marketing channels differ from product to product due to difference in marketing environment, marketing composition and marketing situations. It is apparent that they perform one or all the functions of assembling, buying, selling, transportation, storage and warehousing. The auxiliary functions such as grading / standardization, market financing, market risk bearing and market intelligence/information are also performed by these functionaries.



However, in the existing marketing system the functionaries, except the institutional agencies, have not fulfilled the objectives of effective marketing system, towards remunerative price realization, through sale of coconut and coconut products. The price realization reported to be lower than the direct sale by farmers or through farmer's institutions. Even though every addition of marketing functionaries results in widening of the price spread, the dominance of marketing functionaries in the marketing channels of coconut and its products cannot be denied, due to certain limitations which directly or indirectly affect the farmers and producers / manufactures.

Majority of the coconut farmers have small and marginal holding and have dearth of holding capacity due to financial crisis, lack of credit facilities from the financial or cooperative institution against coconut trees, compel them for forced sale. The coconut farmers are the worst sufferer in the present marketing practices as they need short term credit especially during off seasons and flush season i.e. during summer days. The farmers thus borrow advances from the middle men / traders, especially those who raise coconut palms in grove as monocrop even to meet their expenses for normal production and consumption. Moreover, they do not have storage facility and holding capacity. Fluctuation in prices of coconut forces them to sell these coconuts on farm immediately after harvest. The farmers are unable to take up value addition activities to their produce. This strikingly affects the effectiveness of marketing of coconut and coconut products. The structure of coconut trade varies from traditional coconut growing states to non-traditional coconut growing states and from one region to another, likewise the presence of intermediaries, at different stages of marketing of coconut, copra and the coconut oil (**Annexure – VIIA & B**).

5.8 Future Trading in Coconut : The centralized trading practice in coconut trading, where operating agents practice contracts with standardized specifications with flexibility in prices known as future trading and was in vogue till 1971. Futures' trading of coconut oil was carried out under two recognized association in 1950's viz; the Alleppey Oil Millers and Merchants Association, Alleppey and the Oil Merchant Association, Cochin. At Cochin, four consecutive bi-monthly contracts were permitted to recover concurrently according to the bye-law of the association for the purpose of hedging, the due data of the 1st bi-monthly contract being the 15th of the month and that of the second being the last day of the month. It was discontinued later to check excessive speculation in trading activities.

However, it has been reintroduced in the last quarter of 2001 for coconut oil under the first commodity exchange of India at Kochi, after a gap of 3 decades. This brought about a sea-change in the coconut industry and trade. Copra crushing industry which suffered a set back in the past decade also received a boost on resumption of future trading in June 2002. National Multi-commodity Exchange, Ahmedabad, though

Production and Marketing of Coconut in India

started future trading in coconut oil during their initial months of operations. However, there is not much activity in copra and coconut oil in this exchange, other commodity exchange such as Multi Commodity Exchange (MCX) and National Commodity Exchange (NCDX) are yet to start trading of copra and coconut oil.

The trading in the above markets is conducted simultaneously for three contracts only. These contracts are required to commence three months in advance and the period of hedging is four months. The trader who trades in the exchange are bound to pay margin and special margin money as fixed from time to time by forward market commission (FMC). Further, the members have to deposit a security with the exchange. The limit on open position is fixed with the sanction of Forward Market Commission. Trade in exchange is carried on line. The trading of coconut oil and copra is in two tones and multiple there off. Minimum price movement for coconut oil and copra is 5 kg. / 100 kg. The maximum price fluctuation for a day is Rs.100 and as per bye-law of the exchange delivery can be made any where in India.

The prices at Kochi in 2005 given in Table-14, reveal that the future prices, vis., actual prices, vis., delivered prices of coconut showed using trends during January, 05 to 15th half of March, 05. By the second half of March and beginning of April, 05 the actual price showed decline with respect to future price in respect to the month of January and February where the actual prices were much higher than that of the future market. However, during May, 05 to December, 05 the prices on future market trading were higher than that of the actual prices. However, it is seen that the actual delivery prices were always less than that of actual and future prices except in case of the months of January and February.

Table No.14

Future Price V/s. Actual Price V/s delivered Price of Coconut Oil at Kochi Market
(Rs.)

	Jan '05	Feb' 05	Mar' 05	April '05	May '05	June' 05	July' 05	Aug' 05	Sept' 05	Oct' 05	Nov' 05	Dec' 05
Actual	7280	7198	6199	5763	5394	5539	5212	5154	5125	4862	4864	4765
Future	6767	6700	6417	6167	6043	5935	5709	5702	5517	5399	5217	4888
Delivered	6920	6870	5650	5780	5240	5300	4940	4905	4700	4720	4500	4560

Table – 15 shows the volume of coconut oil traded and delivered under future trading it is clear from the figure that though the total volume traded had increased from 21,628 to 1,24,244 during the year 2002-03 to 2005-06. However, the quantity delivered at the same time was very less, though it had also kept the increasing trend as per the

volume traded. Though the contribution of the system is very negligible, however, active involvement of farmers / traders will help to increase the trade in future market.

It was expected to avoid violent fluctuation in price to bring transparency in marketing of oils and oil seeds, and provide option to farmers / traders to sell their products at a favourable price, three months in advance. Future trading practice could be used as a tool to stabilize price. However, contrary to this expectation from future trading it was reported that in the year 2005, future trading in coconut oil has failed to achieve the expected results due to alleged anomalies in the trading. It has been observed that there was lack of transparency in trading and pricing in the spot market and hence the future market was unable to perform its function. Unfortunately, the spot markets of coconut oil were influenced by the supply and demand factors in particular regions, and future prices were driven by a very small section of operators in the future exchange which was not observed as healthy trend in future trading.

The spot market in coconut oil failed to meet the required conditions in absence of proper dissemination of market information and fragmentation of markets in different regions. It was observed that the speculators were responsible for wild fluctuations of coconut oil prices. Some traders were manipulating the prices by taking comfortable short position in futures market. This has resulted in default in payment amounting to about Rs.2 millions thereby forcing the market to suspend trading for a few days in the year 2005. This kind of artificial fluctuation is certainly detrimental to the coconut farmers and consumers.

Table No.15

Total Volume of Coconut Oil Traded and Delivered Under Futures Trading

Quantity in M.Tonnes
Value in Rs.per tonne

Month	2001- 02		2002- 03		2003- 04		2004- 05		2005- 06		2006- 07	
	Total Volume	Qty. Delivered	Total Volume	Qty. Delivered	Total Volume	Qty. Delivered	Total Volume	Qty. Delivered	Total Volume	Qty. Delivered	Total Volume	Qty. Delivered
April	-		362	0	2744	22	4606	24	6566	210	9780	44
May	-		650	40	2168	48	3496	100	9752	126	9994	42
June	-		698	54	1446	42	4214	26	12382	106		
July	-		292	6	2782	38	3300	72	12146	184		
August	-		1676	44	4108	50	4562	106	15256	162		
September	-		1540	22	1928	80	6186	54	13142	20		
October			1614	80	3260	76	6950	68	11320	118		
November			1730	8	3604	66	6424	28	10126	28		
December	280	14	2350	20	4958	42	6876	142	3804	18		
January	590	70	3812	68	2992	36	7880	34	9444	50		
February	646	40	4056	20	3366	72	7754	22	9660	66		
March	436	0	5848	50	3682	50	8072	74	10646	148		
Total	1952	124	21628	412	37038	622	70320	750	124244	1236	19774	86
Monthly Average	488	31	1802	34	3087	52	5860	63	10354	103	1648	7
Estimated production of coconut oil in Kerala	240500		238550		229450		238550		238550			
% to total production	0.812	0.052	9.066	0.173	16.142	0.271	29.478	0.314	52.083	0.518		

On analysis of the transactions of coconut oil under future trading with reference to the production of coconut oil in Kerala revealed the following facts. During the year 2001-02, against the estimated production of coconut oil at 2.405 lakh Tons, the volume transacted is only 1952 Tons which is only 0.812 per cent where as the delivery is only 124 Tons (0.052 per cent). The corresponding figures for production for the years 2002-03, figures for actual 2004-05, 2005-06 are 9.066 per cent, 16.142 per cent, 29.478 per cent and 52.083 per cent while the corresponding quantity delivered are 0.173 per cent, 0.271 per cent, 0.314 per cent and 0.518 per cent respectively. This indicates the negligible contribution of the system. Active involvements of farmers / traders are absolutely required for justifying the system.

CHAPTER - VI

PRICES

6.1 The classical function of price is to co-ordinate activities of independent business concerns, involved in the marketing of the commodity, so that resources are used to satisfy the demand of consumers as expressed in the market. While this role is still important, it is being modified in many significant ways and the importance of getting adequate information about market price is ever increasing. The study of marketing and that of prices go hand in hand, and to understand marketing of any agricultural commodity adequately, knowledge of fundamentals of pricing are absolutely essential. The study of price behaviour is an essential requisite of successful marketing mix represented by four P's i.e. product, price, place and promotion. It has been observed that marketing cannot be done inside the Boardroom, so the focus has been shifted to the customer. The consumer now a day not only purchases the product, but the experience that comes along with it. The marketing principles have changed and along with 4 Ps, the 3Cs- i.e. control, convenience, choices, have come into the picture. This has led to the emergence of concept such as experiential marketing, customized products for sale in malls and innovative business models to constantly keep the customers engaged. The prices furnish guidelines to indicate how resources should be utilized in an economy governed by price mechanism under competitive conditions and they certainly determine, what should be produced, how much should be produced and their distribution. The price mechanism assists in allocating commodities to different uses, to achieve efficiency in production and distribution on the assumption of consumer's supremacy. In the light of this price mechanism it would be necessary to study and observe the price, price situation, price behaviour, role of producer in determining the price, price support scheme and various other aspects of price of coconut and coconut products.

6.2 PRICES TREND :

6.2.1 Trend of Prices of Coconut : The prices of coconut and coconut products in the country are mainly centered around two major coconut products viz., copra and coconut oil. The price of coconut is usually influenced by the price of coconut oil prevailing in the wholesale markets. However, the coconut oil prices are characterized by wide and violent fluctuation and erratic price trends. The factors that determine the price of coconut and coconut products are also associated with the growers, oil industry, and consumers. The prices therefore, should be attractive to farmers so that they continue to invest and undertake coconut farming for their prospective growth, and remunerative to the product based industry for its survival.

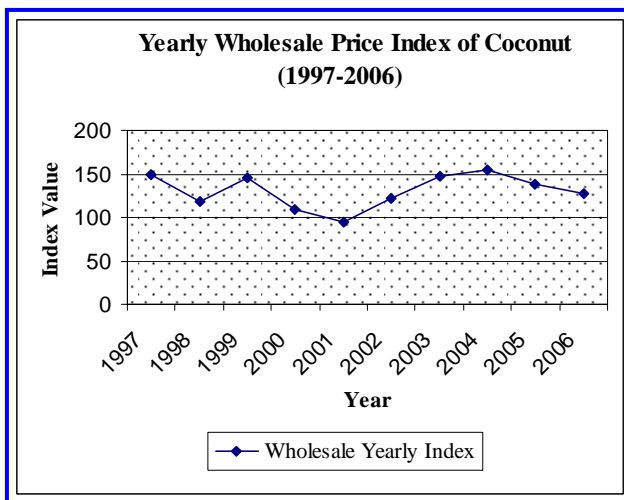
Production and Marketing of Coconut in India

It has been observed that the prices of coconut in the country are integrated with the price of coconut oil prevalent at Kochi market (**Annexure-L**). However variations in quality of matured coconut, size of nuts, copra content, oil contents, marketing cost, marketing methods of fresh tender coconuts and matured coconuts are also deciding factors for the price received by the coconut farmers. The coconuts produced on farm and gardens move through many agencies like farmers or producers, collectors, middlemen, wholesalers and processors, before reaching the consumer in various forms. The involvement of these agencies and number of agencies involved in the marketing channels are also deciding factors of coconut prices.

Study of the price trend based on the wholesale prices of coconut at Ariskere, Kozhikode and Kangayam markets for the period 1997 to 2006 (**Annexure–VIII, IX & X and Figure-6**), shows that the price were higher in all the three markets during the year 1997, which was attributed mainly to a reported decline in the production of coconuts. The average Wholesale Price Index (WPI) of coconut at 118.2 during 1998 was 12.5 per cent lower than that of the corresponding period of the previous year (148.3, 1997). Thus, the decline in the Wholesale Price Index (WPI) for coconut was significantly larger than that of either copra or coconut oil. The month end position of the prices of coconut during January-August, 1998, was in the range of Rs.3200-4000/-, per thousand nuts at Kozhikode and Rs.3800-4500/- at Alappuzha of Kerala state; Rs.3900-5300/- at Arsikere of Karnataka state as against the corresponding range of Rs.4300-5200/-, Rs.4200-6100/-, Rs.4900-6200/- in January–August, 1997, in the respective markets. It would show that the price of coconut fell significantly even in Karnataka which mainly produces ball copra (**Annexure– III, IX, X & XI**).

The index number of wholesale prices of coconut, which was at 147.4 in January, 1999, exhibited its usual seasonal decline to reach 141.7 in July 1999 before recovering at 147.7 in August and further to 155 in October, 1999. At these levels, the Wholesale Price Index (WPI) for coconut work out to 8.8, 13.2 and 7.4 per cent higher in January, July and October, 1999, compared to the corresponding months of the year 1998. During the peak marketing period of January-May, 1999, the month ends wholesale prices of coconut coated in Kerala were in the range of Rs.3750-5000/- per thousand nuts, at Kozhikode and Rs.4800-5300/- at Alappuzha. However, the prices in Karnataka at Arsikere market, were between

Figure – 5



Source : Annexure–XIII & XXVII

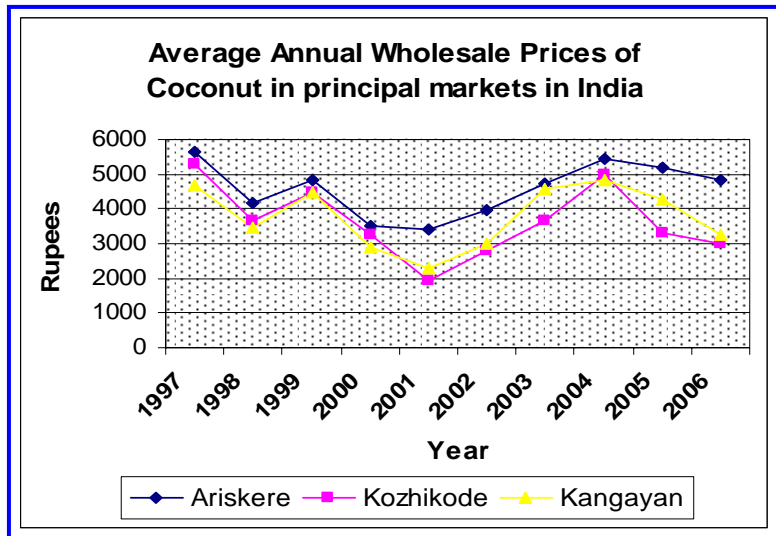
Alappuzha. However, the prices in Karnataka at Arsikere market, were between

Production and Marketing of Coconut in India

Rs.4300-5500/-. The higher price rulings in all the major markets were mainly due to decline in the production of coconuts and copra. Coconut output, after increasing marginally from 13061 million nuts in 1996-97 to 13096 million nuts in 1997-98. Moreover, the coconut production suffered a major set back during 1998-99 due to infestation of coconut palms by the pest *erriophyid mite*.

In the year 2000 and 2001 the Wholesale Price Index (WPI) plunged to very low level recorded at 109 and 94.3, **Figure – 6**

i.e. about 25 per cent and 64 per cent less than the corresponding WPI in the year 1999. The prices of coconuts in all the major markets showed similar trend within annual average price of Rs.3504, Rs 3383 in Ariskere, Rs.3235/-, Rs.1948/- in Kozhikode and Rs.2887/-, Rs.2286 in Kangyam markets in the year 2000-2001, respectively. This decline in January, 2000 in the major



Source – (Annexure–VIII, IX & X)

markets was attributed to bumper harvest in all the major coconut producing states. However, there was improvement in the behavior of prices in the mid of the year 2001-2002. The major reasons for this advantageous situation was attributed to the *synergic* and convergent efforts of coconut development board. The various projects implemented by the board in the field of product diversification and market promotion which had given a dynamic push in the market.

The prices of coconut in the year 2004 ruled above the price levels of the year 2003. The index number of wholesale prices of coconut showed mixed trend. The Wholesale Price Index (WPI) recorded at 146.4 in January and May, the peak months and 148.6 in July 2004 was higher by 9 per cent, 10.4 per cent and 3.9 per cent than the corresponding months of the year 2003. Wholesale prices of coconut were quoted at Rs.4700-4950/- during peak period and Rs.4750 in August at Kozhikode and Rs.5700-6000 during peak and Rs.7050 in August at Alappuzha in Kerala; Rs.3800-5000 during peak and Rs.5300 in August at Ariskere in Karnataka were not only higher than the MSP declared for the year, but also much higher than the prices of the corresponding period of previous year. The increasing trend in coconut prices was attributed to short supply of coconut due to shrinkage in area; drop in production and productivity and higher

demand for the coconut products. Thus, the period 1997 to 2004 witnessed the prices volatility on account of cyclical and seasonal behavior of production and productivity.

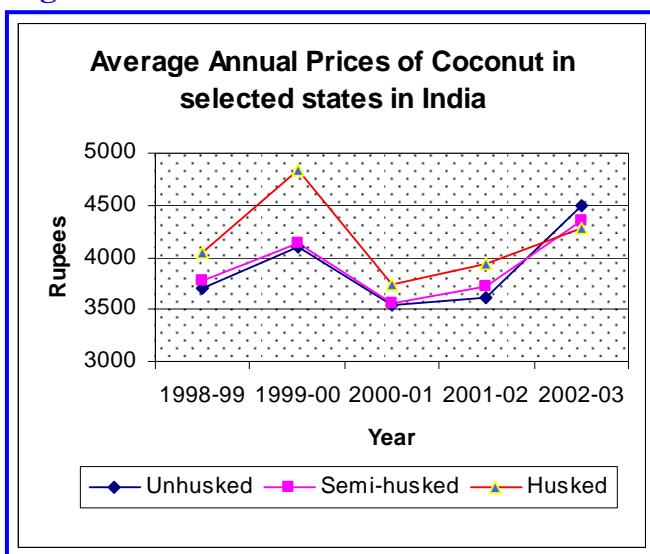
Table No. 16

Average Wholesale Prices of Coconut at Ariseakare, Kozhikode and Kangayan Markets

(Rs.per 1000 nuts)

Year	Ariseakare	% of the 1997 price	Kozhikode	% of the 1997 price	Kangayan	% of the 1997 price
1997	5647	100	5309	100	4678	100
1998	4167	73.79	3684	69.99	3445	73.64
1999	4821	85.37	4468	84.14	4488	95.94
2000	3504	62.05	3235	60.93	2887	61.71
2001	3383	59.91	1948	36.69	2286	48.87
2002	3975	70.39	2818	53.07	2980	63.70
2003	4702	83.26	3663	69.00	4586	98.03
2004	5432	96.19	4988	93.95	4826	103.16
2005	5203	92.14	3306	62.27	4264	91.05
2006	4814	85.25	2850	54.00	3255	69.58

6.2.1.1 Price variation Due to Quality of Unhusked and Husked nuts : From the **Figure – 7**



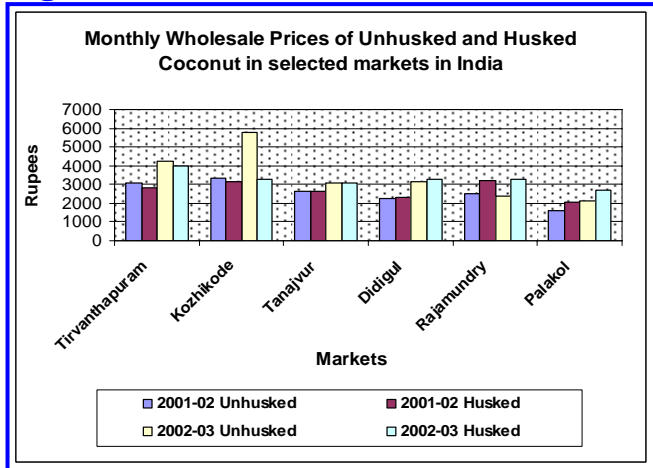
data on prices during 1998-1999 to 2002-2003 of un husked, semi husked and husked nuts prevailed in different states of India, it could be seen that the husked nuts fetched higher prices than un husked nuts. In areas where the retting facilities for husk exist, un husked nuts fetch higher prices than that of husked nuts. In land tracks where retting was not done price of husked and un husked nuts were almost the same (**Annexure–XIV, XV and XVI, figure-7**). The difference between the price of husked and un husked at

Source : (Annexure–XIV, XV and XVI) important markets shows (**figure-8**), that the prices of husked nuts were higher and that of un husked at Rajamundry, Palakat (Andhra Pradesh), Dindigul (Tamil Nadu), while the reverse was the case in all other markets (**Annexure-XVII**).

The difference in prices of unhusked and husked nuts depends upon the price obtainable for husk in different markets from time to time. A comparison of the prices in coconuts with husk and without husk

at Thiruvanthapuram, Quilon and Alapuzzha markets (Annexure–XVIII, XIX & XX), showed that un husked coconut generally fetched higher prices except in Quilon market where it was found that coconut with husk also fetched good price. However, comparison of the yearly prices prevailed in different states of India (Annexure–XIV, XV and XVI, Figure-7) showed only the marginal difference between the prices of the

Figure – 8

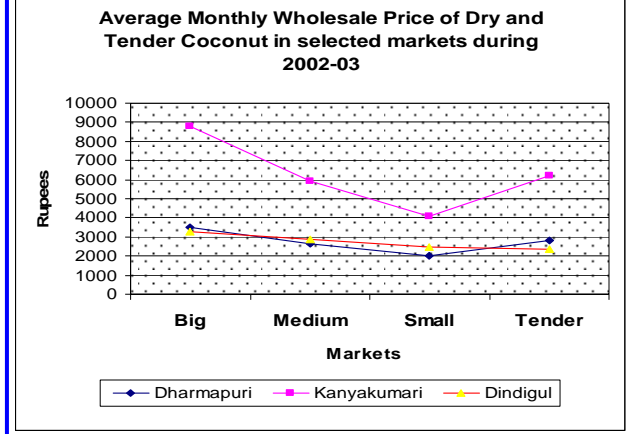


Source : (Annexure – XVII)

husked, un husked and partially de husked or semi husked coconuts.

6.2.1.2 Size of nuts, tender nuts and Copra content : The size of coconuts matters much in fixing price of matured nuts, as bigger nuts usually yield more copra. Therefore, prices of coconuts, as a rule vary according to size of nuts. Nuts harvested in summer being bigger in size usually fetches higher price than the nuts harvested in the monsoon. The coconuts from the laterite soils of coastal tracts yield more copra therefore, fetch higher prices. Coconuts from certain locality are believed to yield copra with a better flavour and taste or to have better keeping quality as compared to other locality and such nuts usually fetch a higher premium price.

Comparison of wholes prices of different varieties in the markets of Dharmapuri, Kanyakumari, Dindigul, producing big, medium and small size coconuts clearly revealed that the prices fetched by big size coconuts are higher than the prices of the medium and small sized coconuts (Annexure–XXI). Harvesting of tender nuts is necessarily of a localized nature, usually fetches some what lower prices than matured nuts. The difference may vary depending upon the demands of tender nuts, which is greater in summer month (Annexure–XXI, figure-9).



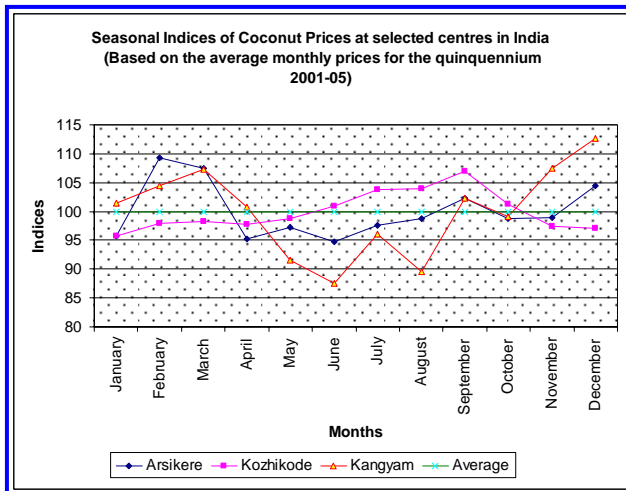
Source : (Annexure – XXI)

Prices of matured nut differ according to the state they are being sold as fresh or

after storage. In the producing areas the prices of dry nuts are generally higher than those of fresh nuts (**Annexure –XXI**).

6.2.1.3 Comparison of Prices in different markets : Comparison of prices of coconut in different markets becomes difficult owing to variation in size of nuts, the period for which they have been stored and difference in the actual number of nut required to be delivered **Figure-6**. The prices at Ariskere market Kozhikode, Kangayam market generally took a similar course (**Annexure–VIII, IX & X**). It would be clear from the **Figure-6** that the prices of coconut in the different markets are not comparable, and also appears to be largely influenced by local condition of supply and demand.

6.2.1.4 Seasonal Variation in Price : Unlike most other agricultural commodities coconuts are harvested several times in a year and as such prices are not affected so much by the presence of supplies at any one particular time of the year. However, the demand for coconut for copra making slackens during the monsoon months. Since, harvesting of coconut in different seasons makes the difference in quality and size of nuts reaching the market. The copra content of the nuts harvested in summer months is higher than the nuts harvested during rainy season. All these facts contribute towards variation in prices of nuts in different months of the year. In order to study the seasonal variation in the prices of coconut data on average monthly whole sale price for the Quinquennium 2001-2005 in respect of three centers viz. Ariskere, Kozhikode & Kangyam was analyzed. From the data, it was observed that the seasonal indices fluctuated from 94.8 to 107.5, 95.8 to 106.9 at Ariskere and Kozhikode markets respectively, the corresponding indices at Kangyam was 87.5 to 112.7 showing a wide fluctuation in the market. **Figure–10** shows the seasonal impact which have been calculated by the method of moving average (**Annexure – XXII**).

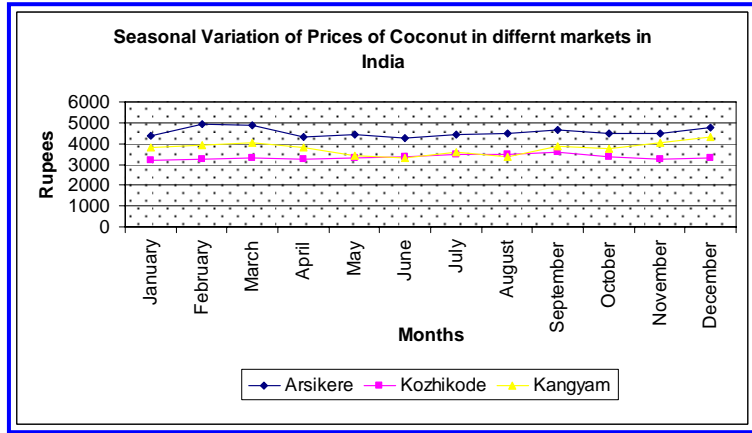


Source : (Annexure – XXII)

average monthly whole sale price for the Quinquennium 2001-2005 in respect of three centers viz. Ariskere, Kozhikode & Kangyam was analyzed. From the data, it was observed that the seasonal indices fluctuated from 94.8 to 107.5, 95.8 to 106.9 at Ariskere and Kozhikode markets respectively, the corresponding indices at Kangyam was 87.5 to 112.7 showing a wide fluctuation in the market. **Figure–10** shows the seasonal impact which have been calculated by the method of moving average (**Annexure – XXII**).

The study of the average monthly wholesale prices of coconut in respect of Arsikere, Kozhikode and Kangayam markets during the Quinquennium 2001-2005 shows the direction and speed of **Figure – 11**

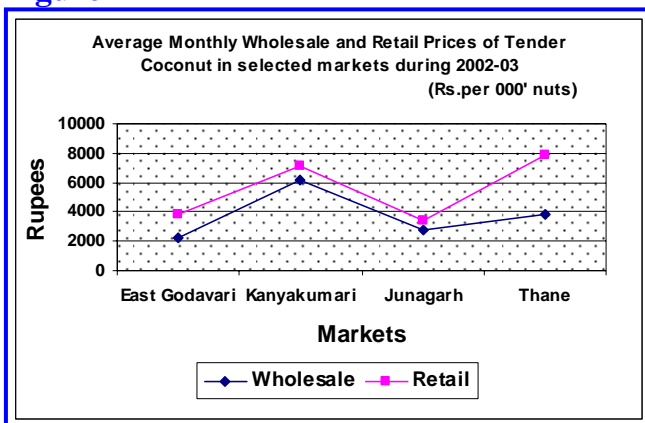
the price behaviour in long run and seasonal fluctuations within the same marketing year (**Annexure-XXIII, XXIV & XXV, Figure-11**) it was also observed that the annual prices movement followed similar trends and the seasonal variations were alike without much fluctuation in prices in all the three marketing centers.



Source : (Annexure-XXIII, XXIV & XXV)

The coconut prices tends to rise from October/November to March/April, this variation in trend may be due to sustained demand for copra making which starts after the cessation of monsoon rains by October/November. Large scale arrivals of coconut starts in the season from January/February months only, the demand for copra making pushes prices to higher levels. From February onwards arrivals of nuts increase and the prices decline due to the presence of more supplies. After July though arrivals of nuts are low, their quality is below average. Further the monsoon rains hamper regular copra making and consequently the demand for nuts goes down.

Figure – 12



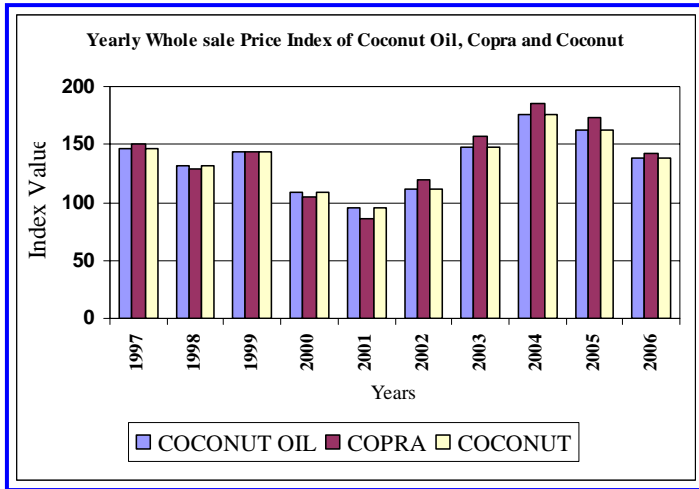
Source : (Annexure – XXVI)

the difference between the whole sale and retail prices varied from Rs. 1000/- to Rs. 3000/- in various markets of India.

6.2.1.5 Retail Price: The retail prices of mature nuts vary mainly according to their size. It has been observed that the difference between the retail and wholesale price varies in different markets and for different transactions, as visible from **Figure-12**, wherein wholesale and retail prices of coconut in different markets have been shown.

Figure-12, Annexure-XXVI,

6.2.1.6 Prices of coconuts in relation to Prices of copra & coconut Oil : The figure-13, indicate that the trend of prices move in tandem with the coconut oil and copra prices(Annexure – XXVII). It also shows that the price of coconut in the country is dependent on the prevailing wholesale prices of coconut oil and copra, which is characterized by recurring violent fluctuation. The coconut is sold according to the price of nuts, the experience of price formation of this produce in the market shows that there is clear in identifiable price differential between copra and coconut i.e. while the price of coconut in variably comes down along with a declining prices of copra, this is not always true when the prices of copra moves up. There is certain period in a year, particularly between May and June, the wet months, when the prices of coconut do not move in the same direction of copra prices.



Source : (Annexure – XXVII)

Figure –13)

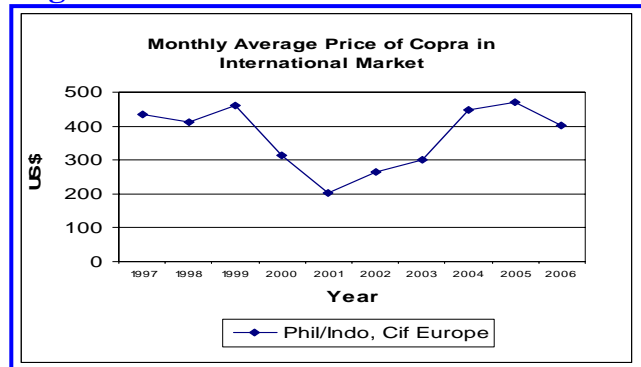
On examination of percentage difference in yearly wholesale price indices of coconut oil, copra and coconut shows that an increase or decrease in the wholesale price indices of coconut oil and copra does accompany similar increase or decrease in the wholesale indices of coconut also.

6.2.2 Copra Prices Trend : The dried kernel of matured coconut, known as copra, is commercially classified into edible and milling copra. The edible copra is processed for the market in the form of balls and cups; milling copra is processed in the form of cups and chips. According to trade estimate only 40 per cent of coconut produced in major coconut producing states, Kerala and Tamil Nadu, convert coconut to copra. About 65 per cent of copra, locally produced in Kerala is used by oil milling industry and 35 per cent is exported to upcountry markets. Though copra is a basic raw material for the end commercial products, the coconut oil but the ruling price of coconut oil is the yardstick for determining the prices of copra and coconut in the market.

6.2.2.1 Prices in International Markets : Analysis of a decade's price on the international prices of copra (**Annexure–XXVIII & Figure-14**). It has been observed

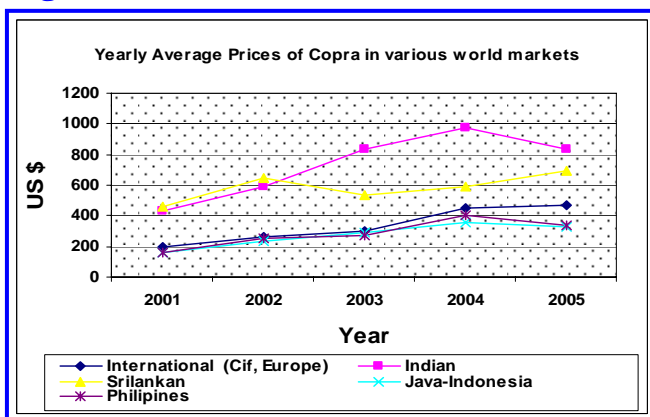
that the average price of copra was at \$ 434 per tonne during 1997, which declined to \$ 411 per tonne in 1998. The prices have however, been looking up since the last quarter of 1998 and the average price during January–July, months of the same year, were quoted at \$ 484 per tonne. However, the prices further dipped to \$ 201 per tonne during 2000-01. Though, after 2001 there was some recovery in the international price of

Figure – 14



copra and in 2004 increased to about \$ 450 per tonne and the trend continued in 2005 (\$ 471), but again declined to \$ 403 in the year 2006. **Source : (Annexure- XXVIII)**

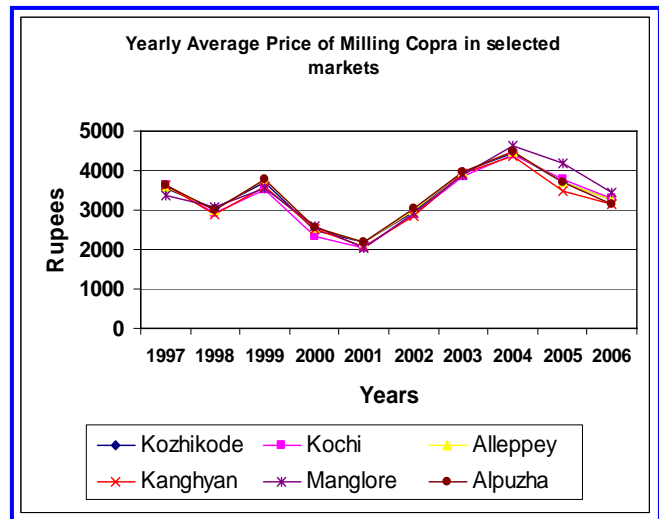
Analysis of the data on the prices of copra for the quinquennium in four important markets of the world viz., Java-Indonesia, Philippines, India and Srilanka, it was found that the prices in India and Srilanka were on the higher side than that of Java in Indonesia and Philippines. The prices in other two countries were seen to follow the same international trend and were about in the range with that Cif Europe (**Figure-15**



(Annexure–XXVIII-XXXII) showed the price trend on higher side compared to the international price, it was even higher than that of copra prices in Srilankan market. **Source :**

6.2.2.2 Price in India in relation to prices in Foreign Markets : The prices of copra in viz., Kochi, Alappuzha, Alleppy, Kozhikode, Manglore, Kangayam markets provide a fair index of copra prices in India (**Figure-16 & Annexure-XXXIV to XXXIX**). It could be observed that the prices in Foreign and Indian markets, generally exhibits a similar trend. It was observed that the Srilanka market and Indian market showed closed affinity towards their price trend than the rest of the world market, which more or less behaved in the same manner. The relative level of prices in these markets changed from time to time. The prices in Indian markets were slightly higher than the prices of Indonesia, Philippines and Srilankan markets (**Annexure– XXIX to XXXII**).

6.2.2.3 Trend of Prices in India : The fluctuating price trend of milling copra, ball copra and edible copra in different markets during the period from 1997 to 2006, could be observed from the **figure No.16**, and the data (**Annexure-XXXIII-XXXVIII**), it would be clear that the prices quoted for milling copra were below the Minimum Support Prices (MSP) in the year 1996 and 1998 and the Wholesale Price Index (WPI) of copra during January–September, 1998 was 10.4 per cent lower than the average Wholesale Price Index (WPI) for the corresponding period of 1997 (**Annexure–XIV & XXVII**). It was also observed that the prices of ball copra remained above the MSP, though the price of coconut fell significantly during the same period. **Figure – 16**



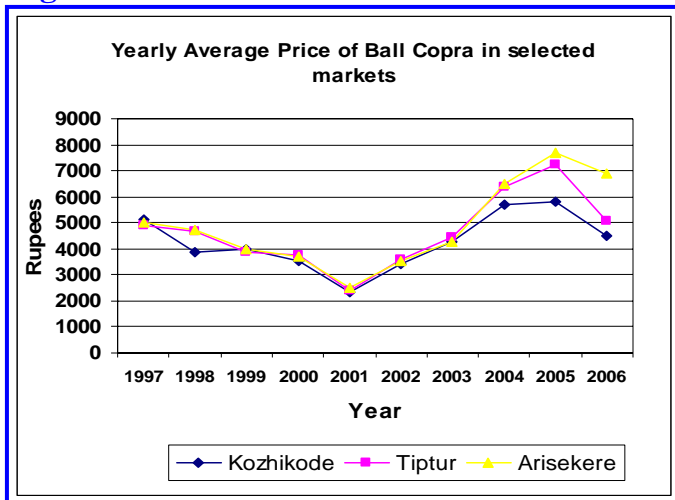
The copra prices were scaling to move **Source : (Annexure-XXXIII to XXXVIII)** upwards till the mid of 2000. However, the copra price plunged to lowest during the year 2001, but again recovered from September, 2002 and henceforth the trend was increasing. Outwardly it would show that the return around in the price of copra in December, 2001 and the subsequent uptrend during 2002 had been a consequence of convergence of several factors, both on the supply and demand side. The first being that the prices of copra, which had been declining since the beginning of 2000, reached lowest by the end of November 2001. This would be evident from the month end wholesale prices prevailed in the major market as shown in **Figure-16**. As a result, the National Agricultural Cooperative Marketing Federation of India Limited (NAFED), at the end of 2001 had to liquidate the entire stock it built up from its operations during 2000 and 2001. Secondly, the supply of copra reportedly declined considerably due to drought during 2002. Apart from reduced supply, the cumulative effect of the eriophyidmite infestation has reduced the productivity and shrinkage in the size of copra in the major producing state of Tamil Nadu, Kerala and Karnataka, thus affecting the price of copra.

It was reported that the harvesting of tender coconut for sale in all these states and usage of coconuts for manufacturing of diversified product increased significantly. According to some market observer, resumption in future trading in coconut oil in October, 2001 helped to push the price of coconut upwardly resulting in increasing in price of copra which were ruling at very low levels prior to the commencement of the trading. Further the resumption of future trading in copra in June, 2002 has thus

strengthened the market. The copra prices which were ruling in the range of Rs.1900-2600/- quintal during January / October, 2001 stepped about Rs.2000-2500/- in November / December, 2001 and gradually moved up to about Rs.3600/- quintal in December, 2002 at Kochi market. The highest price increase in copra was recorded in the year 2004. The price increased nearly by 115 per cent over the price of 2001. A sudden crash in prices of copra and coconut oil generally causes heavy loss to copra manufacturers, trader and coconut farmers. The fall in the prices during 2005-06 of copra was due to combination of various factors such as, demand, supply, imbalances, availability of cheaper substitute and introduction of Value Added Tax (VAT). As a result of imposition of Value Added Tax (VAT), the production cost of copra also increased in the state of Kerala. The copra purchasers moved from Kerala to the neighbouring Tamil Nadu state and created an artificial surplus situation, which led to price crash in other adjoining state in 2005-06.

The market for ball copra produced in Karnataka had relatively better demand pull. The wholesale price was in the range of Rs.6203/- to Rs.8000/- quintal during peak

Figure – 17



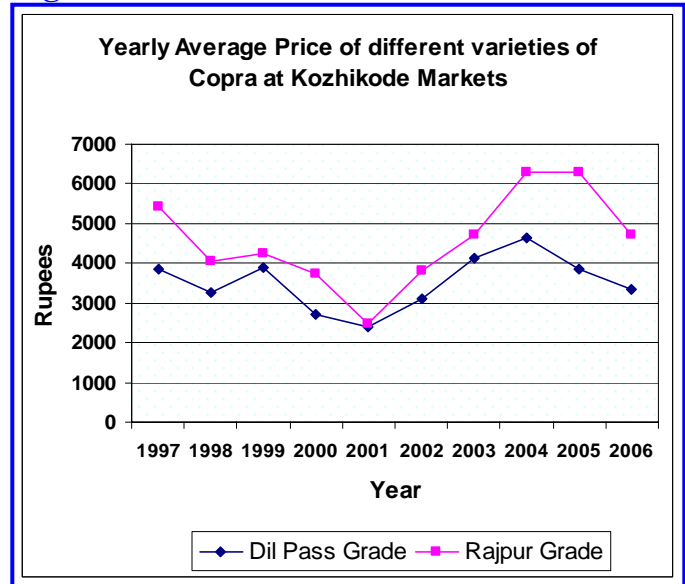
Source : (Annexure–XXXIX to XLI)

situation and higher demand for tender coconuts.

months in the year 2005, which was higher than that of Minimum Support Price (MSP) (**Annexure– XXXIX to XLI**). The prevailing market prices during the year 2005, showed a substantial increase over previous year prices. Unlike milling copra, the prices of ball copra remained insulated from the prices of coconut oil because it was not used by the miller for extraction. The price of ball copra remained higher because of stagnation in coconut production since 2000-01, on account of recurring drought

6.2.2.4 Price Variation due to Quality : The ball copra and the best quality of cup copra are referred as “*edible copra*”, while all the other qualities of cup copra are “*milling copra*”. Ball copra fetches the highest price, while in the cup copra, the edible qualities commands a premium price over the milling qualities, the extent of premium price paid depends upon the respective qualities and the supply and demand situation in different markets for both types of copra. The variation in prices of the milling copra, and the “*Dil pass grade*”, the *Rajpur grades* in different market given in **Annexure- XLII & XLIII**, could be seen from the **Figure-18**. The edible grade invariably fetched a premium, over the milling grade; the “*Rajpur grade*” too fetched a higher price than the other grade. The difference between the prices of the two qualities varied from time to time. When the price trends during 1997 to 2006 were compared, both grade shared the same trend as that of coconut oil and copra, thus showing that different factors mentioned above may also influence the price of different grades in the market.

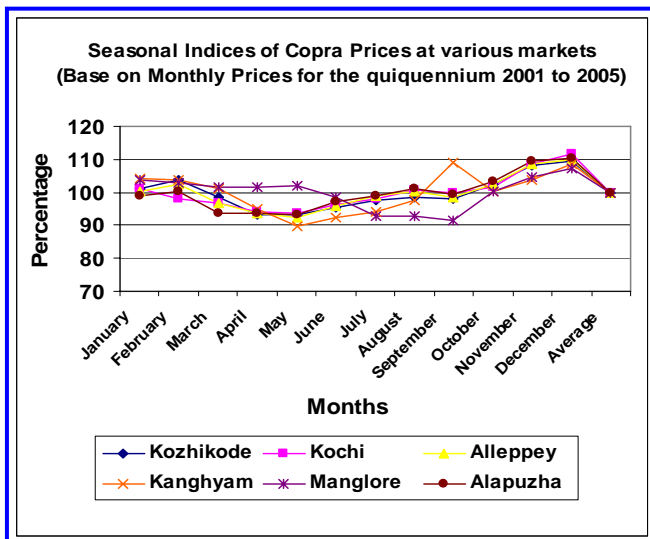
Figure – 18



Source : Annexure- XLII & XLIII

6.2.2.5 Seasonal Variation in Prices : Seasonal variation in the prices of copra has been studied from the data on quinquennium average of monthly wholesale price for the period from 2000-05 at Kochi, Alapuzha, Alleppy, Manglore, Kangayam and Kozhikode market and seasonal indices have been calculated by the method of moving average (**Annexure–XLIV, Figure-19**). The copra prices were usually above the annual average from October to February and below for the rest of the year at Alleppey, Alapuzha, Kangayam, Kochi and Kozhikode markets. This might have been partly **Source :**

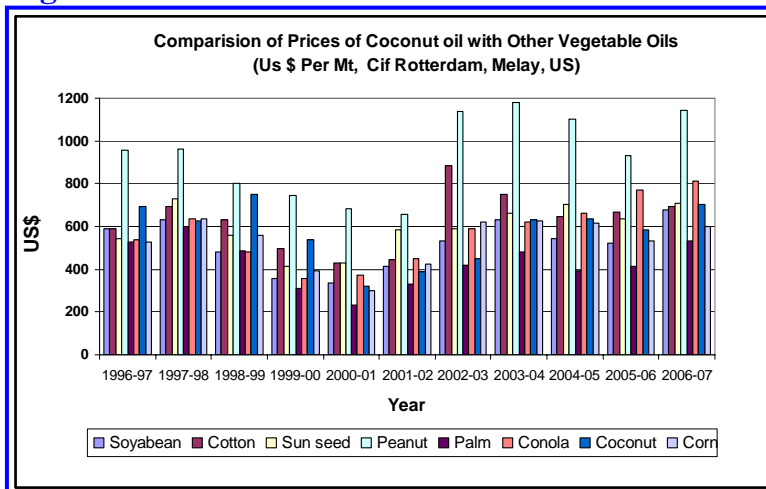
(**Annexure– XLIV**) due to the fact that copra produced in the monsoon



months, is of poor quality, copra crushing activities get stacked and exports become slower due to rains. It has also been observed that the prices were increasing steadily from May-June onwards and reaching the peak in December (7 to 11 per cent above the annual average). This was followed by a precipitated fall in January (5 to 9 points in the index) and further declined in the subsequent months reaching the minimum in April-May (5-7 per cent below the annual average). Though all the above markets had showed similar trend in seasonal variations, some market to market variation was also observed. In case of Manglore market the increase in price indices differ from the other markets. The annual average index increased from November and maintained upward trend till May. The price index dropped in May and continued till September and regained the annual average index in October. The variation between the maximum and minimum price index was about 7 to 8 per cent in the Manglore market. (**Annexure- XLIV, Figure-19**)

6.2.3 Trend of Coconut Oil Prices : The price of coconut oil is influenced by its supply and inelastic demand. The other factors such as end users of entire coconut oil and their responsiveness to the prevailing prices, supply of other major vegetable oils viz., palm oil, soybean oil, rapeseed oil and sunflower oil, dominating the world market and lastly the different policies of Government from time to time do have bearing on the price determination process of coconut oil. As such, the coconut oil is over priced in both, domestic and world markets as well.

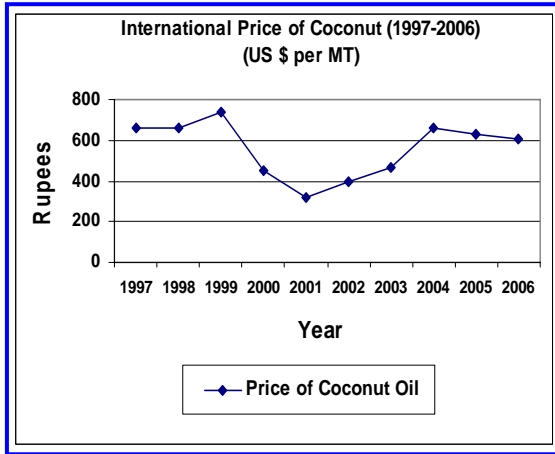
6.2.3.1 Prices In International Markets : Coconut oil is an important commercial product of coconut traded with world wide demand and the price of coconut oil moves in close sympathy with that of other vegetable oil (**Annexure- XLV, figure-20**). The coconut industry is always susceptible to the pressure from low price oil seeds prices and increased availability of cheap oils like palm and soybean oils. Coconut oil being the source of caprylic capric, Lauric acid and myristic acid, which are considered as important items for industrial application and always enjoys a premium price. However, advances in petro-chemical engineering have restricted the growing industrial demand for coconut oil, instead cheap benzene substituted it in the detergent



Source : (**Annexure- XLV**)

Coconut oil being the source of caprylic capric, Lauric acid and myristic acid, which are considered as important items for industrial application and always enjoys a premium price. However, advances in petro-chemical engineering have restricted the growing industrial demand for coconut oil, instead cheap benzene substituted it in the detergent

industry. From the analysis of a decade's data on the international prices of coconut oil (**Annexure–XLVII, Figure-21**) and the annual average prices of selected vegetable oil **Figure – 21**



Source : (Annexure-XLVII)

for the same period (**Annexure–XLVI**), it could be observed that the international prices of all vegetable oils were moving in an oscillated manner with annual fluctuation. It was observed that coconut oil had slipped more sharply in the years 2000 to 2002 and the fluctuation in the coconut oil prices were shaper than other vegetable oils, except that of palm oil which also declined sharply in the international market, thus affecting the economy of many countries in Asia Pacific regions. The declining trend continued till the beginning of the year 2002, however, in the mid of 2002, the price witnessed recovery in the international market. This decline in prices was attributed to a significant increase in the supply of coconut oil from the Philippines and Indonesia and large stock of palm oil as a result of with low demand from India and China. The unpredictable high and low price on account of erratic price behavior of coconut oil, coupled with the availability of substitute oils have been found responsible for the reduced use of coconut oil in soap manufacturing industry which also cast its shadow on the overall price structure of coconut oil.

Traditionally, the coconut oil enjoyed premium price over other oils, but during 2000-04, there has been significant change in the price structure of other oils, as a result the advantage of being a premium oil deteriorated progressively. The golden era of coconut Oil in the world market in terms of price during 1980-85, was the thing of past, when annual average price was the highest ever at US\$ 895/MT, moving within a range of US\$450-US\$1080 (**Annexure–XLVIII**). The decline in coconut production in Indonesia caused by the drought in 1982-83 and a significant rise in consumption in the world market, as well as by impact of bullish prices of other oils were the reasons attributed to this loss to the coconut oil industry. Since, the onset of significant improvement in supply of Palm kernel oil in 1985-89, fluctuations in prices have however been tempered, though some radical spikes in prices were still experienced intermittently, particularly with average level of US\$696 in 1995-99, due to simultaneous lack of production of both Palm kernel oil and coconut oil brought about by severe El Nino in Indonesia and the Philippines, and even Malaysia, in 1998-1999.

Table No.17

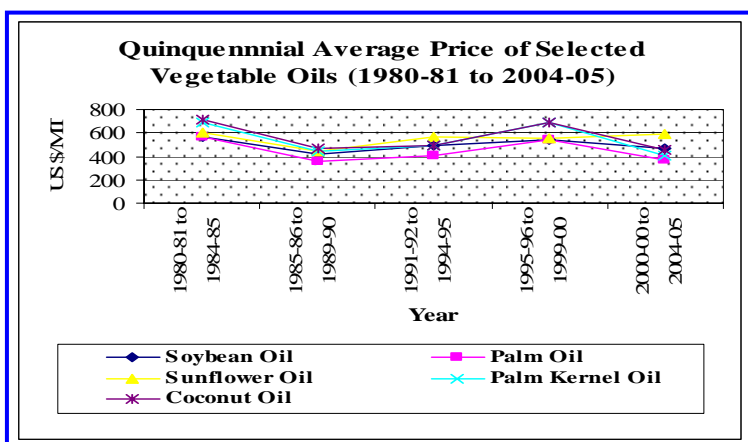
International Price of selected Vegetable Oils (Quinquennial Average)

(Price : US \$ per metric tonnes for the period from 1980-81 to 2004-05)

Sl. No.	Year	Soyabean oil Dutch Fob	Palm Oil Phillipines/ Indonesia Cif Rott	Sunflower Oil Cif Europe	Palm Kernel Oil Cif Europe	Coconut Oil Cif Europe
1.	1980-81 to 1984-85	563	564	607	695	718
2.	1985-86 to 1989-90	418	361	437	437	462
3.	1991-92 to 1994-95	497	405	565	488	492
4.	1995-96 to 1999-00	544	546	550	684	693
5.	2000-00 to 2004-05	466	373	594	408	460

Analysis of the Quinquennial average prices of coconut oil and selected vegetable oils in the international market recorded during past five Quinquennium ending 2004-05

Figure – 22



Source : (Table 16)

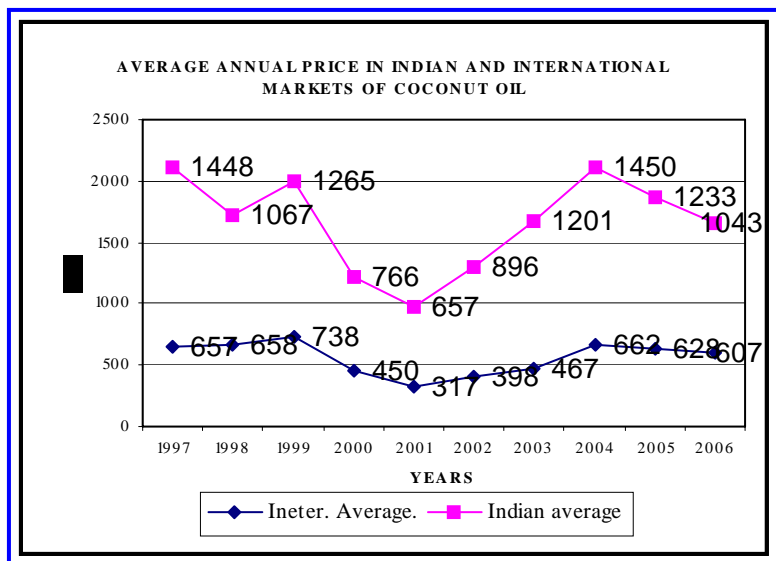
shows the direction and speed of prices in the long run during the marketing years (**Annexure –XLVIII**). It has been observed that the prices hit the lowest during the Quinquennium ending 1989-90 (US \$ 462 per M.T.) and 2004-05 (US \$ 460 per M.T.) compared to the corresponding prices prevailed at the peak i.e. US \$ 718 per M.T. during the period ending 1984-85 and US \$ 693 per M.T. during the period ending 1999-2000. The reason attributed to this dramatic fluctuation was improved supply of palm kernel oil and coconut oil. When the total world production of coconut oil during the corresponding period was at the peak level of 3.42 million M.T. and that of palm kernel oil was also improved to 6.95 per cent per annum during the same period, which had depressed the prices down to US \$ 492 per M.T. during the period ending 1994- 95 in respect of coconut oil, and US \$ 405 per M.T of palm kernel

oil. Prices of other major vegetable oil were bearish as well, compare to the corresponding prices during the same marketing year.

The world production of vegetable oils is dominated by soybean oil, palm oil, rapeseed oil and sunflower oil. In the last five years the soybean oil grew at 28 per cent, palm oil at 45 per cent, rapeseed oil 29 per cent and sunflower oil at 24 per cent. The palm oil production has surpassed the production of soybean oil to become world's largest oil on account of high productivity of the palm oil crop in South East Asian countries. But the growth of coconut oil during the same period was reported to be 0.46 per cent only in the world market. The productivity of coconut in the coconut producing countries all over the world is not enough to compete with productivity levels of competing oil seed crops like palm kernel oil, which is often considered as substitute for coconut oil. The global production, trade and price scenario of coconut oil also has been witnessing certain erratic trend and indeed was on a roller coaster in the recent past. This phenomenon might possibly be due to a more volatile price behavior of competing substitutes like palm oil in the world trade that highlight the prevailing uncertainty of coconut sector in global perspective as well. Since the behaviour of coconut oil price is relatively dependent on over all supply of oils and fats, the coconut oil is loosing its premium position in the vegetable oil trade to other oils. However, due to special characteristics of coconut oil, it has a minimum level of demand below which the coconut oil market moves independent of general oil seeds and fat market. When supply fluctuates around this inelastic level, considerable difference in price may occur.

6.2.3.2 Prices In India In Relation To Price In International Markets : When the average price of coconut oil at Kochi, Alapuzha, Kozhikode, Kangayam for a decade ending 2006 was compared with **Figure – 23**

the average price of Cif Rotterdam, it was observed that **(Annexure- XLVII-XLIX, Figure-23)** the price of coconut oil has always been much higher in India than in the International market because of inclusion of the coconut oil in the list of restricted items of imports. The world price of coconut oil declined to US \$ 657 and \$ 659 per tonne in 1997, 1998 respectively and had increased to \$ 766 per tonne during



Source : (Annexure-XLVII-XLIX)

(January–July), 1999. The international scenario of the price of coconut oil when compared to the domestic market during the same period, it was about 60 per cent higher than the international prices. However, during 2001-2005 the international prices and Indian prices did not show much of the difference and the trend was same in both the markets; though the prices remained over all higher in the Indian markets than that of international market.

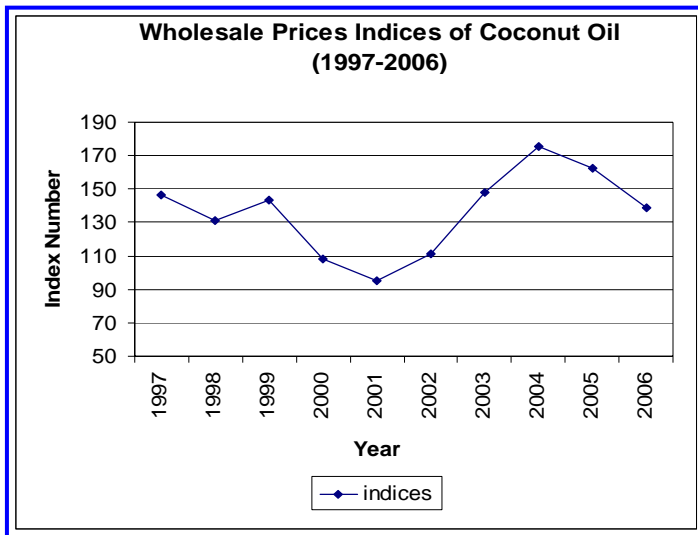
6.2.3.3 Trend of Coconut oil Prices In India : India produces about 4.5 lakhs tones of coconut oil which is equivalent to about 6.9 lakhs tonnes of milling copra. It has been reported that out of all coconut producing states, Tamil Nadu and Kerala accounts for 90 per cent of coconut oil production in the country. The average annual prices of coconut oil in different markets of the country during 1997 to 2006 would indicate the prices trend prevailed in the coconut oil markets (**Annexure–XLIX to LIII**). According to an estimate 40 per cent of the coconut produce is used for production of oil for direct consumption and cosmetic purposes. The usage of coconut oil as a cooking medium is confined to Kerala. It has been estimated that the overall demand for coconut oil as a cooking medium has only increased by about one per cent per annum. About 1.6 lakhs tonnes of oil is being used annually for direct household consumption and about two lakhs tonnes of coconut oil per annum is used for non household purpose, such as manufacture of hair oil, cosmetic and medicinal preparation and associate industrial consumption.

The coconut oil prices are decisive factors in determine the price of copra and coconuts. It has been observed that Kerala being coconut consuming state, coconut prices are controlled in the wholesale markets of Kochi and Kozhikode in the state. It has been observed since long that the prices of coconut oil always fluctuate, prices of coconut oil has no relation between the movement of prices during the season and off season sale in the wholesale market. The frequent, wild and wide fluctuation in coconut oil prices during the season and off season upset the economic of all these stake holder involved in the marketing channel of coconut oil. The high price of coconut oil has widened the price gap between other edible oils. The palm oil and palm kernel are principle substitute of coconut oil. The former competes with coconut oil in the edible oil segment and later in the non edible oil segment. Limited consumption base of the edible coconut oil and erratic prices situation in coconut oil market has led to a shift in demand for cheaper vegetable oils, available plenty in the market. The palm oil prices are globally cheaper than other major edible oil and they not only dominate the Indian import scenario but also trend to transmit price signal to domestic edible oil and oil seed. The traders opined that this shift in consumption pattern to cheaper vegetable oil would result in a slump in demand and draw in price of coconut oil. Further, Kerala, no longer holds the number one position as larger producer of copra in the country, but the neighbouring state of Tamil Nadu has emerged as the consequent largest producer of

coconut, which has resulted in an ease in coconut oil prices in the wholesale market of Kochi. It would thus result in narrow gap in demand and supply in the southern coconut sector in times to come. The price gap might not show a noticeable upward trend during the lean period in Kerala, as demand might not improve in the face of increase production in Tamil Nadu state and large scale import of edible oil in the country. The average annual prices of coconut oil in different markets of Kerala and Tamil Nadu during 1997 to 2006 (**Annexure–XLIX to LIII**) indicates the trend of prices of coconut oil prevailed in the country.

The prices of coconut oils in India showed a declining trend from 1997 to 1998, which again increased in the year 1999. The average price of coconut oil which was found to decline by 10.1 per cent, from Rs. 5259 in 1997 to Rs. 4403 in 1998, had again

Figure – 24

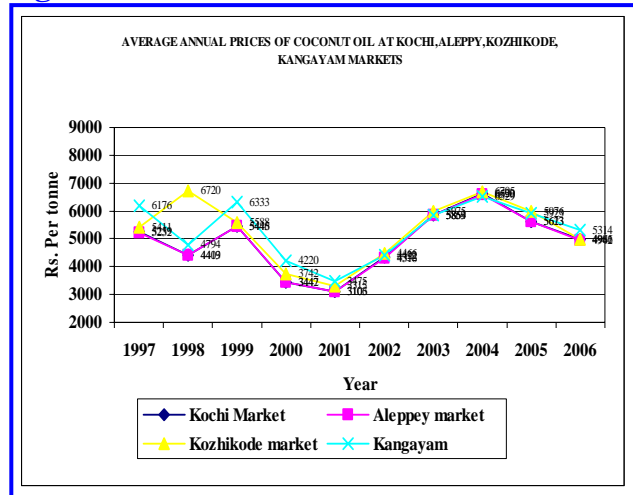


Source : (Annexure-LIV-LV)

started rising during 1999. The average wholesale price indices (**Annexure-LIV-LV, Figure-24**) of coconut oil which had declined by 10.1 per cent from 146.1 in 1997 to 131.4 in 1998 have again gained during 1999. The index has risen from 133.7, in January, 1999 to 143.4, in April, 1999. Afterwards, though the index has registered a striking decline, it has again gone up to 143.3 in August, 1999 (**Annexure–LIV-LV**). During January-August, 1999, the month end wholesale prices of coconut oil were reported in the range of Rs.5000-5900 per quintal at Kozhikode market and Rs.5000-5800 in Kochi market. The price had risen from Rs.4978 in January, 1999, to Rs. 5565 in April, 1999. Afterwards, though the prices had registered a slight decline, it had again gone up to Rs.5888 in November of 1999. The reason for higher price ruling in all the major markets (**Annexure–XLIX-LIII**) during 1999 was attributed, mainly to a reported decline in the production of coconut and copra. Coconut oil price was much higher in India than the international markets (**Annexure–XLVII & XLIX**) and is possibly that was because, in 1999 both copra and coconut oil were on the list of restricted imports. However, India having lost its case for continuing with quota restriction in WTO, the effect of competition from abroad was felt more than anticipated earlier.

The coconut oil prices fell by over 24 per cent during 2000, followed by a further fall of 12 per cent in 2001. The wholesale price index of coconut oil, however, staged a sharp turn around in December, 2001 and registered an average increase of about 12 per cent during 2002 (January–October). The month end price of coconut oil, which ruled the markets in the range of Rs.2800-3200 per quintal during January-October, 2001 in Alappuzha, Rs.2900-3400 in Kozhikode, Rs. 2800-3000 in Kochi market, and Rs.3100-3600, in Kangayam market, spurred to Rs.3400-3750 and Rs.3650-4160 in November–

Figure – 25



Source : (Annexure–XLIX–LIII)

December, 2001, respectively, in the above markets. However, with some initial hesitancy, the price of coconut oil gradually moved up during 2002 and the average price quoted in October 2002 was Rs. 4637 in Kochi market, Rs.4600/- per quintal in Alappuzha, Rs.4800/- in Kozhikode and Rs. 4800 in Kangayam market. The monthly average market price of coconut oil in wholesale markets of Allapuzza, Kerala in 2003 ruled at Rs.6250 per quintal. The average index number of wholesale prices for coconut during January-September, 2003 was 140.7 (Annexure – XLIX to LIII).

One of the reasons attributed to the above spurt in prices was the resumption of futures trading in coconut oil in October, 2001, under the first commodities Exchange of India Ltd., Kochi, after a gap of 3 decades. Secondly the net import of coconut oil, despite very low international prices as compared to domestic prices, has been insignificant in terms of volume in recent years. Apart from high tariff of 85 per cent, coconut oil continued to remain a canalized item, to be imported only through an authorized State trading organization. However, net import levels of about 9 thousand tonnes in 2000-01 and 24 thousand tonnes in 2001-02 had also not materially affected the supply situation of coconut oil. Thirdly, the industrial demand for coconut oil has considerably been shifted to other vegetable oils, especially palm kernel oil in the sector such as paints, soaps and detergents.

The price of coconut oil during 2004 also ruled above last year's level. The wholesale price index fluctuated between 166.3 and 175.7 during January-July, 2004.

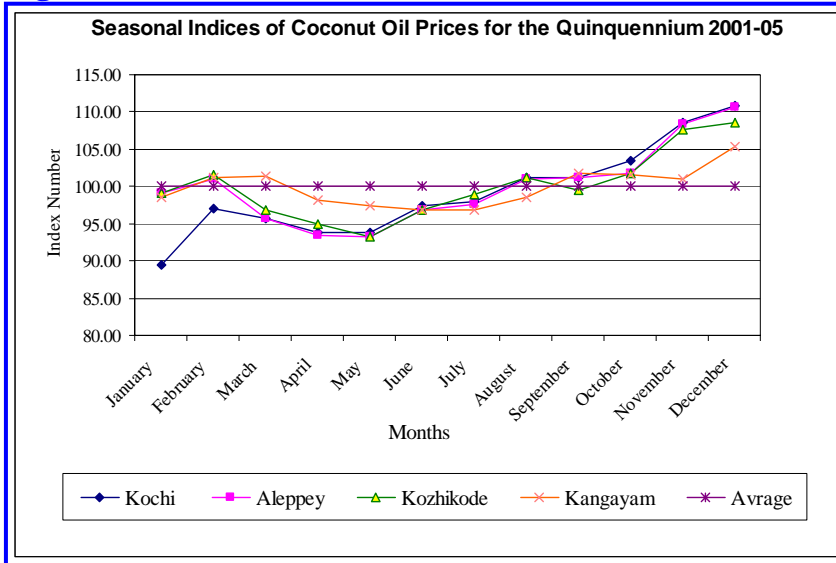
The average wholesale price index of coconut oil is estimated at 162.8 and 174.6 in the peak season of coconut and 170.7 in July, 2004 were higher by 21.1 per cent, 28.8 per cent and 23.8 per cent than in the correspondence months of 2003. The prices of coconut oil have been reported in the range of Rs.5900-6800 per quintal during peak period (January-May) and Rs.6975 in August at Kozhikode, Rs.5800-6500 during lean period and at Alappuzza, Rs.6950 in August and Rs. 5800-6500 during peak period and Rs.7025 in August at Kochi in Kerala. The import of coconut oil despite very low international price (Rs.30447 metric tonnes), as compared to higher domestic price of Rs.81249 per metric tonnes in Tamil Nadu and Rs.63906 in Kerala. The average index number of Wholesale Prices Index (WPI) of coconut oil, with 1993-94 as base, recorded at 172.8 during first seven months (January-July) of the year 2005 was marginally higher than Wholesale Prices Index (WPI) of 172.6 during the corresponding period of the previous year. The Wholesale Prices Index (WPI) of coconut oil during different months of 2005 also revealed a similar trend as that of copra. The Wholesale Prices Index (WPI) after remaining higher than the last year's level by 9.2, 11.2 and 3.6 per cent during January, February and March, fell below the last year's level by 0.9, 6.3, 6.4 and 8.5 per cent in April, May, June and July, 2005. In consonance, the month end wholesale prices of coconut oil remained higher than last year's, level during first two months (January and February) at Kozhikode, Alappuzha and Ernakulam in Kerala. **(Annexure- XLIX-LV)**

The agricultural trade liberalization is apparently swinging the market equilibrium against the interest of coconut oil prices. The import of cheaper vegetable oil with low incidence of duty and more specifically to the import of palm oil and palm kernel oil has increased the availability of cheaper substitutes for coconut oil. This has depressed the demand for coconut oil, imparting its price in the market. The palm oil being cheaper than other edible oils dominates the import basket of edible oils. The imports have increased more than fifteen folds from 3.46 lakhs tones to 52.90 lakhs tones.

It has been reported that there has already been a consumption shift to cheaper vegetable oil due to price advantage among the lower income strata of the society in Kerala. Though, the Government authority had again increased the import duty from 65 per cent to 80 per cent for crude palm oil and crude palmolein, from 75 per cent to 90 per cent for RBD palm oil, RBD palmolein and other palm oil, but the gap between the price of cheap imported substitutes and domestic produce still remained wide.

6.2.3.4 Seasonal variation in prices : The production and consumption pattern during various season in the country always affects the price structure of all the agricultural and horticultural produce. The analysis of data on the average monthly wholesale prices of

Figure – 26



the Quinquennium 2001-2006 in respect of Kochi, Alleppey, Kozhikode and Kangayam market has also revealed the seasonality in coconut oil prices (Annexure-LVI & LVII, Figure-26). It has been observed that the price tends to decline during January to May and then steadily increase till it reaches to peak by December. The main reason attributed for the decrease is the peak

Source : (Annexure-LVI- LVII)

production period of coconut and copra. The increase of prices of coconut oil during September to December is on account of shortage of raw material and the peak price increase is due to the highest seasonal demand for coconut oil during the festival period as there are different festivals like Onam, Deepawali, X'mas and New Year, when the demand of coconut oil is at the maximum.

6.2.4 Coconut Oil Cake Price Trend : Oil meals are a rich source of proteins and are used as cattle feed all over the world including India. Oil meals are obtained after the extraction of oil from oilseeds whether by expelling or solvent extraction. Oil meals from India are exported across the world in view of the heavy demand from many developed and developing countries, as an ingredient of animal feed, where animal meat consumption is high. The animal gains weight by eating more proteins through the oil meals, which results in higher yield of meat per animal.

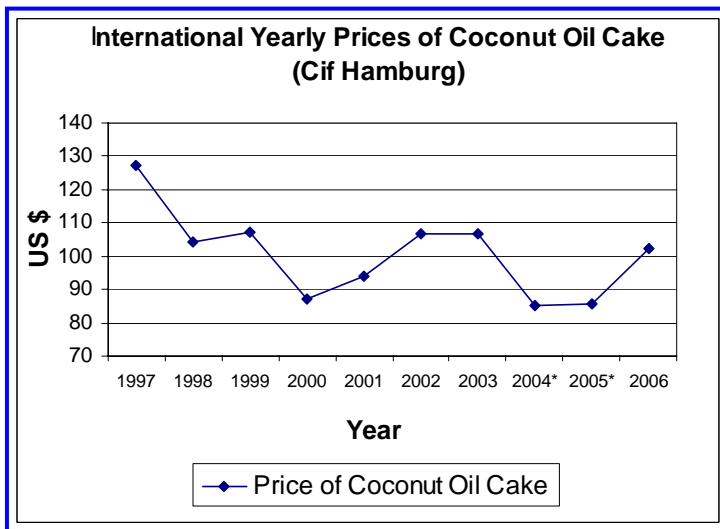
Coconut oil cake/meal is the residue left after extracting oil from copra. The yield of coconut oil cake may be reckoned to vary from 33 to 36 per cent of the copra. Traditionally it is used as cattle feed. The most important qualities of coconut oil cake as observed by the farmers are its palatability to the animals and better results in terms of

milk production as well as the improved quality of butter and ghee. Coconut meal is fed mostly to dairy cattle. Though it is comparatively a moderate protein (20% to 22%) source, it is highly palatable and its protein has a very high biological value. The copra meal produces firm butter of exceptional quality if it is used in cattle feed preparations.

The dominant factor that affected copra meal market was the situation of other oil meal, a surplus meal production especially, soybean meal and sunflower meal and sluggish demand for oil meals from Asian countries. The market for oil meals in Asian countries is still affected by monetary and economic crisis. It resulted in eroding purchase power and decline in demand for meal. As oil meals are used as animals feed and when the demand for oil meals decreases, the prices too decline. As the soy meal being leader in oil meal sector, it brings bearish sentiments to other oil meals including copra meal. In addition, the supply of copra meal from Indonesia and the Philippines also affects the price of coconut meal in world market.

6.2.4.1 Prices in International Market : The price of coconut oil cake was found to be

Figure – 27



in tandem with that of international price of coconut oil and copra. It has been observed that the price of coconut oil cake which was about US \$ 127 in 1997 followed a recessive trend and decline to about US \$ 87 in 2000. However, in 2001-02 the prices gained some margin but in the year 2004 and 2005 again dip to US \$ 85 & 86 respectively. However, the price showed upward trend in the year 2006. It was observed that the international price and Indian Price for coconut

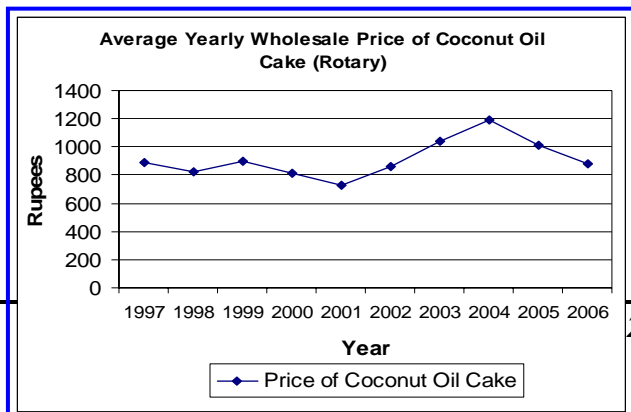
Source : (Annexure-LVIII)

oil cake followed similar trend (Annexure – LVIII, Figure-27).

6.2.4.2 Trend of Prices in Indian Market : The average price of coconut oil cake, in

1997 was above Rs.793 per quintal at Kochi market, Rs.861 per quintal at Alappuzha market and Rs.821 per quintal at Kozhikode. It was observed that the price increased considerably in 1999 reaching at Rs.957 at Alappuzha market which was maximum, to Rs.920 in Kozhikode and Rs.850 in Kochi

Figure – 28



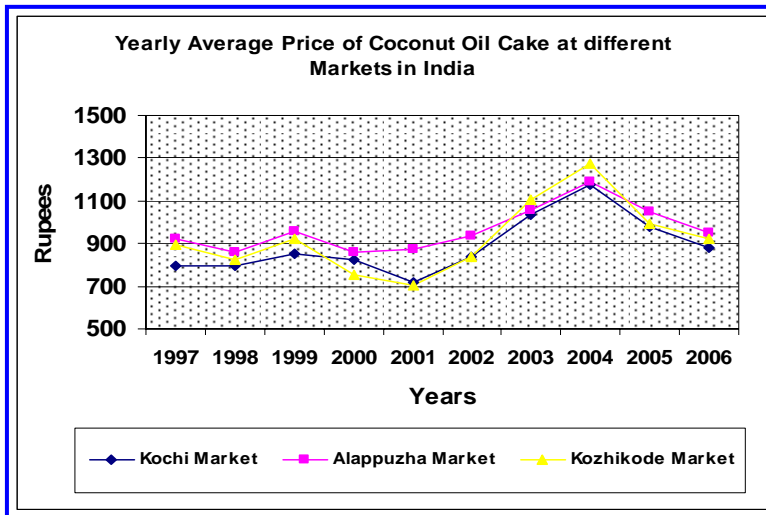
markets, respectively. Thereafter, the prices showed a downward trend and almost fell down to Rs.706 in Kozhikode market in the year 2001. During 2002,

(Annexure- LIX)

however, prices showed some increase and the trend continued till the end of 2004. However, after 2004 the price once again showed recessive trends **(Annexure-LX, LXI & LXII, Figure-29).**

Source :

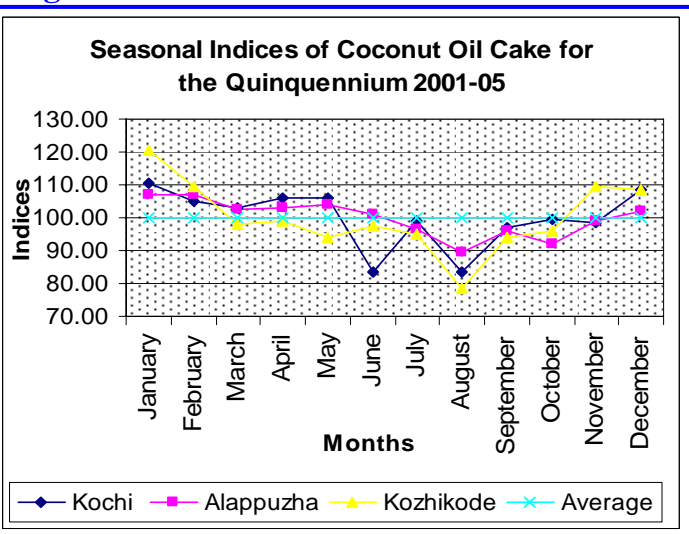
6.2.4.3 Comparison of Prices in different Market : The comparison of yearly average prices of coconut oil cake prevailed in the important markets viz; Kochi, Alappuzha and Kozhikode show that the prices in all the three markets followed similar trend **(Annexure-LX to LXII, Figure-29).** Though the prices of coconut oil cake in these three market's do not move in close sympathy with on another on monthly basis. The prices of coconut oil cake at Alappuzha market were generally higher than those at Kochi and Kozhikode markets.



Source : (Annexure- LX to LXII)

Kozhikode markets.

6.2.4.4 Seasonal Variations in Prices : The analysis of the data on the price of coconut oil cake for the quinquennium ending 2001-2005 showed that the seasonal variation in coconut oil cake at Kochi, Alappuzha at Kozhikode market showed that the price of coconut cake were usually above the annual average from January to May and below for rest of the year. In Kozhikode market, however, the prices were found to be more than the annual average during November to February. It was also observed that in the month of January the percentage increase was in the range of 7 to 20 per cent



Source : (Annexure-LXIII)

and the minimum range in particularly difference was above 3 to 13 per cent (**Annexure- LXIII, Figure-30**).

6.2.5 Minimum Support Price (MSP) : The Minimum Support Price (MSP) with a guarantee to purchase the copra at a pre-determined price for coconut was introduced in 1986. NAFED at the national level is the sole agency involved in the operation of MSP through primary cooperative at the grass root level for procurer of copra (**Annexure – LXVII**) show the per cent variation between the wholesale price and the Minimum Support Price. From the table, it is clear that in the last decade the wholesale price of coconut was found to be on the higher side than that of the Minimum Support Price. Though seasonal variation can be seen, however, during 2000-2002 and 2006, the wholesale price was seen less than that of the MSP otherwise, in all other years the wholesale price was on the higher side of the price and was maximum during 2004. Thus, the growing trend towards physical construction renders the MSP for copra economically on infeasible proportion on account of heavy base. Though it was essential to implement the programme to safe guard the coconut farmers from market risk particularly during peak production.

6.2.6 Price Spread : Assessment of the efficiency of different marketing channels is carried out by studying marketing cost and margins and producer's share in consumer's price. It intends to find out the scope for improvements of various marketing functions so that the farmers get remunerative price for their produce and consumers get produce at reasonably fair price. The cost & margin is studied by concurrent method in which the prices prevailing at successive stage of marketing are compared at particular point of time. (**ANNEXURE-LXIV**) (D. Behera et al., 1998)

Table No.18

Marketing Cost, Margins and Price Spread of Coconut in Regulated and Unregulated Marketing Channels

Particulars	Channel-I Regulated Market	Channel-II Unregulated Market	Average
A. Producers share in Consumers Rupee.	53.64% Rs.2145.67	51.55% Rs.2063.33	52.59% Rs. 2104.59
B. Marketing Cost.	17.93% Rs.717.23	17.91% Rs.717.10	17.92% Rs. 717.16
C. Marketing Margins.	28.43% Rs.1137.10	30.54% Rs.1222.27	29.48% Rs.1179.68
D. Consumers Price.	100% Rs.4000	100% Rs.4002.67	100% Rs. 4001.33

In a study conducted on price spread and marketing cost and margin of coconut trading in the regulated and unregulated marketing channels of Orissa it was observed

Production and Marketing of Coconut in India

that the average producers' share was 53.64 per cent in case of Sakhigopal regulated marketing channel and 51.55 per cent through unregulated marketing channel. Where as the marketing cost in both the channels was almost the same i.e. 17.93 and 17.19 respectively. The total trade margin was more 30.54 per cent in unregulated markets than in regulated (28.43 per cent). However the average consumers price was almost same for both the marketing channel Rs.4000 per 1000 nuts and Rs.4002.67 per 1000 nuts in unregulated marketing channel.

In an another survey conducted in central Kerala, it was observed that Coconut are marketed through different channels viz.

- ☛ Producer → Copra Maker → Oil Miller → Wholesaler → Consumer.
- ☛ Producer → Oil Miller → Wholesaler → Retailer → Consumer.
- ☛ Producer → Oil Miller → Consumer.
- ☛ Producer → Itinerant Merchant → Wholesalers → Oil Miller → Retailer → Consumer.

However the most predominant channel had been the producer→Copra Maker→Oil Miller→ Wholesaler→Consumer in the Kerala State. It was observed that the price realized by the farmers was Rs.310/- per 100 nuts and price paid by consumers for the same was Rs.512/- per 100 Coconuts. (Table No.19) implying a price spread was Rs.202/- per 100 nuts.

Table No.19

Margins and Costs of various Intermediaries for Coconut Marketing in Central Kerala

Sl. No.		Rs.	Percentage
i)	Price received by Farmer	310.33	60.58
ii)	Price received by Copra maker.	415.25	81.06
iii)	Marketing Cost of Copra Maker.	33.60	6.56
iv)	Price realized from by products by copra maker.	9.53	1.86
v)	Net Margin of Copra Maker.	80.85	15.78
vi)	Price paid by Wholesaler.	431.00	84.14
vii)	Marketing Cost of Oil Miller (Milling)	16.00	3.12
viii)	Price realized from by products by Oil Miller.	25.25	4.93
ix)	Net Margin of Oil Miller.	25.00	4.88
x)	Marketing Cost increased Wholesaler.	00.50	00.10
xi)	Price paid by retailer.	459.00	89.60
xii)	Net Margin of Wholesaler.	27.50	5.37
xiii)	Marketing Cost incurred by retailer.	2.12	00.41
xiv)	Net Margin of retailer.	51.13	9.98
xv)	Price paid by Consumer.	512.25	100.00
xvi)	Price Spread.	201.92	39.42

Source : Journal of Tropical Agriculture

The study revealed that the producer's share in Consumer's rupee was 61 per cent of the price paid by the end consumer and the price spread was 39 per cent. (Santosh et.al., 2004)

CHAPTER - VII

COCONUT PRODUCTS / BY PRODUCTS: UTILISATION AND DIVERSIFICATION

7.1 Major coconut production in the country primarily is in demand from consuming states for traditional products viz. matured nuts, tender coconut water, coconut oil, desiccated coconut, oil cake and coir products. Nearly 90 percent coconut production is directed for traditional use in domestic markets. The most important traditional commercial product traded in the country has been the coconut oil. Therefore, the demand and supply of this single coconut product determines the price of raw coconut. Moreover, the market share of coconut oil both in domestic and export market is declining due to tough competition, especially from palm and soybean oil prices. Diversification efforts made by coconut oil industries have yielded limited success. In the process of diversification and product development, to bring new coconut products in the market, strategic market research is essential. Besides, coconut oil and oil cake, the coconut processing industry traditionally has been confined to copra production, manufacture of desiccated coconut, coir and coir products only. Because, the coconut processing sector remained confined to these traditional products, it has been observed that inspite of commendable achievements made in enhancing the production and productivity of coconut, the processing sector could not make much progress in the direction of diversification and value addition to coconut products. The processing determines effective utilization of harvested produce and the quality of the end product, which ultimately affect the consumption and acceptance of the product.

7.2 However, with the advent of modern technology and for faster development of coconut sector in the country, product diversification, value addition and byproduct utilization have gained importance, to create demand for new products and byproducts in domestic market, and to ensure their supply throughout the year. Further, the cost of production of the traditional coconut products in the country has been so high that price-wise, the Indian coconut products are less competitive in global market. Its contribution to export market has therefore been insignificant except the coir and coir products.

In the process of diversification and product development, more than 50 value added coconut products have been developed in Asian and Pacific Countries for domestic as well as export market. Though actual data about these products could not be obtained, some of the important products which have received consumer acceptance in

the country are coconut cream, coconut milk, coconut water and nata-de-coco which has also gained expanded market in Philippines and Indonesia. Pre-packed tender coconut water in sachet is produced by number of countries and has gained popularity. Philippines is even producing and exporting coco-chemicals viz. fatty alcohol, fatty acids. These products could be promoted for wider and global acceptance through concerted efforts and aggressive market strategies by APCC countries.

7.3 In India, product diversification of coconut was accelerated in late nineties due to sustained efforts made by Coconut Development Board by employing technology development through reputed Research Institutions in the country. The marketable value added products includes packed tender coconut water, coconut milk and milk based products, coconut chips, coconut based dairy products, desiccated coconut, coconut water based products, snowball-tender-coconut, vinegar, coir based products, coconut shell and coconut wood based products. Other products, which are being subjected to research and development, are organic food, oleo chemical, bio-diesel, bio-lubricant and cosmetics.

Some of these products viz. coconut milk, coconut cream, spray dried coconut milk powder, vinegar, packed tender coconut water, snowball-tender- coconut and virgin-coconut-oil have been produced on commercial scale. Besides, coconut biscuits, coconut chips, coconut based sweets and coconut chutney like traditional convenience products, using indigenous technology were already in the market. The Government of India, through the Coconut Development Board made strategic efforts and motivated entrepreneurs industrialist and artisans to exhibit their products in national and international trade fairs and exhibitions, to get better access to up country markets. Coconut shell and wood based products viz. handicrafts and utensils certainly have aesthetic utility and value. It has been observed that these products have good demand for export too.

7.4 Tender Coconut : In the development process of coconut, about 12 months period lapses between the emergence of inflorescence and complete maturity of the fruits and at one point of time palm carry 12 or more bunches of coconut at successive stages of development, each representing growth interval of about a month. In the development process the fruit reaches it maximum size normally in the 6 months and filled with nut water through out this period. The water of tender coconut is technically called as liquid endosperm. The kernel starts forming as a thin soft layer in 6 months and increases in its hardness and quantity till the end of maturity. With the increase in thickness of kernel



Packed Tender Coconut water as a thin soft layer in 6 months and increases in its hardness and quantity till the end of maturity. With the increase in thickness of kernel

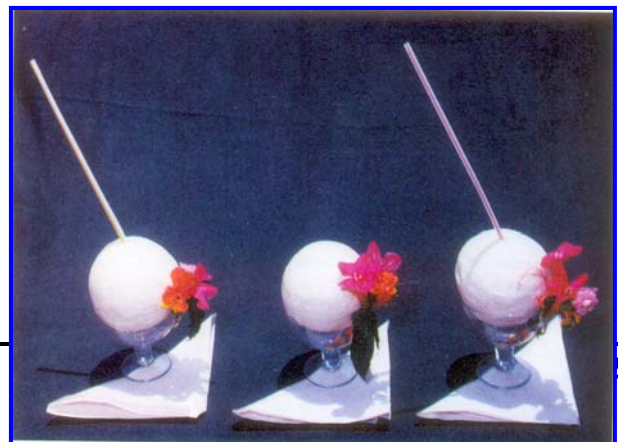
the internal cavity gets reduce in size and decrease in quantity of nut water as the nuts ripen. The chemical composition and volume of nut water changes during maturation. The coconut water plays an important role in bio-synthesis of fat in the kernel and also in the development of germination of the nuts.

Maximum volume of water has been found in 6th month old nuts as reported from many coconuts growing states. The immature nut of three months old contains small quantity of water and maximum is found in the eighth months, there after, there is sharp decline in water content as the nut ripens. The water of tender coconut is the most nutritious, wholesome beverage that nature has provided. It has calorific value of 17.4 per hundred gms. with the normal PH between 4.9 and 5.2.

Sugars are important constituents of tender coconut water found in maximum concentration of about 5 to 5.5 percent in early months of maturation and slowly reduces to 2 percent at the stage of full maturity of nuts. In early stages of maturity glucose, fructose and sucrose are found in the coconut water. In the fully matured nuts approximately 50 percent of total sugar is sucrose. The composition of total sugar, reducing sugar and non-reducing sugar in tender coconut water, vary from variety to variety and from place to place, even at the same stage of maturity.

The tender coconut water contains most of the minerals such as potassium, sodium, calcium, phosphorous, iron, copper, sulphur and magnesium. The tender coconut water being rich in potassium and other minerals is of immense the rapeutic value as di-uretic and is considered curative for hypertension. It is rich in vitamin C (ascorbic acid) content and other vitamins of 'B' (**Annexure-LXIX**) group. Tender coconuts are plucked, transported and sold in natural form which involves lot of transportation cost due volume of the nuts so the answer lies in value addition and establishment of processing units for manufacture of pre-packed coconut water in consumer packs.

7.4.1 Snow Ball Tender Coconut : The snow tender kernel of tender coconut is a delicious dessert. Traditionally, the kernel of tender coconut is sometimes consumed after drinking the water by the consumer or else the ball is thrown away. The tender coconut water along with tender coconut kernel without husk is produced and named as snow ball tender coconut. It is the tender coconut without husk, shell, and testa which is in ball shape and white in colour. This white ball contains tender coconut water which can be consumed by



just inserting a straw through the top white tender coconut kernel. Coconut of 8 month of maturity is considered suitable for making snowball tender coconut. **Snow Ball**

Tender Coconut

The snow ball tender coconut can be individually packed and refrigerated under hygienic condition, thereby increasing the shelf-life of this product, the snow ball coconut can be stored for prolonged period and sold as ready to serve product.

7.4.2 Egg Coconuts : Eggs coconut referred to a form of product derived from tender coconut where a whole around soft kernel is pulled out from its shell with tender water intact in it. Generally the small sizes of older bunch of tender nut are used to make egg coconut and this generally correspond to 8 to 9 month's old fruits. In Malaysia the commercial processor of egg coconut usually harvest the Malayam Yellow Dwarf variety because the husk shell of MYD is softer and the nuts are smaller in size and easier to process.



Egg Coconut

7.4.3 Pre Packed Tender Coconut Water : Tender coconuts from the producing area are transported and sold in their natural form involving a lot of transportation cost due to volume of the material. Moreover, life of tender coconut water in the nut is short and can not be kept for long duration. The shelf life of the tender coconut water can be increased by packing it in flexible pouches or in aluminium beverage containers. The optimum age of tender coconut for this purpose is around 6 months as tender coconut water attains its optimum level of quantity and quality in respect of flavour, taste and yield. The characteristic flavour of tender coconut water is contributed by heat sensitive sugars and hence partial heat treatment combined with preservative is employed. The flavours of the tender coconut vary, in accordance with the agro-climatic conditions, irrigation, nature of soil and level of fertilizers applied. Therefore, to obtain a uniform taste some of the sweetening agents are added to bring it to the optimum level and acceptability. The pre packed tender coconut water is well acceptable upto a period of 3 months under ambient condition and about 6 month under refrigerated conditions, without any change in the flavour. The flavour retention is better in case of cans than in flexible pouches.

7.4.4 Bottled Coconut Water : Matured coconut water can be marketed as natural soft drink if preserved and packed in bottles as non-carbonated beverage. The process involves collection of water, up-gradation, pasteurization, filtration and bottling. The coconut water collected from copra processing units is immediately filtered through a clean cheese cloth. Initial filtration at the collection centres reduces the bacterial load in

the water. The pH of the coconut water is adjusted to 4.2 with citric acid and 0.1 – 0.15 per cent sodium citrate as the salt reduces the bitter taste that may develop on addition of citric acid to stabilize the acidic pH. Sodium chloride at the concentration of 0.01 to 0.05 per cent found to have improved the taste in some formulations. The total soluble solid content is adjusted to 8-10 per cent with refined sugars. Sodium benzoate is also added @ 0.05 per cent to increase the shelf life. The formulation is immediately pasteurized at 94⁰C for 25-30 minutes. Excessive heat treatment is avoided as it imparts cooked flavour to the product. The protein starts coagulating at 70⁰C at this stage; rigorous agitation is also avoided in order to prevent disintegration of protein coagulation into fine particles. After pasteurization, the formulation is passed through a pressure filtration mechanism and the filtered product is filled in sterilized bottles and sealed, when the temperature of the product in the bottle ranges between 72⁰C to 75⁰C. The bottled coconut water can be stored for three months at ambient temperature without spoilage.

7.4.5 Coconut Vinegar : Coconut water can be converted into vinegar by using vinegar generator assembly which comprises a feed vat, an acidifier and a receiving vat for collection of vinegar. The mature coconut

Plate – 21



water consisting of about 3 per cent sugar content is concentrated to 10 per cent level by fortifying with sugar. The fortified coconut water is then fermented by inoculating the solution with *Sacchaaromyces cerevieae*. After alcohol fermentation is completed for about 4-5 days, the clear liquid is siphoned off and inoculated with mother vinegar containing *aceteobacter* bacteria. The alcoholic ferment obtained is then fed into vinegar generator where it is uniformly sprayed over the surface of the porous packing

Coconut Vinegar

medium (corn cobs). At this stage the alcoholic ferment is oxidized to acetic acid. The product is recycled into vinegar generator and the process of acidification is repeated until strength of 4 per cent is attained. This acidified vinegar is then aged before bottling. Vinegar is used as preservative in pickle industry and flavouring agent in many food products. It has been reported that the natural coconut vinegar enjoys consumer's preference over synthetic vinegar when available in the market.

7.4.6 Nata-de-Coco : It is a gelatinous dessert delicacy produced by action of bacteria *Acetobacter xylinum* in culture medium of matured coconut water. The culture solution

Plate –22



is prepared by mixing coconut water with sugar and acetic acid in prescribed proportion, which is inoculated with the micro-organism *Acetobacter xylinum* through a culture liquid. It is filled in glass jar covered with thin cloth and kept for 2-3 weeks without disturbance. During this period a white or cream coloured jelly like substance forms and floats on the top of the culture medium. It is harvested, cut into pieces and washed in hygienic potable water to remove all acid. It is then immersed in flavoured sugar syrup for 12 hours and packed in glass bottles. The product

is used as a dessert and as an ingredient in ice-cream and fruit mixes and has great export potential in South East Asian countries. The recommended proportion of ingredients for production of Nata-de-Coco are boiled, cooled and filtered coconut water 1 kg, sugar 65 g., glacial acetic acid 25 g., mother liquor 165 g. (Thampam-93)

7.5 Coconut Milk : Coconut milk is a product extracted from the endosperm or kernel of coconut and constitutes into an emulsion of coconut oil in water, stabilized by proteins and probably by some iron found in oil water interface. It is milk like liquid obtained from the gratings of fresh coconut kernels after they are mixed with some water, kneaded and pressed out. The coconut milk has a pleasant sweet and agreeable flavour. The stability of emulsion is better in the pH range in which coconut proteins are more soluble. Coconut milk is richer in fat, poor in protein and sugar content. It is an important dietary component in the food of coconut producing countries; valued for its characteristic nutty flavour and also for its nutritional values. It is an ingredient in many household culinary viz., fish, shell-fish, meat, poultry and vegetable dishes confectionaries, sweets and as substitute of dairy cream in beverage type milk, evaporated sweet condensed milk, cheese, yoghurt and many other types of preparation. Since coconut milk is extremely sensitive to processing, aseptic system of packaging of low acid food products in consumer or bulk packaging could be the best to prevent it from spoilage. Preserved form of coconut milk such as canned coconut cream or milk and coconut milk powder are available in many coconut growing countries.

Coconut milk can be preserved by spray drying method and converted into spray dried coconut milk powder. The coconut milk powder offers additional advantage such as reduced storage space, bulk packaging at reduced cost and longer shelf life. The spray dried coconut milk powder can be reconstituted to coconut milk by addition of potable water. The Central Food Technology Research Institute, Mysore, has developed the technology for commercial production of spray dried coconut milk.

7.6 Sweet Coconut Chips : The product is developed from the matured coconut kernel after removing the moisture content of the kernel through osmotic dehydration using various osmotic pressures technics. The dehydrated coconut chip in ready-to-eat form, can be used as snacks.

Fresh kernel of matured coconut containing reasonable amount of water is used for preparation of sweet coconut chips. The important steps involved in the production are dehusking, removal of shell, removal of testa, slicing of kernel, blanching of slices, osmotic dehydration of slices, drying of the slices in hot drier and then packing in aluminum foil. Cane sugar of commercial grade is used as sweetening agent. The CPCRI, Kasaragod has developed this product and it has been reported that about 50 per cent of chips by weight of the fresh kernel are obtainable. On an average, about 150 gms. Chips can be obtained from matured coconuts. The sweet coconut chips are hygroscopic in nature. If the relevant humidity is more than 75 per cent, it will absorb moisture and loose its crispness. Hence, coconut must be packed in aluminum foil laminated with Low Density Polyethylene (LDPE) pouches which will maintain its flavour and crispness upto 6 months without affecting its microbial and bio-chemical qualities. To avoid the breakage of chips during the transportation, it may be packed as blown packets using inert gases like nitrogen or carbon dioxide.

7.7 Virgin Coconut Oil : Scientific research and studies have found out that Medium Chain Fatty Acid (MCFA) which are predominantly present in coconut oil have **Plate – 23** neutriceutical effects similar to the present in mother's milk, which



gives infants, immunity from diseases. Further, it has been discovered that the MCFA in coconut oil with lauric acid and its monoglyceride form monolauric, are the most potent in antimicrobial property. The beneficial properties of coconut oil led to development of special type of coconut oil, known as virgin coconut oil, which has high market value. The virgin coconut oil is obtained from the fresh coconut meat (kernel) of coconut by chemical or natural means with or without the application of heat, which does not alter the oil and its properties. Virgin coconut oil

Virgin Coconut Oil is edible in its natural state immediately after expulsion and filtration. It is a pure form of coconut oil, crystal white in colour, with natural vitamin E (Tocopheorl) contents. It has a mild scent of fresh coconut. Virgin coconut oil, greatly by differs from traditionally produced copra-derived coconut oil, which has to undergo chemical processing, bleaching and dehydration process to make it a suitable for human consumption. The refined bleached coconut oil is yellow in colour, odourless and tasteless. It does not contain vitamin E, as it gets lost in the process of thermal and chemical processing. Virgin coconut oil can be produced either from the fresh comminuted coconut meat, coconut milk or coconut residue. **Fresh coconut meat** can be processed by different methods.

1. **Fresh Dry Processed / Wet Milling Route** – Involves de-shelling the coconut meat manually or by machine – splitting and slicing the de-shelled meat – washing – grinding or wet milling – drying the particulated coconut meat – extracting the oil using screw type press to produce virgin coconut oil. Virgin coconut oil and food grade medium fat coconut flakes. The flakes are ground to produce coconut flour.
2. **Fresh Dry Processed / Desiccated Coconut Route** – The processed involve all the steps desiccated coconut viz., de-shelling, paring, washing, grinding blanching and drying except sulphite treatment and then extracting the virgin coconut oil using screw type press.
3. **Fresh Dry Processed / Graded Coconut Route** – It involves splitting the nut grating – blanching and drying the coconut meat and extracting the virgin coconut oil using screw type press.
4. **Low Pressure Oil Extraction or Intermediate Moisture Content Method** – It involves splitting the nut – grating the meat to find particles – drying to the level of moisture content of 10 to 12 per cent of extracting the virgin coconut oil using a manually operated press.

Contents of Virgin Coconut Oil

Total Fats	96.46%	Capric Acid	5.53%
Saturated	89.46%	Oleric Acid	4.40%
Mono-unsaturated	4.60%	Others	14.20%
Poly-unsaturated	1.00%	Cholesterol	0%
Lauric Acid	43.59%	Trans Fatty Acids	0%
Myristic Acid	17.08%	Iodine Value	4.94%
Caprylic Act	7.94%	Sodium (Na +) %	9.46%
Palmtic Acid	7.26%		

7.8 Coconut Products and By-products :

Sl. No.	Principal Edible Products	Products by Products and Value Added Products
1.	2.	3.
1.	Products from Inflorescence SAP.	Derivatives i) Sugar / Jaggery. ii) Beverage (Boiled sap) iii) Toddy (Fermeuted sap) iv) Coconut wine v) Neera (Fresh sap) vi) Vinegar vii) Confectionary Jelly
2.	Products from Coconut Kernel (Meat)	Immatured Coconut Kernel in Syrup i) Coconut Jam ii) Puddings / Ice cream
		Matured Coconut

Production and Marketing of Coconut in India

		i) Desiccated Coconut ii) Partially De-fated Coconut Powder iii) Roused Coconut Paste iv) Coconut Chips (Sweetened Chips) (Sliced Coconut) v) Ball Copra vi) Cup Copra (Coconut flour) vii) Coconut Yoghurt / Ice cream viii) Fresh Coconut gratings ix) Dehydrated edible coconut meat x) Coconut oil / Virgin Coconut oil
3.	Products from Coconut Milk	i) Milk Powder (Dehydrated Milk) ii) Coconut Milk / Syrup iii) Coconut Spread / Cheese iv) Coconut honey / candy v) Coconut Skim Milk Beverage vi) Sweetened coconut skim milk blend vii) Coconut protein viii) Low / high fat coconut jam ix) Virgin Coconut oil
4.	Production from Coconut Water	Tender Coconut
		i) Fresh Tender Coconut Water ii) Tender nut Coconut water & Coconut Meat shake iii) Canned or Pouched tender coconut water
		Matured Coconut
		i) Coconut water concentrate (Syrup) as flavoured beverage on dilution ii) Carbonated / non carbonated coconut water iii) Nata-de-coco iv) Vinegar v) Toddy
5.	Coconut oil	i) Edible oil ii) Bio diesel / biofuel iii) Industrial oil iv) Cosmetics

1.	2.	3.
6.	Virgin Coconut oil	i) Dietary oil ii) Body oil/ Baby oil (skin can) iii) Body cream/ Lotion/ Shampoo iv) Soap v) Pharmaceuticals vi) Nutraceutical Products
	Non Edible Products	
1.	Coconut Husk	i) Coir, Coir foam, Rubberized foam ii) Coir Carpets/ Mattresses iii) Coir geotextiles iv) Coir Composite v) Coir pith briquette vi) High Value coir products safety belts vii) Coir boards, Coir asbestos
2.	Coconut shell	i) Charcoal ii) Activated charcoal iii) Shell powder iv) Shell handicrafts v) Ice-cream & beer cups vi) Shell gasified for alternate heat energy
3.	Coconut palm wood	i) Furniture ii) Doors iii) Panels (Wall & Floor) iv) Handicrafts
4.	Coir pith	i) Organic Manure ii) Ornament plant growing pot iii) Coir pith briquettes iv) Coir chullah

7.9 Coir : India is the largest producer of brown coir fibre and its production has been steadily increased during the last five years Coir is one of the important natural, golden colour, hard fibres extracted from the husk or fibrous mass (mesocare) covering the coconut. It is of great commercial interest and falls under the category of industrial hard fibres such as hemp, abucca, henequen etc. Coir has certain unique qualities, such as resistance to spoilage due to moisture and dampness. Coir fibres possess remarkable,

durability to withstand physical strength and hence it is a renewable resource for manufacturing various floor covering and other coir products. In India coir fibres is extracted from coconut husk after retting in saline water and also by deploying mechanical method using fibre extracting machines. Mechanical extraction of coir fibre requires dry husk and is widely used in coconut growing states in the country owing to better realization of coir fibre, cost effectiveness and overall inadequate retting facilities.

The white fibre sector has become stagnant over last few years, where as the export requirement is mainly of white fibres products.

The coir industry is mainly concentrated in the coconut producing states viz., Kerala, Karnataka, Tamil Nadu and Andhra Pradesh in southern region and Orissa in the eastern region. The industry's strength lies in the export oriented coir products manufactured in the country.

It has been reported that there were 6531 functional coir processing units in the country. Out of which 5124 units in Kerala, 217 units in Karnataka, 262 in Tamil Nadu, 265 in Andhra Pradesh, 100 in Orissa, 75 in West Bengal, 5 in Maharashtra, 6 in Pondicherry and 3 in Goa. Consequent upon mechanization in coir processing sector in Kerala, production of brown fibre has increased many folds. A new retting process using coir ret, a bacterial culture developed through research by coir board has become popular in Karala. The fibre is called green husk fibre which is mixed with white fibre to make coir yarn and other products.

7.9.1 Coir Pith : Coir pith commonly known as coconut peat is the by-products of coir industry, which was hitherto considered as a waste material. Coir pith is converted into briquettes for the purpose of easy transportation. It is easily composed to be used as an organic manure and soil ameliorant. 'Pith plus' a product developed by the Coir Board in collaboration with Tamil Nadu Agril. University, is supplemented with urea is added to coir pith to make the manure.

Coconut Shell Products : The coconut shell can be converted into very useful industrial products like coconut shell charcoal, activated carbon and coconut shell powder which have a market all over the world especially in Japan, South Korea, France, United Kingdom and USA. Coconut shell is a by-product of the coconut industry. It has been estimated that ever one to seven million tonnes of coconut shell could be salvaged per annum in the country but very small quantity of coconut shell is processed into useful products.

CHAPTER - VIII

STATUS OF FURTHER PROCESSED, VALUE ADDED COCONUT PRODUCTS

8.0 Coconut In Ayurvedic Medicines : Coconut palm is of great importance in the ayurvedic medicine as it helps to cure many diseases. The India system of medicines prescribe coconut kernel, coconut milk, coconut oil, coconut inflorescence, tender shoot (cabbage), tender coconut water, coconut neera, coconut jaggery and recommends the consumption of these coconut products. The coconut products possess immense medicinal properties and hence they are used in various ayurvedic preparations.

8.1.1 Coconut Cabbage

8.1.2 Coconut inflorescence

8.1.3 Tender coconut

8.1.4 Coconut husk

8.1.5 Coconut water

8.1.6 Coconut kernel

8.1.7 Coconut milk

8.1.8 Coconut oil

8.1.9 Sweet toddy (Neera)

8.1.10 Jaggery

8.2 Culinary Preparations with Coconut

Vegetarian Culinary Preparations :

8.2.1 VELLAYAPPAM.

8.2.2 PALAPPAM (HOPPERS)

8.2.3 SPICED CASSAVA DOSSA.

8.2.4 COCONUT DOSA.

8.2.5 APPAM.

8.2.6 TOASTED COCONUT CHIPS.

8.2.7 COCONUT LADOO.

8.2.8 MAIDA DOSAI.

8.2.9 TENDER COCONUT PAYASAM.

8.2.10 IDIAPPAM (RICE SEMIA OR NOODLES)

8.2.11 COCONUT CAKE.

- 8.2.12 VEGETABLE DISH.
- 8.2.13 GREEN GRAM DAL PAYASA.
- 8.2.14 DUFFILED PUDDING.
- 8.2.15 COCONUT COOKIES.
- 8.2.16 MUNTHIRI KOTH.
- 8.2.17 KERALA APPAM.
- 8.2.18 IDIAPPAM (RICE SEMIA OR NOODLES)
- 8.2.19 GREEN GRAM THOREN/KIANJI PAYAR THOREN.
- 8.2.20 BEAN LEAF OR PUMPKIN LEAF THOREN.
- 8.2.21 RAW MANGO CHUTNEY.
- 8.2.22 PLANTAIN CHUTNEY.
- 8.1.23 BRINJAL CHUTNEY.
- 8.2.24 TOMATO CHUTNEY.
- 8.2.25 COCONUT KOZHUKKATTA.
- 8.2.26 COCONUT HALWA.
- 8.2.27 COCONUT BALLS.
- 8.2.28 TENDER NUT PRADHAMAN.
- 8.2.29 COCONUT RICE.
- 8.2.30 DAL CURRY.
- 8.2.31 KERALA APPAM.
- 8.2.32 MUSHROOM COCONUT CURRY.
- 8.2.33 KOZHUKKATTA.
- 8.2.34 PANKI.
- 8.2.35 CHILLI CURRY.
- 8.2.36 COCONUT BURFI.
- 8.2.37 COCONUT MIX BURFI.
- 8.2.38 CHICKEN CURRY. (Non-Vegetarian Preparations)
- 8.2.39 DRY CHICKEN CURRY.
- 8.2.40 DEVILLED HEN.
- 8.2.41 FISH (SINGAN).
- 8.2.5 COCONUT MILK CURRY OF FISH.
- 8.2.6 FISH AND MANGO.
- 8.2.7 FISH CURRY IN COCONUT MILK.
- 8.2.8 MUTTON KURMAH.
- 8.2.9 BEEF SMOORE.
- 8.2.10 BEEF CURRY.

CHAPTER - IX

SUMMARY AND CONCLUSION

9.1 Coconut, '*Cocus nucifera linn*', the most important, ancient and useful of the tropical palms, has been cultivated in India from the time immemorial. Because of the economic importance, this plantation crop is grown in more than 90 countries across the world and India ranks third in production of coconut. Traditionally, the economic importance of coconut was laid on its nourishing water, kernel, copra, oil and coir, but laying emphasis on value addition and product diversification is widening the spectrum of its economy.

9.2 Though, coconut originated from South East Asia including Australia, it dispersed through out the world specifically in the coastal areas. The coconut plantation crop is grown across the world in an area of 11.85 million hectares producing 57.514 billion nuts equivalent to 10.52 million tonnes of copra. Among the Asian and Pacific coconut community (APCC) mainly six countries i.e. Philippines, Indonesia, India, Sri Lanka, Thailand and Malaysia together accounts for more than 80 per cent of the total area under coconut cultivation and about 82 per cent of the worlds coconut production. About 50 per cent of the coconut production in the world is processed into copra, which varies from country to country depending upon the pattern of consumption. The economy of coconut is mainly dependent on coconut oil and its price and is susceptible to pressure from cheaper substitute like palm oil, soybean oil and sunflower oil. But because of its lauric acid and myristic acid content, it is still considered as an important oil for industrial application and enjoys a premium price.

9.3 The coconut occupies a significant position in socio-cultural needs of the Indian society and is gaining considerable importance in the national economy as a potential source of rural employment and income generation among the plantation crops in coconut growing areas. The coconut palms grow under varying soil and climatic conditions and hence gaining popularity for cultivation even in non-traditional areas of the country. Coconut palms are grown in most of the zones except subtropical and temperate regions, which includes 19 states and three Union Territories in the country, but are favourably adapted to coastal agro ecosystem. The major area under coconut cultivation in the country comprises of states of Kerala, Karnataka, Tamil Nadu, Pondicherry, Andhra Pradesh, Maharashtra, Goa, Orissa, West Bengal, Andaman & Nicobar, Lakshadweep Island, Gujarat, Assam and other parts of North Eastern States. Nearly 48-50 per cent of the total area is under coconut cultivation in Kerala, followed by Karnataka, Tamil Nadu and Andhra Pradesh which all together accounts for 90 per

cent of total area under coconut in the country. Various bodies like the Indian Coconut Central Committee (1945), Directorate of Coconut Development (1966) and Coconut Development Board (1981) were established to carry out the organized and systematic development of coconut and coconut products.

The improvements in the production and productivity of coconut had been on account of continuous efforts made by all the agencies involved in the process of integrated approach to improve the production and productivity of the coconuts in the country. The foremost factors which determine the production and productivity of coconut are the indigenous and exotic varieties evolved through selective breeding and hybrids, through cross breeding. The important varieties are **Tall varieties** (WCT/ECT, Lakshadweep ordinary / Benaunum Tall, Kamrup), **Exotic** (Philippine ordinary, Fiji Tall, etc.). Indigenous Dwarf varieties evolved are chowghat orange, Malyam yellow, Ganga Bandam, Gangapani etc., evolution of hybrid varieties certainly improved the coconut productivity by crossing different types of Tall dwarf varieties. More than 80 hybrid combinations have been evaluated in India and so far eleven hybrids were released for commercial cultivation and establishment of seed gardens, viz., Kerashankar, Godavari, Ganga, VHC-1,2, VH-3. Selection of appropriate varieties of hybrids for plantation depends on agro-climatic conditions prevailing in the area. Coconut being a mono crop does not utilize all the basic resources such as, sunlight, groundwater and therefore, intercropping is economical to the farmer and gardeners, crops grown in coconut garden are tapioca, ginger, turmeric, leguminous plants spices, medicinal plants and various vegetable crops. The Central Plantation Crop Research Institute (CPCRI), Kasaragod has evolved High Density Multi-Species Cropping System (HDMSCS) to meet the diverse needs of the coconut farmers.

Like any other plantation crop, coconut is also prone to various pests and diseases which directly affects the production of coconut palm viz., root (wilt) diseases, eriophyid mite, stem bleeding, bud and leaf rots and basal stem diseases. Of late, the infestation by the eriophyid mite, the deadly rot has been reported in traditional coconut growing areas. The farmers in the country had therefore, adopted the integrated disease and pest management control measure to save the coconut crop.

The harvesting practices of coconut depend upon the local economy of the coconut growing state. In southern state, matured coconut are harvested for making copra for oil and edible purpose and to obtain good quality husk for manufacturing of coir product, where as in the state of West Bengal, Assam and Orissa, coconut are mainly harvested for consumption of tender coconut water and matured coconuts for religious and culinary purpose.

9.4 The coconut palm being a small land holder's plantation crop grown in 1.89 million hectare area in the tropical belt of the country extending from Kerala, Karnataka, Tamil Nadu, Andhra Pradesh in south, Gujarat, Maharashtra in west; Orissa and West Bengal in the east, Assam and Tripura in the North Eastern region of India and is a means of living for millions of people inhabiting in the traditional and non traditional coconut growing states and union territories. The islands of Andaman and Nicobar and Lakshadweep are other traditional coconut areas. It is predominantly cultivated in small and marginal holding and as a medium of resource to poor farm environment having less marketable surplus. It has been reported that the national average productivity of coconut in India is very low i.e. around 40 nuts per palm per year. The low productivity of coconut crop in the country has been on accounts of several reasons, i.e. lack of adoption of scientific cultivation practices to enhance productivity; which helps in bringing down the cost of production. In most of the small coconut holdings, the soil nutrients and water are limiting factor in crop production. Kerala, the southern most state situated along the West coast is a major coconut growing state. Except in Kerala and a few small states and union territories, coconut is not grown contiguously but limited to only congenial belts accounting to an insignificant portion of the total arable agricultural area. Kerala, Karnataka, Tamil Nadu and Andhra Pradesh are therefore the four major coconut producing state, sharing 90.8 per cent of the total area, whereas the contribution of other States / Union territories is only 9.2 per cent.

9.5 Marketing of coconuts differs from that of other fresh fruits due to natural durability of coconuts, which are sold as fresh tender nuts as well as matured water nuts and dry nuts, though the marketing practices followed are similar in nature, they may differ in accordance with the post harvest practices followed by farmers of coconut and form of products consumed in that area. Coconut farmers in the country have adopted indirect mode of disposal of their produce. However, rich farmers prefer to trade through direct channel, as a result the role of intermediaries or middle men is seen prominently in the marketing channels of coconut. Most of the coconut farmers have adopted leasing their farms / gardens as the mode of disposal of the coconut, but absence of lease holder, low productivity and uncertain farming conditions, always force coconut farmers to adopt mixed marketing practices.

Since tender coconuts are marketed for drinking coconut water, the farmers prefer to sell them immediately after harvesting without subjecting it for grading. Tender coconuts have great demands in most of the towns and cities all over the country, Kolkata, Mumbai, Chennai, Bangalore and Delhi are major consuming market for tender coconut and the major assembling markets for tender coconut are located at Kolkata, Maddurai and Mumbai. The assembling and distribution of tender coconut through out the country is almost uniform and involves producer, contractor, itinerary merchants, wholesalers, retailers and hawkers. Realizing the importance of tender coconut as a

nutritious and refreshing drink, the tender coconuts are also marketed to the processing unit for packing the tender coconut water in bottles, polythene satchels or aluminum cans.

The matured nuts reaching markets are either partially husked or dehusked as per demand and requirements in distant markets. The coconut meant for copra making are sold fully husked by the farmers in near markets, similarly, where the coir industries are located and retting facilities are available, the coconut are completely dehusked for marketing purposes. In accordance with the demand the storage practices for matured coconuts differ from place to place and from farmers to the traders depending upon the requirement for the ultimate utility for the market.

Since the major portion of the coconut produced in the country is marketed through indirect mode of disposal and to limited extent through direct channel, the numbers of agencies involved in the marketing system are more or less similar through out the country with exceptional number where direct sale is involved. The states where copra making and milling industries are located, the agencies involved are village merchant / or copra maker, middle men or copra merchant, trader / miller.

Though grading of coconut is an important marketing function to fetch a remunerative price for the coconut but it has not been fairly adopted at the producer's levels, through out the country, whether for tender and or matured coconuts. However, the wholesale traders adopts the practice of grading coconut and copra based on the categories such as size, colour, freshness in case of tender coconut and size, weight and kernel content in case of matured coconuts, while copra is graded, into edible and milling as ball and cup copra. The grades and classification differ from the state to state and depends upon the local nomenclature.

Since, Kerala is an important coconut trading centre the main centre for coconut oil markets are located at Kochi, Trichur and Trivendrum, similarly Kanganayam and Vellakovil in Tamil Nadu and Udipi and Mysore in Karnataka are main oil trading centres.

The marketing practices followed in the coconut and coconut product trade, it has been revealed that innumerable intermediaries, channels, functionaries, brokers, assemblers, traders, merchants, wholesalers, institutions and retailers are involved directly or indirectly in the movement of coconut from the point of production to the point of consumption, performing various activities in the flow process, enabling movement of coconut and its products until placed in the hands of consumers. Though the future trading in copra and coconut oil was discontinued due to excessive speculation

in trading activities, in early 70's it was reintroduced in 2001 for coconut oil under the first commodity exchange of India at Kochi, to boost marketing of coconut oil and copra in the country.

9.6 Since long the prices of coconut and coconut products in the country are mainly centred around copra and coconut oil, the price of coconut is usually influenced by the prevailing prices of coconut oil in the wholesale market. The coconut prices are characterized by wide and violent functions with erratic price trends. The prices of coconut at the important markets in coconut producing areas (viz., Arikere, Kozhikode, Kanghyam) generally move in close sympathy with one another but at other distant markets the prices do not show the sympathetic trend. The monthly wholesale prices in the above markets followed similar trend and seasonal variations and moved alike without much fluctuation in these three marketing centers. The coconut prices tend to rise where there is sustained demand of copra making from the months of October, November to March and April. The large scale arrival of coconut during the month of January-February declines the prices of the coconuts in almost all the markets. However, the prices remain low during monsoon period inspite of regular supply in the market due to reduction in copra making.

The coconut prices vary in accordance with the quality of the nuts, the size of coconut matters much in fixing the price of matured nuts, big nuts invariably fetches higher price than the smaller nuts. However, the previous price trend had changed a lot in case of tender coconuts in today's market good quality tender coconut fetches higher price or if not then equivalent to the price of matured coconut due to higher demand from the consuming market. In areas where the coir industries are located, the unhusked coconut fetches higher prices than the husked coconut.

Copra is a basic raw material for commercial end product the coconut oil, but the ruling price of coconut oil is the yardstick for determining the prices of copra in the market. The price trend in India showed that the ball copra generally fetched more price than cup and milling copra. Similarly, the edible copra fetched even higher prices than that of milling copra. Since copra prices is subjected to wide fluctuation Government ensures the remunerative price to the farmers by declaring Minimum Support Price (MSP) as a result some time it was observed that the price of ball copra remained above the Minimum Support Price (MSP), though the prices of coconut declined in the market. The other factor which affects the prices of copra in the markets are harvesting of tender coconuts, increase in demand, resumption of future trading and or combination of various factors such as demand-supply imbalancing, availability of cheaper substitute and introduction of Value Added Tax (VAT).

Since, coconut oil is an important product of coconut with world wide demand, the prices of coconut oil moves in close sympathy with that of other vegetable oils. The other features which affect the prices of coconut oil are the end uses of coconut oil and their responsiveness to the prevailing prices, supply of other major vegetable oils viz., soybean oil, palm oil and different policies of Government in execution from time to time, do effect the price determination process of coconut oil. The coconut oil as such is over priced in domestic and world market, being source of caprelic, capric, lauric acid and myristic acid, which are considered as important items for industrial application.

CHAPTER - X

RECOMMENDATIONS

- 10.1 Coconut Production :** To increase productivity, it is necessary to take up systematic replanting and under planting to replace the old, senile, unproductive and disease affected palms, using quality planting material. Secondly, the integrated farming system should be popularized. All the field models of inter / mixed / multicrop / multistoried cropping and mixed farming integrating livestock farming such as dairy, poultry, duck farming, aquaculture have to be popularized among the farmers. Breeding of high yielding varieties resistant to diseases, tolerance to biotic and abiotic stress should be developed.

Decreasing the cost of production of nut is the most important criteria for increasing competitiveness. Cost effective management practices such as organic recycling of coconut biomass and other farm wastes or converting them into vermicompost, addition of need based in-puts at the appropriate level and time, adopting drip irrigation by providing subsidy for it, soil moisture conservation, basin management with organic mulching or growing green manures and incorporating them, need based plant protection measures using bio-control agents are also to be adopted for substantial growth in production and to increase the productivity of coconut.

10.2 Integrated Pest and Disease Management : The integrated pest and disease management approach allows pest and disease management without any adverse impact on ecological sustainability of the Agro ecosystem. It is necessary that a massive and concerted programme be launched involving research and extension backed by suitable subsidy scheme. It is recommended that a massive programme should be launched to weed out the old unproductive and diseased coconut palms and replanting seedling of improved hybrid varieties of coconut palms as a measure of rehabilitation.

10.3 National Agricultural Insurance Scheme : Adverse weather condition and the problem of disease infestation are the two major risk factors affecting coconut production and productivity which result in low income to farmers. In the absence of any effective mechanism for risk cover, the economy of coconut plants suffers severely. Hence, the scope of National Agricultural Insurance Scheme should be extended to provide risk cover to coconut farmers.

10.4 Trade in Coconut Product : Conventional trade in coconut product including nuts and copra are characterized by the involvement of intermediary at different levels of marketing due to which the farmers suffers a long. Thus, there is necessity of a system that mediates between “*the farm and the firm*”. Adoption of farm level processing, involving farmer’s groups / societies / associations should be encouraged. Bigger units of copra making should be set up. Introduction of state of art warehousing facilities and access to robust prices risk management instruments such as “future contracts for coconut, coconut oil, copra and oil cake” should be encouraged. Organized transport system involving number of cottage industry area should be involved.

10.5 Development of Market Intelligence System : It includes all the pertinent marketing data about a product line from both external and internal sources and assembles the data, thus helping in marketing decision making as it comprises of collection and storage of data, analysis and interpretation of data and the dissemination of intelligence. Thus, a competitive data base market intelligence system should be developed to generate advance estimation of coconut production, copra with a view to generate reliable and consistent estimates.

10.6 Market Research : Market promotion is one of the key aspects for a better scales outlet and better price. Market survey, market research and market promotion are interlinked and should be a continuous process. These aspects need strengthening to identify domestic and export market, identification of rich production and distribution channels; thus linking the consumer, customers and public to the market. It is, therefore, recommended that need based and problem oriented market research should be taken up to find solution to emerging marketing problems.

10.7 Organic Coconut Product :The consumer for organic foods are increasing and organic sales is growing by 20 per cent. Since consumer of organic food look for absence of pesticides/herbicides/synthetic fertilizer, coconut is the best option to satisfy all these preferences. Since coconut is largely raised in all the coconut growing areas under natural farming it can be marketed as organic product.

10.8 The demand for diversified and value added product of coconut is increasing in India and abroad very rapidly, In spite this potential, its valuable wealth resources have not been exploited to its optimum potential. Many circumstances have contributed to diffidence in the value added sector of coconut viz., prices of raw materials, technologies, fear of competition and non-attachment of quality standards, end product price uncertainty, lack of investments are some of the factors which are hampering the growth of coconut into diversified and value added product. Therefore, it is recommended that the Government may play an active role in promoting the diversification of usage of coconuts and its value added products like coconut cream, spray dried coconut cream powder, coconut vinegar etc., by providing:

- a) Institutional support system which will offer knowledge base as i) quality concepts ii) Technology linkage iii) National and International Production and Processing Standards.
- b) Programmes for technology improvement, absorption, quality upgradation, investment generation, product improvement.
- c) Providing financial support and appropriate incentives in the form of soft loans, tax holidays or cut down taxes, working capital and capital subsidy.
- d) By providing adequate funds at liberal terms for processing and storage facilities for copra.
- e) Creating awareness and exposition of value added products among consumers.
- f) Close interaction among coconut processors, traders, research organization and Government by way of organizing workshops, trade fairs, exhibitions for the all-round growth of processing industry is necessary.

Thus it would help in bringing down the cost of production of diversified and value added product within the reach of consumers and also provide a better price to farmers.

10.9 Packaging and Labeling : Proper packing is as important as other aspects of marketing. As this area has not received much attention in case of coconut based products, it is necessary that this may be given good attention to attract consumers.

Proper labeling is yet another area that needs immediate attention. Consumers are cautious of the product they purchase. Therefore, it should scrupulously followed in India to increase trading in diversified and value added products of coconut.

It has been observed that coconut oil has great medicinal, cosmetic and industrial application, therefore, all the market promotion efforts should be directed to promote the coconut oil as basic and essential ingredient for medicinal and cosmetic purpose. Accordingly, the research and development should be directed to explore, the multipurpose use of coconut oil for industrial application and improve, its marketability in India and abroad.

WORLD AREA , PRODUCTION AND PRODUCTIVITY OF COCONUT

S.No.	Name of Country	Area	Production	Yield
1.	American Samoa	2,200	4,700	21,364
2.	Bangladesh	31,000	89,000	28,710
3.	Barbados	600	1,800	30,000
4.	Belize	345	1,100	31,884
5.	Benin	12,000	20,000	16,667
6.	Brazil	275,007	2,973,700	108,132
7.	Brunei Darussalam	120	200	16,667
8.	Cambodia	13,000	71,000	54,615
9.	Cameroon	1,700	5,100	30,000
10.	Cape Verde	1,700	6,000	35,294
11.	China	28,200	289,000	102,482
12.	Cocos (Keeling) Island	950	7,600	80,000
13.	Colombia	13,350	110,028	82,418
14.	Comoros	27,000	77,000	28,519
15.	Congo, Republic of	1,100	4,000	36,364
16.	Cook Islands	700	1,800	25,714
17.	Costa Rice	4,000	19,500	48,750
18.	Cuba	26,432	110595	41,841
19.	Cote d'Ivoire	30,000	240,000	80,000
20.	Dominica	3,450	11,500	33,333
21.	Dominican Republic	38,000	181,533	47,772
22.	Ecuador	3,540	20,973	59,246
23.	El Salvador	7,900	112,000	141,772
24.	Equatorial Guinea	2,500	6,000	24,000
25.	Fiji Island	50,000	140,000	28,000
26.	French Guinea	63	230	36,508
27.	French Polynesia	19,800	86,800	43,838

S.No.	Name of Country	Area	Production	Yield
28.	Ghana	55,000	315,000	55,000
29.	Grenada	2,300	6,500	2,300
30.	Guadeloupe	120	270	120
31.	Guam	9,500	53,000	9,500
32.	Guatemala	11,500	40,000	11,500
33.	Guinea	6,000	22,500	6,000
34.	Guinea-Bissau	9,000	45,500	9,000
35.	Guyana	14,000	45,000	14,000
36.	Haiti	9,700	24,000	9,700
37.	Honduras	2,300	21,150	2,300
38.	India	1,900,000	9,500,000	1,900,000
39.	Indonesia	2,660,000	16,289,000	2,660,000
40.	Jamaica	51,000	170,000	51,000
41.	Kenya	15,000	60,000	15,000
42.	Kiribati	27,000	103,000	27,000
43.	Liberia	2,400	7,000	2,400
44.	Madagascar	33,000	84,000	33,000
45.	Malaysia	179,000	710,000	179,000
46.	Maldives	7,500	35,000	7,500
47.	Marshall Island	8,000	15,000	8,000
48.	Martinique	500	1,150	500
49.	Mauritius	510	1,900	510
50.	Mexico	148,000	959000	148,000
51.	Micronesia, Fed States of	30,300	140000	30,300
52.	Mozambique	70,000	265000	70,000
53.	Myanmar	41,000	350000	41,000
54.	Nauru	320	1600	320
55.	Nepal	173	352	173

S.No.	Name of Country	Area	Production	Yield
56.	New Caledonia	16,000	16,000	59,259
57.	Nicaragua	5,800	5,800	50,435
58.	Nigeria	50,000	166,000	33,200
59.	Niue	3,125	2,500	8,000
60.	Pacific Island Trust Tr	0	0	0
61.	Pakistan	500	2,000	40,000
62.	Panama	4,700	15,000	31,915
63.	Papua New Guinea	200,00	650,000	32,500
64.	Peru	1,500	21,283	141,887
65.	Philippines	3,253,927	14,344,920	44,085
66.	Puerto Rico	900	5,250	58,333
67.	Reunion	125	560	44,800
68.	Saint Kitts and Nevis	200	1,000	50,000
69.	Saint Lucia	3,500	14,000	40,000
70.	Saint Vincent/Grenadines	685	2,550	37,226
71.	Samoa	21,500	140,000	65,116
72.	Sao Tome and Principe	13,000	28,500	21,923
73.	Senegal	1,550	4,700	30,323
74.	Seychelles	700	3,200	45,714
75.	Sierra Leone	2,700	2,600	9,630
76.	Singapore	15	130	86,667
77.	Solomon Island	37,000	330,000	89,189
78.	Sri Lanka	447,000	1,950,000	43,624
79.	Suriname	1,100	9,000	81,818
80.	Tanzania, United Rep of	310,000	370,000	11,993
81.	Thailand	337,000	1,450,000	43,027
82.	Togo	4,200	14,500	34,524
83.	Tokelau	600	3,000	50,000
84.	Tonga	8,100	58,000	71,605

S.No.	Name of country	Area	Production	Yield
85.	Trinidad and Tobago	3,300	18,000	54,545
86.	Tuvalu	1,600	1,600	10,000
87.	Vanuatu	74,000	240,000	32,434
88.	Venezuela, Bolivar Rep of	19,681	190,908	97,001
89.	Viet Name	132,800	930,600	70,075
90.	Wallis and Futuna Is	4,100	2,300	5,610

Source : FAO, 2004

Annexure - II**AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN APCC COUNTRIES (1970-2002)**

Area – ‘000’/Ha.
Production in Copra – ‘000’ M.T.
Productivity - M.T./Ha.

Sl. No.	Name of Countries	1990			2002		
		Area	Production	Productivity	Area	Production	Productivity
1.	F.S. Micronesia	17	8	0.44	17	8	0.47
2.	Fiji	56	34	0.60	61	15	0.24
3.	India	1472	1397	0.95	1899	2398	1.26
4.	Indonesia	3394	2332	0.69	3983	3331	0.83
5.	Kiribati	-	-	-	25	26	1.04
6.	Malaysia	323	225	0.69	131	86	0.66
7.	Marshal Islands	-	-	-	8	7	0.87
8.	Papua New Guinea	260	164	0.63	260	162	0.62
9.	Philippines	3112	2629	0.84	3259	2377	0.73
10.	Samoa	47	47	0.51	96	55	0.57
11.	Solomon Islands	59	39	0.66	59	22	0.37
12.	Shri Lanka	419	514	1.23	395	518	1.31
13.	Thailand	393	342	0.87	343	240	0.70
14.	Vanuatu	96	62	0.64	96	60	0.62
15.	Vietnam	350	190	0.54	133	136	1.02
	TOTAL	9939	7983	0.80	10,765	9441	0.88

Source : Asian and Pacific Coconut Community Statistics.

AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN INDIA (GROWTH RATE)

YEAR	KERALA			KARNATAKA			TAMIL NADU		
	Area "000 ha	Production Million Nuts	Productivity Nuts/ ha	Area "000 ha	Production Million Nuts	Productivity Nuts/ ha	Area "000 ha	Production Million Nuts	Productivity Nuts/ ha
1992-93	877.0	5125.2	5844	246.0	1269.7	5161	196.4	2771.1	14109
1993-94	882.3	5197.0	5890	252.9	1308.0	5172	272.8	3311.4	12139
1994-95	911.0	5335.1	5856	263.8	1364.1	5171	298.6	4345.7	14554
1995-96	980.0	5908.0	6029	278.8	1450.9	5204	322.5	3257.6	10101
1996-97	1010.0	5759.0	5702	290.0	1493.0	5148	328.0	3811.6	11621
1997-98	1020.3	5911.0	5793	302.4	1550.4	5127	267	3097	11620
1998-99	882.3	5132.0	5817	310.4	1611.5	5192	285.0	3335.3	11703
1999-2000	899.1	5167.0	5747	320.6	1670.3	5210	304.0	3222.0	10599
2000-01	925.8	5536.0	5980	333.8	1754.2	5255	323.5	3192.0	9867
2001-02	939.5	5744.0	6114	369.8	1503.6	4066	335.8	3293.6	9808
2002-2003	905.5	5338.0	5895	369.8	1503.6	4066	345.9	2860.7	8270
2003-04	906.2	5484.0	6052	376.0	1529.1	4067	352.7	2560.5	7260
2004-05	897.8	5727.0	6379	385.4	1209.6	3139	357.1	3243.5	9083
Growth over the period	20.8	601.8	534.9	139.4	-60.1	-2022.8	160.7	472.4	-5026.6
Growth rate	0.20	0.93	0.73	3.81	-0.40	-4.06	5.11	1.32	-3.60
Growth over 10 yr period	-13.2	391.9	522.6	121.6	-154.5	-2032.4	58.5	-1102.2	-5470.7
Growth rate for last 10 yr	-0.15	0.71	0.86	3.86	-1.19	-4.87	1.81	-2.88	-4.61

AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN INDIA (GROWTH RATE)

YEAR	ANDHARA PRADESH			OTHER			ALL INDIA		
	Area "000 ha	Production Million Nuts	Productivity Nuts/ ha	Area "000 ha	Production Million Nuts	Productivity Nuts/ ha	Area "000 ha	Production Million Nuts	Productivity Nuts/ ha
1992-93	71.7	1081.8	15088	146.6	993.1	6774	1537.7	11240.9	7310
1993-94	79.9	1103.5	13811	147.2	1054.8	7166	1635.1	11974.7	7324
1994-95	86.6	1181.4	13642	153.8	1073.3	6979	1713.8	13299.6	7760
1995-96	90.0	1231.4	13682	159.6	1104.4	6920	1830.9	12952.3	7074
1996-97	90.0	685.9	7621	174.5	1238.0	7095	1892.5	12987.5	6863
1997-98	95	815	8588	176.9	1344.2	7599	1861	12717	6863
1998-99	98.0	698.1	7123	178.8	1759.0	9838	1755	12536	7145
1999-2000	101.7	1051.8	10342	142.1	1016.4	7153	1768.1	12129.0	6860
2000-01	102.6	1092.7	10650	138.2	1103.5	7985	1823.9	12678.4	6951
2001-02	104	1125	10817	183.2	1297.0	7080	1932.3	12962.9	6709
2002-2003	105.3	1158.6	11003	187.0	1280.3	6847	1913.5	12535.0	6551
2003-04	104.0	1195.0	11490	194.8	1409.6	7236	1933.7	12178.2	6298
2004-05	104.0	1199.3	11532	190.7	1453.5	7622	1935.0	12832.9	6632
Growth over the period	32.3	117.5	-3556.1	44.1	460.4	847.7	397.3	1592.0	-678.2
Growth rate	3.15	0.86	-2.22	2.22	3.23	0.99	1.93	1.11	-0.81
Growth over 10 yr period	17.4	17.9	-2110.3	36.9	380.2	643.4	221.2	-466.7	-1128.3
Growth rate for last 10 yr	-0.15	0.71	0.86	2.17	3.08	0.89	1.22	-0.36	-1.56

AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN INDIA (GROWTH RATE)

YEAR	Area '000 ha	Production Million Nuts	Productivity Nuts/ ha
1994-95	1713.8	13299.6	7760
1995-96	1830.9	12952.3	7074
1996-97	1892.5	12987.5	6863
1997-98	1861.0	12717.3	6834
1998-99	1754.5	12535.9	7145
1999-00	1768.1	12129.0	6860
2000-01	1823.9	12678.4	6951
2001-02	1932.3	12962.9	6709
2002-03	1921.8	12535.0	6523
2003-2004	1933.7	12178.2	6298
2004-05	1935.0	12832.9	6632
Growth over the period	221.2	-466.7	-1128.3
Growth rate	1.22	-0.36	-1.56
Growth rate for 5 yrs	1.82	1.13	-0.67
Growth rate for 2 yrs	0.34	1.18	0.84

Annexure - IV A**STATE-WISE AREA AND PRODUCTION OF COCONUT IN INDIA**

Year	Andhra		Assam		Kerala		Tamil Nadu		Maharashtra		Karnataka	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
1992-93	71.7	1081.8	15.6	103.2	877.0	5125.2	196.4	2771.1	7.9	131.0	246.0	1269.7
1993-94	79.9	1103.5	17.3	116.5	882.3	5197.0	272.8	3311.4	7.9	148.5	252.9	1308.0
1994-95	86.6	1181.4	17.8	117.6	911.0	5335.1	298.6	4345.7	8.2	178.6	263.8	1364.1
1995-96	90.0	1231.4	18.2	140.3	980.0	5908.0	322.5	3257.6	8.2	169.1	278.8	1450.9
1996-97	90.9	686	19.6	126.9	1005.7	5835	327.9	3811.0	15.1	245.3	291.4	1498
1997-98	94.9	815.0	19.7	126.9	1020.3	5911.0	266.5	3096.7	15.1	226.8	302.4	1550.4
1998-99	98.2	1922.1	19.7	126.9	1078.2	6672.0	266.5	3096.7	15.1	226.8	287.8	1495.1
1999-2000	102	1051.8	20.2	150.1	899.1	5167.0	304.0	3222.0	15.1	226.7	320.6	1670.3
2000-01	103	1092.7	21	136	925.8	5536	323.5	3192.0	16.8	244.4	333.8	1754.2
2001-02	104	1125	21.1	163.6	939.5	5744	335.8	3293.6	16.8	193.8	369.8	1503.6
2002-03	105	1158.6	21.1	163.6	905.5	5338	345.9	2860.7	16.4	180.7	369.8	1503.6

Annexure - IV B**STATE-WISE AREA AND PRODUCTION OF COCONUT IN INDIA**

Year	Orissa		West Bengal		A&N Islands		Goa		Lakshadweep		Pondicherry		Tripura	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
1992-93	38.4	219.5	20.4	285.1	24.1	84.4	24.2	113.0	2.8	21.0	1.9	31.0	11.3	4.9
1993-94	38.4	219.5	21.1	310.3	24.4	85.3	24.0	116.0	2.8	26.3	1.9	27.7	9.4	4.7
1994-95	42.9	234.5	21.6	274.4	24.4	85.4	24.6	118.0	2.8	26.0	2.1	34.1	9.4	4.7
1995-96	47.3	246.8	23.1	279.4	24.4	85.4	24.7	119.0	2.8	27.0	2.1	31.5	8.8	5.9
1996-97	53.1	272	23.7	313.0	24.7	87.5	24.7	121	2.8	27.7	2.1	31.5	9.1	6.1
1997-98	54.1	413.4	24.3	306.2	24.8	86.6	24.9	120.9	2.8	27.7	2.1	29.6	9.1	6.1
1998-99	54.5	795.1	24.6	318.2	24.7	87.5	24.9	121.0	2.8	27.7	2.1	29.6	9.1	6.1
1999-00	29.0	163.3	24.2	324.3	24.7	87.5	25.0	121.6	2.8	28.3	2.2	31.2	9.1	7.5
2000-01	17.7	109.9	24.5	330.5	25.2	89	25	125.1	2.7	36.9	2.2	24.7	3.1	7
2001-02	46.7	208.2	25	324.2	25.2	90	25	125.1	2.7	53.1	2.3	24	3.3	7
2002-03	50	205.4	25	324.2	25.3	94.3	25.1	122	2.7	53	2.3	22.3	3.3	7

ARRIVALS OF TENDER AND MATURED COCONUT IN DELHI MARKET

(Qty. in M.T)

Sl.No.	Month	TENDER COCONUT			MATURED COCONUT		
		2002-03	2003-04	2004-05	2002-03	2003-04	2004-05
1.	April	4839.8	3077.1	2678.4	4526.3	2536.2	2052.9
2.	May	3897.9	3240.3	2067.6	2485.3	2279.7	2314.4
3.	June	2278.9	2106.2	1610.6	4744.1	2383.3	2490.9
4.	July	3073.7	1310.2	1652.3	3803.5	3482.7	2637.0
5.	August	2530.6	1350.2	1456.4	4480.0	3120.1	2997.0
6.	September	1878.8	2040.3	1824.4	3655.3	5527.5	3689.1
7.	October	2619.8	1896.9	1991.1	5160.7	3146.1	6801.1
8.	November	1636.1	1576.4	1198.3	2135.2	1749.0	1812.5
9.	December	1257.1	1029.7	1046.0	1466.4	1272.0	1465.1
10.	January	655.5	626.9	855.5	1570.5	1330.1	1911.0
11.	February	1277.0	1113.1	1098.9	1706.5	1639.1	1505.8
12.	March	2411.4	1977.9	2575.8	3537.2	4066.5	3729.7
	Total	28356.6	21345.2	20055.3	39271.0	32532.3	33406.5
	Average	23252.4			35069.6		

Total arrival of fruits :
 2002-03 = 2157763.2 (MT)
 2003-04 = 2391504.6 (MT)
 2004-05 = 2327328.0 (MT)

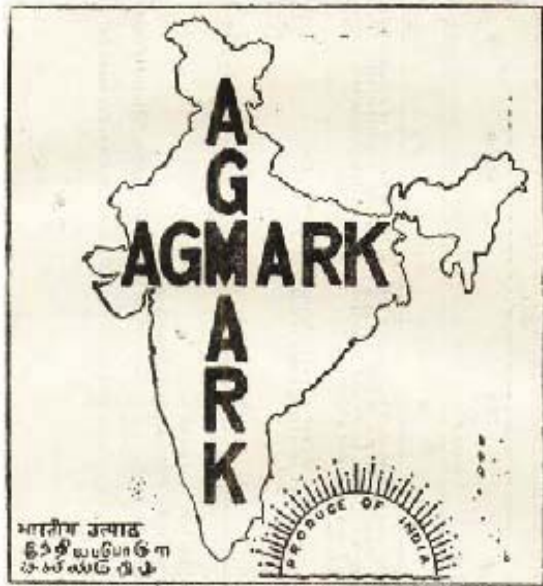
COCONUT GRADING AND MARKING RULES

1. **Short Title and Application :-**(i) These rules may be called the Coconut Grading and Marking Rules, 1976.
(ii) They shall apply to coconuts-in-shell and copra produced in India.
2. **Definitions :-** In these rules - (i) "Agricultural Marketing Adviser" means the Agricultural Marketing Adviser to the Government of India.
(ii) "Authorised packer" means a person or a body of person who has been granted a certificate of Authorisation by the Agricultural Marketing Adviser for getting the commodity graded and Agmarked in accordance with the grade standards and procedure prescribed under these rules.
(iii) "Certificate of Authorisation" means document issued by the Agricultural Marketing Adviser in the name of a particular person or a body of persons granting an authorisation for grading a particular commodity at a specified premises for a specified period mentioned in it.
(iv) "Schedule" means a schedule appended to these rules.
3. **Grade Designation:** - The grade designations to indicate the quality of coconuts shall be as set out in column 1 of schedule II to V.
4. **Definitions of Quality :-** The quality indicated by the grade designations shall be as set out against such designation in Schedule II to V.
5. **Grade Designation Mark :-** The grade designation mark shall consist of label bearing the design resembling the one set out in schedule I.
6. **Method of Marking :-** (i) The grade designation mark shall be securely affixed on each container in a manner approved by the Agricultural Marketing Adviser. (ii) In addition to the grade designation mark, each container shall be clearly marked with such particulars and in such manner as may be specified from time to time by the Agricultural Marketing Adviser. (iii) An authorised packer may after obtaining the previous approval of the Agricultural Marketing Adviser, mark his private trade mark on a container in a manner approved by the said officer, provided that the private trade mark does not represent quality or grade of coconut different from that indicated by the grade designation mark affixed on the container in accordance with these rules.
7. **Method of Packing :-** (i) Only sound, clean and dry gunny bags neatly, stitched, free from objectionable odour shall be used for packing. Any other type of container shall be used only after obtaining approval of the Agricultural Marketing Adviser. (ii) All containers shall be secured and sealed in a manner approved by the Agricultural Marketing Adviser.
8. **Special Conditions of certificate of Authorisation :-** In addition to the conditions specified in rule 4 of the General Grading and Marking Rules 1937, the special condition set out in Schedule VI shall be the conditions of every Certificate of Authorisation issued under these rules.

SCHEDULE - I

(See Rule 5)

DESIGN FOR THE GRADE DESIGNATION MARK OF COCONUT
(In shell or Ball Copra or cup Copra)



Coconut
(In shell or Ball Copra or cup Copra)

Grade For edible use
For Oil Milling

Lot number.....

Date of packing.....

Place of packing.....

Signature of inspecting officer.....

.....
This label is the property of the Government of India

.....

SCHEDULE-II

(See Rules 3 and 4)

GRADE DESIGNATION AND DEFINITIONS OF QUALITY OF COCONUT-IN-SHELL

Grade Designation	Colour	Size(1) (Diameter) in Millimeters	Description
Extra special	Brown	110 and above	The Coconuts shall be well developed, matured and husked *(2) with or without water. These shall be free from bad smell, damage and blemish due to fungus and insect infestation and dark with finger or metal it shall give the characters tic metallic sound without any dull note.
Special	I Brown white or II Brown & White	100 and above	
Standard	I Brown White or II Brown & White	90 and above	
General	Mixed	Below 90	
Non specified+(3)	--	--	

- Note :** (1) To find out the size, the nuts should be husked and the size should be measured by passing the nuts in the iron rings made to the size required.
- *(2) The husk not exceeding 10% of the weight of the nuts is permissible.
- +(3) Packing under "non-specified" grade will be allowed only against a specific order from the foreing buyer indicating the quantity and quality of the produce desired.

SCHEDULE III

(See Rules 3 and 4)

GRADE DESIGNATION AND DEFINITIONS OF QUALITY OF BALL COPRA FOR EDIBLE USE

Grade Designation	Size (Diameter) Minimum in mm	Foreign matter % by weight (maximum)	Mouldy Black Kernels % by Count (maximum)	Wrinkled Kernels % by Count (maximum)	Moisture content % by weight (maximum)	Chips % by weight (maximum)	Description
Grade 1	85	0.2	2.0	10.0	7.0	1.0	(i) These shall be the kernels obtained intact and in the form of balls from the fruits of <i>cocos nucifera</i> Linn. family-palmae. (ii) These shall be well dried, reasonably firm and in sound merchantable condition. (iii) These may be fumigated by sulphur or other fumigants permissible under PFA Rules, 1955 and shall be free from rancid taste and objectionable odour. The testa shall be whitish to dark brown in colour and the meat shall be pearly white to ash white in colour and shall be sweet in taste
Grade 2	75	0.2	2.0	10.0	7.0	1.0	
Grade 3	60	0.2	2.0	10.0	7.0	2.0	

+ Non-Specified

Note :

1. Foreign matter includes sand, dust, straw and shell.
2. Mouldy and black kernels include balls in which more than 5% of the inner surface is covered with mould and/or is dark brown to black in colour.
3. Wrinkled kernels include balls that are shrunk out of normal shape or are not fully matured or developed or have a rubbery structure and uneven surface. Such kernels are often discoloured.
4. Chips include pieces of kernel which are smaller in size.
5. Meat means the soft body enclosed in the shell which carries the oil.
- +6. Packing under Non-Specified grade will be allowed only against a specified order from the foreign buyer indicating the quantity and quality of the produce desired.

SCHEDULE IV
(See Rules 3 and 4)

GRADE DESIGNATION AND DEFINITIONS OF QUALITY OF CUP COPRA FOR EDIBLE USE

Grade Designation	Size (Diameter) Minimum in mm	Foreign matter % by weight maximum	Mouldy Black Kernels % by Count maximum	Wrinkled Kernels % by Count maximum	Chips % by weight maximum	Moisture content % by weight maximum	Acid value of extracted oil maximum	Description
Grade I	70	0.5	2.0	10.0	1.0	6.0	2	These shall be kernels obtained from the fruits of <i>Cocos nucifera</i> Linn fam Palmae, which have been cut into approximate two equal pieces forming a cup shape. These shall be well dried, reasonable firm and in sound merchantable condition. It may be fumigated by sulphur or other fumigants permissible under P.F.A. Rules, 1955 and shall be free from rancid taste and objectionable odour. The testa shall be whitish to dark brown in color and the meat shall be pearly white to ash white in colour and sweet in taste.
Grade II	-	0.5	2.0	10.0	1.0	6.0	2	
Non-specified	-	-	-	-	-	-	-	

Note :

1. Foreign matter includes sand, dust, straw and shell
2. Mouldy and black kernels include those in which more than 5% of the inner surface is covered with mould and/or is dark brown to black in colour.
3. Wrinkled kernels include those which are shrunk out of normal shape or not fully matured or developed or have rubbery structure and uneven surface. Such kernels are often discolored.
4. Chips include pieces of kernel which are smaller in size.
5. Meat means the soft body enclosed in the shell which carries the oil.
6. Packing under Non-Specified grade will be allowed only against a specific order from the foreign buyer indicating the quantity and quality of the produce desired.

SCHEDULE V
(See Rules 3 and 4)

GRADE DESIGNATIONS AND DEFINITIONS OF QUALITY OF CUP COPRA FOR OIL MILLING

Grade Designation	Foreign matter % by weight maximum	Mouldy Black Kernels % by Count maximum	Wrinkled Kernels % by Count maximum	Chips % by weight maximum	Moisture content % by weight maximum	Oil contention moisture free basis % by weight maximum	Acid value of extracted oil maximum	Description
Grade I	0.5	5.0	10.0	5.0	6.0	70.0	2	These shall be kernels obtained from the fruits of <i>Cocos nucifera</i> Linn., fam. Palmae which have been cut into approximately two equal pieces forming a cup shape. These shall be well dried, reasonably firm and in sound merchantable condition. It may be fumigated by sulphur or other fumigants permissible under P.F.A. Rules, 1955 and shall be free from rancid taste and objectionable odour. The testa shall be whitish to dark brown in colour and the meat shall be pearly white to ash white in colour.
Grade II	1.0	10.0	10.0	10.0	6.0	68.0	4	
Grade III	2.0	15.0	15.0	15.0	6.0	66.0	10	
+ Non-specified	-	-	-	-	-	-	-	

Note :

1. Foreign matter includes sand, dust, straw and shell -
2. Mouldy and black kernels include those in which more than 5% of the inner surface is covered with mould and /or is dark brown to black in color.
3. Wrinkled kernels include those which are shrunk out of normal shape or are not fully matured or developed or have rubbery structure and uneven surface. Such kernels are often discolored.
4. Chips include pieces of kernels which are smaller in size.
5. Meat means the soft body enclosed in the shell which carries the oil.
6. Packing under Non-specified grade will be allowed only against a specified order from the foreign buyer indicating the quantity and quality or the produce desired.

SCHEDULE VI

(See Rule 8)

SPECIAL CONDITIONS OF CERTIFICATE OF AUTHORISATION

1. An authorized packer shall own or have access to suitable hygienic premises for the processing and/or storage of coconuts/copra duly approved by the Agricultural Marketing Adviser.
2. An authorized packer shall make such arrangements for the testing of Coconuts/Copra as may be prescribed from time to time by the Agricultural Marketing Adviser. He shall also maintain proper records of the analysis of samples.
3. All instructions regarding method of sampling and analysis, sealing and marking of containers and maintenance of records etc, which may be issued from time to time by the Agricultural Marketing Adviser shall be strictly observed.
4. A sample of coconut/copra drawn in a manner prescribed by the Agricultural Marketing Adviser, from each lot, shall be forwarded to such Control Laboratory as may be directed from time to time.
5. Each container shall be filled with coconuts in the manner prescribed by the Agricultural Marketing Adviser.
6. An authorized packer shall provide all facilities as may be necessary to the Inspecting Officers duly authorized by the Agricultural Marketing Adviser in this behalf

VEGETABLE OILS GRADING AND MARKING RULES

1. **Short title and application:-**
 - 1) These Rules may be called the Vegetable Oils Grading and Marking Rules, 1955.
 - 2) They shall apply to Vegetable Oils produced in India.
2. **Definitions-** In these rules unless the context otherwise requires,-
 - 1) “Agricultural Marketing Adviser” means the Agricultural Marketing Adviser to the Government of India ;
 - 2) “Authorised packer” means a person or a body of persons, who has been granted a certificate of authorization to grade and mark commodity in accordance with the grade standards and procedure prescribed under these rules.
 - 3) “Certificate of authorisation” means a certificate issued under the General Grading and Marking Rules, 1988,
 - 4) “Schedule” means schedules appended to these rules.
3. **Grade designations:-** The grade designation to indicate the quality of Vegetable Oils shall be as set out in column 1 of Schedule I to XVI
4. **Definition of quality:-** The quality indicated by the grade designations shall be as set out against such designations in Schedule I to XVI
5. **Grade designation marks :-** The grade designation marks shall consist of;
 - (i) A label specifying name of the commodity, grade designation and bearing a design consisting of an outline map of India with the word “AGMARK” and the figure of rising sun with the words “Produce of India” and **भारतीय उत्पाद** resembling the one as set out in Schedule XVII-A ; or
 - (ii) Agmark replica consisting of design incorporating the number of certificate of authorization, the word “AGMARK”, the name of the commodity, the grade designation resembling the one as set out in Schedule XVII-B; Provided that the use of Agmark replica in lieu of Agmark labels shall be allowed to such authorized packers who have been granted permission, by the Agricultural Marketing Adviser or an officer authorized by him in this behalf and subject to conditions as specified from time to time •
6. **Packing provisions:-**
 - 1) Vegetable Oils shall be packed either in new, sound, clean and rust free tins or in clean bottles., mild steel drums, railway tank wagons or in approved clean and new thermo plastic containers/ flexible packs like pouches, cans, bottle jars etc.
 - 2) The plastic containers shall be manufactured out of food grade plastic materials permitted under Prevention of Food Adulteration rules , 1955.
 - 3) The Vegetable Oils shall be packed in the standard size namely, 100gms., 200gms., 500gms, 1Kg, 5Kgs and thereafter in multiples of 5 Kgs net weight. The edible vegetable oils may also be packed in corresponding volumetric packings expressed in milli-liters or liters along with their weights in gms/kgs as the case may be.
 - 4) The containers of oils shall be free from any contaminants and shall not be composed of whether wholly or in part, any poisonous or deleterious substance which renders the contents injurious to health.
 - 5) The container of oils shall be free from insect infestation, fungus contamination or any obnoxious and undesirable smell.
 - 6) The packing shall be done in the manner prescribed for different types of packing,

7. **Marking provisions-** 1) The grade designation mark shall be securely affixed to each container in a manner approved by the Agricultural Marketing Adviser. In addition to the grade designation mark, the following particulars shall also be clearly and indelibly marked on each container:-
- (a) Name of packer.
 - (b) Place of packing (business address)
 - (c) Tank filling No.
 - (d) Date of packing in plain letters.*
 - (e) Net weight /volume (wherever applicable)

Note* : the date of packing shall be the date of completion of analysis of the sample.

- 2) An authorised packer may after obtaining the prior approval of the Agricultural Marketing Adviser or an officer authorised in this behalf, mark his private trade mark on a container in a prescribed manner; Provided that private trade mark does not represent quality or grade of the Vegetable Oil different from that indicated by the grade designation mark affixed on the container in accordance with these rules.

8. **Special conditions of certificate of authorisation:-** In addition to the conditions specified in sub-rule (8) of rule 3 of the General Grading & Marking Rules, 1988, the conditions set out in Schedule III shall be the conditions of every Certificate of Authorisation issued for the purpose of these rules.
9. **Repeal and Savings :-** The Edible Oils Grading and Marking Rules, 1939 and the Castor Oil Grading and Marking Rules, 1949, are hereby rescinded without affecting the previous operation of the said rules or anything duly done or suffered thereunder.

Note :- Each label shall have printed thereon a serial number along with a letter or letters denoting the series e.g. A. 004378.

AGMARK GRADE DESIGNATION AND DEFINITION OF QUALITY OF COCONUT OIL

Definition of Quality											
Grade Designation	Moisture and insoluble impurities percent by weight (not more than)	Colour on Lovibond scale* in 1 inch cell expressed as Y +5R (not deeper than)	Specific gravity at 30°C/30°C	Refractive Index at 40°C	Specification value (not less than)	Iodine value ((Wij's method)	Unsataponifiable matter per cent by weight (not more than)	Acid value (not more than)	Polenske value (not more than)	Description	General requirement
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Refined	0.10	2	0.915 to 0.920	1.4481 to 1.4491	250	7.5 to 10.0	0.5	0.5	13.0	Coconut oil shall be obtained either by process of expression of good quality copra (Cocos nucifera) or by a process of solvent extraction **of good quality coconut cake or good quality copra (Cocos nucifera) using approved food grade solvents. The refining of the oil shall be done by neutralization with alkali and/or physical refining and/or by miscella refining followed by bleaching with adsorbent earth And/or activated carbon and deodorisation with Steam. No chemical agent shall be used.	The oil shall have natural sweet taste. it shall be clear and free from turbidity when a filtered sample is kept for 24 hrs. at 30°C. The oil shall be free from rancidity, admixture or other oils or substances or adulterants. The oil shall be free from mineral oil, sediments, suspended matter, separated water, obnoxious odour, added colouring and flavouring agents. The oil may contain permitted antioxidants not exceeding in concentration as specified under Prevention of Food Adulteration Rules, 1955.

* In the absence of Lovi-bond Tintometer, the colour shall be matched against standard colour comparator.

* In case of solvent extracted oil, the flash point by Pensky-Mattens (closed cup) method shall not be less than 225°C and the container shall be marked "Solvent Extracted".

Contd..2/

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Grade-I	0.25	4	0.915 to 0.920	1.4481 to 1.4491	250	7.5 to 10.0	0.8	3.0	13.0	The oil shall be the product obtained by expression of good quality copra (Cocos nucifera only)	The oil shall have natural sweet taste and characteristic odour. It shall be clear and free from rancidity, admixture of any other oil, substances or adulterants. It shall also be free from mineral oil, sediments, suspended matter, separated water, obnoxious odour, added colouring and flavouring agents. The oil may contain permitted antioxidants not exceeding in concentrations as specified under Prevention of Food Adulteration Rules, 1955.
Grade- II	0.25	11	0.915 to 0.920	1.4481 to 1.4491	250	7.5 to 10.0	0.8	6.0	13.0	the product obtained by expression of good quality copra (Cocos nucifera only)	The oil shall have natural sweet taste and characteristic odour. It shall be clear and free from rancidity, admixture of any other oil, substances or adulterants. It shall also be free from mineral oil, sediments, suspended matter, separated water, obnoxious odour, added colouring and flavouring agents. The oil may contain permitted antioxidants not exceeding in concentrations as specified under Prevention of Food Adulteration Rules, 1955.

VEGETABLE OIL CAKES (EXPRESSED OR SOLVENT EXTRACTED)
GRADING AND MARKING RULES

1. **Short title and application** – These rules may be called Vegetable Oil Cakes (Expressed or Solvent Extracted) Grading and Marking Rules, 1979.
2. **Definition.** – In these rules,- (a) “Agricultural Marketing Adviser” means the Agricultural Marketing Adviser to the Government of India;
(b) “Schedule” means a Schedule appended to these rules.
3. **Grade designations.**-The grade designations to indicate the quality of oil cakes (expressed or solvent extracted) shall be as set out in column (1) of Schedule II-A
4. **Definition of quality**-. The quality indicated by the grade designation shall be as set out against each grade designation in Schedule II-A to IX-B.
5. **Grade designation marks**.- The grade designation mark shall consist of a label bearing the design set out in Schedule I and specifying the grade designation, the name of cake and whether it is expressed or solvent extracted.
6. **Method of marking** – (1) The grade designation mark shall be securely affixed or stenciled on each container in a manner approved by the Agricultural Marketing Adviser and shall as indicate the number of the Certificate of Authorization issued to the packer by the Agricultural Marketing Adviser.
(2) In addition, on every container the following particulars shall clearly and indelibly be marked :-
 - (a) Lot number,
 - (b) Name of packer,
 - (c) Date of packing,
 - (d) Place of packing.
(3) The authorized packer may, after obtaining the prior approval of the Agricultural Marketing Adviser, mark his private trade mark on the container in a manner approved by the said officer, provided that the private trade mark does not represent quality or grade of the oil cake different from that indicated by the grade designation mark affixed to the container in accordance with these rules.
7. **Method of packing** – (i) The oil cake shall be packed only in container made of jute or other material approved by the Agricultural Marketing Adviser from time to time. (ii) Each container shall be securely closed and sealed and shall contain oil cake of one trade description and of one grade designation only.
8. **Special conditions of Certificate of Authorization**- In addition to the conditions specified in Rule 4 of the General Grading and Marking Rules, 1937, the following conditions shall also be the conditions of every Certificate of Authorization issued for the purpose of these rules, namely:- (i) Each authorized packer shall take all precautions to avoid admixture of oil cakes with castor seeds and castor cake (ii) If an authorized packer handles more than one type of oil cake in the same premises adequate precaution shall be taken by him to avoid mixing of different oil cakes. The premises should be clean and hygienic and should be subjected to prophylactic treatment at an interval no more than three weeks. The stock should be fumigated as and when any insect infestation is noticed. (iii) The authorized packer shall make such arrangements for testing oil cakes as may be specified from time to time by the Agricultural Marketing Adviser and shall also maintain proper records of analysis of the samples. (iv) All instructions regarding methods of sampling and analysis, packing and marking and maintenance of record, which may be issued from time to time by the Agricultural Marketing Adviser shall be observed (v) A sample of oil cake drawn in the manner prescribed by the Agricultural Marketing Adviser from each lot, shall be forwarded to such control laboratory as may be notified from time to time.

GRADE DESIGNATIONS AND DEFINITIONS OF QUALITY OF COCONUT OIL CAKE-EXPRESSED

Grade Designation	Moisture per cent by weight (maximum)	Crude protein (nitrogen x 6.25 per cent by weight minimum)	Crude fat or ether extract per cent by weight (minimum)	Crude fibre per cent by weight (maximum)	Total ash per cent by weight (maximum)	Acid insoluble ash per cent by weight (maximum)	Castor husk	General characteristics
Good	10.0	21.0	8.0	12.0	8.0	1.5	Nil	<p>1. Coconut Oil cake of grade good shall be the products obtained after the extraction of oil from copra (dried coconut kernels) by power driven machinery.</p> <p>2. Ghani grade oil cake shall be the product obtained after the extraction of oil from copra(dried coconut kernels) by animal driven ghani or chakki.</p> <p>3. The material shall be free from harmful constituents and castor cake or husk.</p> <p>4. It shall be free from rancidity adulterants, insects or fungus infestation and from fermented musty and other objectionable odour.</p> <p>5. It shall be free from dirt and extraneous matter.</p>
Ghani	12.0	18.0	13.0	12.0	8.5	2.5	Nil	

NOTE : The values specified in columns 3 to 7 are calculated on moisture free basis. Adopted from the Indian Standards Specifications for coconut oil cakes as Livestock feed (IS : 2154-1962).

GRADE DESIGNATIONS AND DEFINITIONS OF QUALITY OF COCONUT OIL CAKE (MEAL)- SOLVENT EXTRACTED

Grade Designation	Moisture per cent by weight (maximum)	Crude protein (nitrogen x 6.25 per cent by weight minimum)	Crude fat or ether extract per cent by weight (minimum)	Crude fibre per cent by weight (maximum)	Acid insoluble ash per cent by weight (maximum)	General characteristics
Good	10.0	23.0	1.0	14.0	1.5	The solvent extracted coconut oil cake (meal shall be obtained by extraction of oil by means of a solvent from the expeller ghani pressed coconut oil cake. The expeller or ghani pressed coconut oil cake used for extraction shall have been obtained by pressing clean and sound coconut. The meal shall have been subjected to heat and steam treatment un controlled and regulated conditions so as to remove traces of solvent. The material shall be in the form of either flakes or powder. It shall be free from harmful constituents and castor cake or husk or both and mahua cake. It shall be free from rancidity, adulterants, insects or fungus infestation and from musty odour.
Fair	10.0	21.0	1.5	15.0	2.0	

Note :

1. The values specified in columns 3 to 6 are calculated on moisture free basis. Adopted from Emergency Indian Standards specification for a solvent extracted coconut oil cake (meal) as livestock feed (IS : 3591-E-1966)
2. Solvent for extraction : Only hexane food grade solvent shall be used for the purpose of extraction. The requirement of the solvent shall be as follows :-
Boiling range 63⁰ C to 71⁰ C Aromatic content max : 1 per cent. Non-volatile content max. 0.001 gms/100 ml.

SCENARIO OF COCONUT MARKETING IN INDIA

Sl. No.	State / UT	District / Market	Private channel	Institution / channel	Name of the producer - seller	Village	Size of holding orchard (hect)	Distance from village to assembling market (km.)	Type of road	Transport used	Qty. of nut	Price for 1000 nuts	System of sale open auction, tender, mutual negotiation etc.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.	Tamil Nadu	Chennai	P	I	M.Kuzhanathai, Chennai	Thenngdupi Narthu	4	3	Tar road	Tractor	10000	5500	Mutual negotiations
		Dharam Puri	P	--	R.Jeyavelu	Manivambadi	1	18	Surface	Bus	1000	3500	- do -
		Pollachi	P	I	Shri V.Ratnam	Annamalai	48	2	Tar road	Lorry/Tractor	20000	6500	- do -
		Vadassary	P	--	S.Kumaresan	Vandavila	4	10	- do -	- do -	10000	7500	- do -
2.	Pondicherry	Dindigul	P	--	S.Mod.Sayeed	Sithyery Koltai	20	20	Surface	Truck	9000	4000	- do -
		--	P	--	G.Narayan	Murungapalkam	12	10	Tar road	Lorry	15000	5000	- do -
3.	Maharashtra	Ratnagiri	P	--	R.Pillankar	Bhatye Village	Less than 0.149	4	Surface	Personal tempo	380	8000	Direct method
		Sindhudurg	P	--	V.D.Thakurdesai	Nangaon	0.2	5	- do -	Hired vehicle	800	8000	- do -
		Mumbai	P	--	R.L.Vaze	Arnala	1.2	16	- do -	Truck	6000	4000	Contract system
4.	Gujrat	Junagarh	P	I	Yusufbhai Gameti	Gadu	2	12	Tar road	Auto carrier	2000	2250	By auction
		Navsari	P	--	S.G.Patel	Jeravasam	1	10	Surface	Auto	2750	3500	- do -
		Ahmedabad	P	--	R.M.Godavi	Jarpara	0.60	10	- do -	Tempo	1750	3100	Mutual negotiations
		Bhavnagar	P	--	J.B.Henabhai	Ratol	2	9	- do -	Bullock cart	177	400	Open auction
5.	Daman	Daman	P	--	R.B.Gandhi	Magarwada	0.50	12	- do -	Auto	1450	4500	Mutual negotiations
6.	Diu	Diu	P	--	K.B.Malala	Bucharwada	0.50	6	- do -	Auto	700	4000	- do -
7.	Orissa	Cuttack	P	--	B.S.Behra	Gangapur	1/3	3	- do -	Trolley rickshaw	120	4800	- do -
		Ganjam	P	--	T.Nag.Reddy	Basinaputi	¼	3	- do -	- do -	100	5000	- do -
		Khurda	P	--	G.C.Rath	Jamukoli	0.5	11	- do -	Auto/tractor	500	6000	- do -
		Nayagarh	P	--	B.Mahapatra	Dinagaon	3	7	- do -	Tractor	3000	5000	- do -
		Puri	P	--	P.Pradhan	Pambhandar	0.7	4	Kutch road	Auto	540	7000	Open auction
8.	Karnataka	Mysore	P	--	Mahadeva	Kyanahalli	3	2	Pucca road	Bullock cart	1000	5000	Mutual negotiations
		Mandya	P	--	Shankar	Annakere	Medium	8	- do -	- do -	300	5100	- do -
		Mangalore	P	--	Abdul Hamid	Padil	2	10	- do -	Tempo	500	5500	- do -
		Tumkur	P	--	Jagdish Appa	Gopalanahalli	2	12	Surface	Tractor	3000	5700	By tender
		Bangalore	P	--	Manjunath	Nuggenhatti	0.8	18	- do -	Bullock cart	1000	6000	Mutual negotiations
9.	Kerala	Trivendrum	P	--	Gangadhar Nair	Kattakada	1	--	- do -	N.A	500	6000	- do -
		Nedumangal	P	--	Ravindran Pillai	Aruvikkra	0.8	6	- do -	--	900	4800	- do -
		Thiruvanthapuram	P	--	Chandras Nair	Katlakada	2	2	- do -	Jeep	1300	5000	- do -
		Thrissur	P	--	Vijaragavam	Korumbissey	2	--	- do -	Nil	4500	6500	- do -
		Malappuram	P	--	Maiddeen Kutty	Anakayam	1.5	6	Pucca road	Tempo	2500	1200	- do -

Annexure – VII B

SCENARIO OF COCONUT MARKETING IN INDIA

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
9.	Kerala	Ponnani	P	--	Kuttun	Kuttikad	1	10	Pucca road	Tempo	20000	4500	Mutual negotiations
		Manna	P	--	Muhammad	Anakayam	52 cents	15	- do -	- do -	500	1100	- do -
		Kalicut	P	--	M.M.Matheus	Mukkam	1.2 hect.	--	- do -	- do -	1650	5250	- do -
		Kozhikodi	P	--	Abdul Raheman	Roanuthum	1.5	2	Surface	Auto	800	--	- do -
		Kannur	P	--	Thomas	Oblathar	5	5	- do -	- do -	4400	--	- do -
10.	Lakshadweep	Manglore	P	--	Pookoya	Kavarati	3	1	- do -	- do -	1000	--	- do -
11.	Andhra Pradesh	Shrikakulam	P	--	C.N.Mittal	Tekkali	75 hect.	--	Pucca raod	Truck	10000	5000	- do -
		East Godavari	P	--	B.Murthy	Arukkamula	10	8	- do -	- do -	15000	4000	- do -
		West Godavari	P	--	T.Madhoo Rao	Yelamnchill	8	10	- do -	- do -	8000	4200	- do -
		Vishakhapatanam	P	--	B.Meenu	S.Ragavana m	5	--	Surface	Van	8000	3000	- do -
		Vizayanaganam	P	--	Appala Narasiah	Bhogapuram	4	--	- do -	--	9000	4500	- do -
12.	West Bengal	24 Paraganas (S)	P	--	Rabial Nagne	Shyompur	1	1	- do -	Rickshaw	300	3000	- do -
		Murshidabad	P	--	M.Ghosh	Kosipur	0.5 hect.	5	Unsurface	- do -	500	700	- do -
		Howrah	P	--	Nemaj Mandal	Bonnarpara	1	2	- do -	- do -	200	550	- do -
		Midnapur	P	--	Mahadeo Khatua	Geonkhali	1	15	- do -	- do -	400	600	- do -
13.	Goa	South Goa Distt.	P	--	Moreswar Joshi	Dhave	1.5 hect.	8	Pucca road	Bus	5000	5500	- do -
14.	Assam	Silchar Town	P	--	Ramshwar Saikia	Gedaborri	0.25 ha.	--	--	--	400	500	- do-/Auction
		Dibrugarh	P	--	Gopap Barria	Uria-gaon	0.5 hect.	--	--	--	500	450	- do -
		Tinsukia Town	P	--	Ali Askan	Borri-gaon	0.3 hect.	--	--	--	500	450	- do -
		Hazakamarup	P	--	Krishna Das	Soldnlattaro	0.5 hect.	3	Surface	--	200	1400	- do -
		Guwahati	P	--	Kamala Barman	Bonmaza	0.25 ha.	--	--	--	500	450	- do -

Annexure-VIII**MONTHLY AVERAGE PRICE OF COCONUT AT ARSIKERE MARKET****(Rs/1000 Nuts)**

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4900	5200	4200	4000	2900	4000	4500	4891	5460	3958
February	6200	5200	5300	5000	4000	4200	5200	5481	5919	3879
March	5800	5300	5300	4800	4000	4300	4400	6048	5648	4910
April	5600	4000	5200	3700	3500	3700	4000	4897	5500	5596
May	5700	3500	4500	3700	2800	4000	3900	5629	5750	4990
June	5400	3800	4900	3500	3000	4000	4000	5393	4945	4713
July	5600	4000	4800	3450	3300	3800	4605	5370	5085	4758
August	5300	3700	4700	3100	3200	3750	4777	5690	5014	4723
September	5800	3600	4600	2900	3000	3750	5489	5731	5242	5275
October	4800	3800	4700	2600	3300	3800	5347	5324	4629	5376
November	4850	3900	4650	2600	3500	3900	5258	5231	4581	4783
December	5250	4000	5000	2700	4100	4500	4950	5500	4663	4805
Average	5433	4167	4821	3504	3383	3975	4702	5432	5203	4814

Annexure – IX**MONTHLY AVERAGE PRICE OF COCONUT AT KOZHIKODE MARKET**
(Rs/1000 Nuts)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4710	3968	3816	4510	2206	2400	3074	4277	4055	3282
February	4683	3787	3861	4137	1978	2430	3307	4798	3879	3496
March	4896	3637	4092	3873	1988	2312	3311	5165	3664	2989
April	5492	3517	4111	3533	1683	2499	3377	5155	3643	2985
May	5808	3278	4204	3052	1678	2573	3497	5250	3495	2900
June	5786	3304	4493	3180	2000	2787	3485	5078	3534	3048
July	6078	3804	4576	3160	1873	3009	3733	5332	3403	3015
August	5842	3606	4492	3173	1840	3321	3830	5291	3120	3270
September	5944	3778	4874	3250	1797	3500	3947	5416	3211	3270
October	5343	3873	5052	2376	1765	3031	4083	5121	2918	2850
November	4815	3858	5127	2370	1975	3016	4095	4824	2395	3024
December	4313	3800	4922	2204	2591	2936	4212	4146	2350	2850
Average	5309	3684	4468	3235	1948	2818	3663	4988	3306	3024

Annexure - X**MONTHLY AVERAGE PRICES OF COCONUT AT KANGAYAM MARKET****(Rs/1000 Nuts)**

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	N.A	4310	4240	4975	2425	2500	4220	5000	4950	3500
February	N.A	3538	3875	N.A	2500	2500	4688	5000	4988	3182
March	N.A	3350	4500	N.A	2500	2500	4763	5625	4813	2950
April	4750	3425	4400	3450	2375	2500	4575	5390	4130	3063
May	4750	2690	4250	3150	2200	2500	4050	4550	3925	3188
June	4750	2750	4250	2700	2320	2500	4000	4325	3338	3000
July	4750	3000	4250	2650	2025	3025	4000	4080	4950	3063
August	4600	3125	4600	2500	2000	3250	4192	4575	2850	2538
September	4500	3500	4000	2500	NA	3062	4600	4600	3130	3300
October	4500	3500	5010	2563	2000	3500	5063	4670	3425	2750
November	4500	4150	5000	2000	2050	3710	5438	5150	3875	4250
December	5000	4000	5480	2380	2750	4213	5438	4950	3863	4280
Average	4678	3445	4488	2887	2286	2980	4586	4826	4264	3255

Annexure - XI**MONTHLY AVERAGE PRICES OF COCONUT AT ALAPPUZHA MARKET****(Rs/1000 Nuts)**

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	6100	4500	5000	6250	2880	4000	5700	6750	7250	N.A
February	5900	3800	4875	5730	3000	4000	4900	6250	6875	N.A
March	4500	3800	4967	4130	3000	3870	4675	6120	6250	N.A
April	5300	4000	5275	4000	3500	3800	4875	5920	6000	N.A
May	4200	3800	5050	3500	3000	3850	4875	6175	6000	N.A
June	4700	4100	5700	3380	3130	3900	4875	6500	6000	N.A
July	4700	4000	5130	3250	3500	4125	5200	6750	N.A.	N.A
August	4600	4200	5380	3500	3500	4375	5750	6750	N.A	N.A
September	4700	4100	5880	3130	3500	4425	6150	6750	N.A	N.A
October	4600	4580	6250	3000	2900	4525	6875	6750	N.A	N.A
November	5500	4450	7130	2880	3500	5150	6750	7250	N.A	N.A
December	5000	4700	6380	2880	3780	5950	7000	8000	N.A	N.A
Average	4983	4169	5585	3803	3266	4331	5635	6664	6396	N.A

Annexure - XII

MONTHLY AVERAGE PRICES OF COCONUT AT KOCHI MARKET

(Rs/1000 Nuts)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	N.A	N.A	N.A	5750	2780	3500	4775	6150	7000	N.A
February	N.A	N.A	5313	4750	2780	3370	5200	5720	6750	N.A
March	N.A	N.A	5413	3630	2780	3620	5050	6000	6750	N.A
April	N.A	N.A	5710	3600	2700	3550	5150	5870	6500	N.A
May	N.A	N.A	5325	3250	2850	3900	4950	6125	6250	N.A
June	N.A	N.A	5456	3250	2850	4350	5250	6250	5500	N.A
July	N.A	4380	4880	2850	2850	4500	5100	6120	N.A	N.A
August	N.A	4413	5350	2850	2950	4250	5500	6375	N.A	N.A
September	N.A	N.A	5750	2950	2800	4250	5600	6000	N.A	N.A
October	N.A	5065	5750	2750	2780	4250	6000	6250	N.A	N.A
November	N.A	4888	5750	3000	3130	5000	6375	6850	N.A	N.A
December	N.A	5313	5750	2950	3750	4875	6120	7000	N.A	N.A
Average	N.A	4812	5538	2892	3043	4521	5783	6433	6458	N.A

Annexure - XIII

MONTHLY WHOLESALE PRICE INDEX OF COCONUT

(Base Year 1993-94 = 100)

	January	February	March	April	May	June	July	August	September	October	November	December
1997	155.3	170.6	156.7	150.4	148.9	143.3	147.2	149.2	143	134.7	139.1	140.8
1998	135.4	127.1	127.3	125.2	112.6	111.3	113.9	111.3	108.7	115.6	105.5	124.8
1999	127.4	130	148.4	149.8	148.6	141.7	141.9	147.7	147.3	155.4	158.9	153.7
2000	146.7	135.6	135.3	128.7	111.3	96.8	91.7	92.7	93.5	99.4	87.3	89.6
2001	91.9	94.4	94.4	91.1	84.5	88.5	95	94	91	94.8	95.7	116.8
2002	118.3	116.5	118.9	109.1	112.7	120.5	128.5	122.2	119.8	120.7	135.4	134.6
2003	134.3	141.1	139	134.2	132.6	133.6	143	147.6	163.3	162.7	169.7	157.4
2004	146.4	150.9	143	144.1	146.4	149.8	156	160.2	165.7	164.9	167.4	167.2
2005	163.3	166.4	151.2	144.4	136.5	131.1	133.3	135.8	130.5	125.3	123.9	121.3
2006	118.8	125.9	130.4	128.5	126.8	123.4	119	123.2	126	132.9	133.7	131

MONTHLY AVERAGE WHOLESALE PRICES OF UN-HUSKED COCONUT IN INDIA
(Rs.../Nuts)

Sl.No.	State/Uts	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003
1	Karnataka	3546	4105	2833	2803	3611
2	Tamilnadu	3691	3748	2669	2730	3996
3	Andhra Pradesh	2684	2782	2135	2457	2647
4	Orissa	3458	4247	3348	3643	4067
5	West Bengal	4472	4882	5549	5381	6015
6	Kerala	3847	5103	3012	3260	6049
7	Maharashtra	5000	5125	5792	6069	6292
8	Gujarat	2818	2502	3293	2912	3210
9	Assam	5113	5400	5632	5625	5689
10	Goa	3367	4014	2428	2732	3765
11	Pondicherry U.T.	2808	3208	2162	2196	4070
12	Div Daman	N.A.	N.A.	N.A.	N.A.	N.A.
13	All India	3709	4101	3532	3619	4492

MONTHLY AVERAGE WHOLESALE PRICES OF SEMI-HUSKED COCONUT IN INDIA

Sl.No.	State/Uts	1998-99	1999-2000	2000-01	2001-02	2002-03
1	Karnataka	3858	4179	3464	3573	4419
2	Tamilnadu	3002	3546	2390	2683	3163
3	Andhra Pradesh	3042	3082	2438	2727	2964
4	Orissa	4447	4686	4562	4598	4692
5	West Bengal	6267	6752	5573	5350	5372
6	Kerala	N.A.	N.A.	N.A.	N.A.	N.A.
7	Maharashtra	5000	5500	6500	7000	7500
8	Gujarat	2104	2360	2662	3001	3287
9	Assam	N.A.	N.A.	N.A.	N.A.	N.A.
10	Goa	3148	3815	2227	2530	3565
11	Pondicherry U.T.	3058	3315	2265	2296	4165
12	Div Daman	N.A.	N.A.	N.A.	N.A.	N.A.
13	All India	3770	4137	3565	3751	4347

MONTHLY AVERAGE WHOLESALE PRICES OF HUSKED COCONUT IN INDIA
(Rs.../Nuts)

Sl.No.	State/Uts	1998-99	1999-2000	2000-01	2001-02	2002-03
1	Karnataka	N.A.	N.A.	N.A.	N.A.	N.A.
2	Tamilnadu	3691	3763	2647	2688	3904
3	Andhra Pradesh	3529	3473	2745	2850	3131
4	Orissa	N.A.	N.A.	N.A.	N.A.	N.A.
5	West Bengal	6820	7203	7236	7508	4241
6	Kerala	3509	4723	2797	3010	3718
7	Maharashtra	5000	5500	6500	7000	7500
8	Gujarat	N.A.	N.A.	N.A.	N.A.	N.A.
9	Assam	N.A.	N.A.	N.A.	N.A.	N.A.
10	Goa	3126	3695	2207	2480	3586
11	Pondicherry U.T.	2650	3017	2021	1994	3865
12	Div Daman	N.A.	N.A.	N.A.	N.A.	N.A.
13	All India	4046	4482	3736	3933	4278

Annexure-XVII

MONTHLY WHOLESALE PRICES OF HUSKED AND UN HUSKED IN SELECTED MARKETS
(Rs...../Nuts)

Month	Trivendrapuram		Kozhikode		Tanjavur		Dinidgul		Rajamundry		Palakol	
	Un husked	Husked	Un husked	Husked	Un husked	Husked	Un husked	Husked	Un husked	Husked	Un husked	Husked
2001 – 2002												
April	2675	2425	2957	2738	2750	2700	2200	2300	2400	3200	1800	2300
May	2450	2213	2943	2725	2400	2300	2050	2150	2500	3000	1800	2300
June	2650	2400	3143	2910	2015	2150	2050	2150	2400	2800	1600	1900
July	2775	2525	3186	2950	2350	2200	2000	2100	2400	2700	1800	2800
August	2940	2640	3024	2800	2565	2575	2050	2150	2500	3500	1800	2500
Sept.	3000	2750	3078	3850	2631	2600	1950	2050	2600	3200	1600	1900
Oct.	3000	2750	3119	2888	2525	2650	2050	2150	2600	3400	1300	1900
Nov.	3270	3020	3218	2980	2700	2800	2200	2300	2500	3300	1000	1600
Dec.	3875	3600	3915	3625	2885	2950	2600	2700	2500	3200	1600	2000
Jan.	3672	3400	3915	3625	3250	3000	2800	2900	2500	3300	1600	2000
Feb.	3524	3263	3780	3500	2915	2700	2300	2400	2500	3300	1500	1900
March	3294	3050	3780	3500	2560	2600	2500	2600	2500	3300	1500	1900
Average	3094	2836	3338	3174	2629	2602	2229	2329	2492	3183	1575	2083
2002 – 2003												
April	3438	3188	5425	3100	2980	2600	2450	2550	2400	3200	1800	2300
May	3500	3250	5513	3150	2650	2700	2450	2550	2400	3100	1500	2000
June	3800	3550	5623	3213	2625	2750	2600	2700	2400	3100	1600	2000
July	4075	3825	5775	3300	2925	3000	2750	2850	2400	3100	1700	2100
August	4000	3750	5294	3025	2675	3000	3200	3300	2300	3000	2100	2800
Sept.	3975	3725	5163	2950	3125	3050	3300	3400	2400	3000	2100	2500
Oct.	3900	3660	5163	2950	3150	3100	3200	3300	2300	3000	2100	2500
Nov.	4650	4350	6108	3490	3000	2800	3300	3400	2300	3500	2200	2600
Dec.	4830	4550	6080	3453	3250	3200	3700	3800	2300	3500	2200	2400
Jan.	4750	4500	6213	3550	3450	3600	3700	3800	2400	3500	2300	3800

Feb.	5000	4800	6388	3650	3450	3900	3450	3550	2400	3600	3100	3900
March	5050	4840	6370	3640	3450	3650	3650	3750	2300	3400	3000	3800
Average	4247	3999	5760	3289	3061	3113	3146	3246	2358	3250	2142	2725

MONTHLY AVERAGE PRICE OF COCONUT (WITH HUSK) AT
THIRUVANANTHAPURAM MARKET
(Rs...../Nuts)

Months	1998	1999	2000	2001	2002
January	5000	4850	5625	2750	3750
February	4780	4630	4750	2775	3750
March	3850	4980	4000	2790	3250
April	3380	5000	3250	2667	3250
May	3750	4880	3000	2450	3125
June	3550	4380	2880	2650	3250
July	3600	4500	2550	2750	3550
August	4000	4650	2750	2940	3988
September	4000	4800	2900	3000	4000
October	4750	4800	2750	3000	N.A.
November	4750	5150	2650	3213	N.A.
December	4730	5750	2500	3750	N.A.
Average	4178	4864	3300	2895	3546

MONTHLY AVERAGE PRICE OF COCONUT (WITH HUSK)
AT QUILON MARKET
(Rs..../Nuts)

Months	1998	1999	2000	2001	2002
January	4750	4500	5375	3875	4950
February	4130	4750	4750	3963	4800
March	4000	5000	4125	3700	4800
April	4000	5000	3500	3440	4500
May	3750	5000	3500	3525	4490
June	3500	5000	3030	3600	4788
July	3500	5250	2900	3625	5000
August	3380	5750	3000	4187	N.A.
September	4000	5700	2880	4175	N.A.
October	4000	5850	2750	4250	N.A.
November	3880	6100	2750	4780	N.A.
December	4250	5750	3000	5225	N.A.
Average	3928	5304	3463	4029	4761

**MONTHLY AVERAGE PRICE OF COCONUT (WITH OUT HUSK) AT
ALAPPUZHA MARKET**

(Rs..../Nuts)

Months	1998	1999	2000	2001	2002
January	4260	4800	4825	2975	4000
February	3900	4675	4240	3690	3700
March	3675	4825	4360	3000	3730
April	3780	5060	4100	2835	3975
May	3725	4775	3940	2725	4500
June	3750	4800	3140	3040	5300
July	3800	4880	2900	3235	N.A.
August	3850	5350	3200	3000	N.A.
September	3925	5300	3520	2925	N.A.
October	4340	5370	3475	2988	N.A.
November	4300	5540	3320	3280	N.A.
December	4725	5240	2975	4100	N.A.
Average	4003	5051	3666	3149	4201

Annexure-XXI**AVERAGE MONTHLY WHOLESALE PRICES OF DRY AND TENDER COCONUT IN SELECTED
MARKETS DURING THE YEAR 2002-03**
(Rs...../Nuts)

Month	Dharmapuri				Kanyakumari				Dindigul			
	Big	Medium	Small	Tender	Big	Medium	Small	Tender	Big	Medium	Small	Tender
April	2750	2100	1575	2150	7500	5000	3100	5400	2550	2300	2000	1650
May	2650	2000	1500	2050	7650	5100	3570	5500	2550	2300	2000	1650
June	2620	2000	1500	2020	7575	5050	3535	5400	2700	2300	2000	1900
July	2750	2100	1525	2050	7500	5025	3525	5400	2850	2450	2100	1950
August	3275	2400	1700	2575	7500	5000	3500	5400	3300	2900	2400	2300
Sept.	3375	2500	1825	2675	8250	5500	3850	6000	3400	3000	2500	2400
Oct.	3400	2400	1800	2700	8025	5350	3745	6000	3400	3000	2600	2300
Nov.	3725	2725	2000	3025	7600	5075	3550	5500	3400	3000	2600	2400
Dec.	3950	2950	2225	3150	8360	5575	3900	6000	3800	3400	2900	2900
Jan.	4250	3250	2475	3450	10500	7200	5040	8000	3800	3400	2900	2850
Feb.	4700	3650	2900	4000	12500	8500	5950	8000	3550	3150	2700	2900
March	4600	3500	2775	3900	12800	8600	6020	8000	3750	3250	2850	2800
Average	3504	2631	1983	2812	8813	5915	4107	6217	3254	2871	2463	2333

**SEASONAL INDICES OF COCONUT PRICES AT SELECTED
CENTERS (Quinquennium Average 2001-05)**

Month / Year	Arsikere	Kozhikode	Kangyam
January	95.8	95.8	101.4
February	109.3	98	104.5
March	107.5	98.3	107.3
April	95.2	97.8	100.7
May	97.2	98.7	91.5
June	94	101	87.5
July	97.6	103.7	96
August	98.8	104	89.6
September	102.3	106.9	102.2
October	98.7	101.2	99.1
November	99	97.5	107.4
December	104.5	97.1	112.7
Average	100.0	100.0	100.0

MONTHLY AVERAGE PRICE OF COCONUT AT ARSIKKARE MARKET

(Rs.per 000' nuts)

Month / Year	2001	2002	2003	2004	2005	Average
January	2900	4000	4500	4891	5460	4350
February	4000	4200	5200	5481	5919	4960
March	4000	4300	4400	6048	5648	4879
April	3500	3700	4000	4897	5500	4319
May	2800	4000	3900	5629	5750	4416
June	3000	4000	4000	5393	4945	4268
July	3300	3800	4605	5370	5085	4432
August	3200	3750	4777	5690	5014	4486
September	3000	3750	5489	5731	5242	4642
October	3300	3800	5347	5324	4629	4480
November	3500	3900	5258	5231	4581	4494
December	4100	4500	4950	5500	4663	4743

MONTHLY AVERAGE PRICE OF COCONUT AT KOZHIKODE MARKET

(Rs.per 000' nuts)

Month / Year	2001	2002	2003	2004	2005	Average
January	2206	2400	3074	4277	4055	3202
February	1978	2430	3307	4798	3879	3278
March	1988	2312	3311	5165	3664	3288
April	1683	2499	3377	5155	3643	3271
May	1678	2573	3497	5250	3495	3299
June	2000	2787	3485	5078	3534	3377
July	1873	3009	3733	5332	3403	3470
August	1840	3321	3830	5291	3120	3480
September	1797	3500	3947	5416	3211	3574
October	1765	3031	4083	5121	2918	3384
November	1975	3016	4095	4824	2395	3261
December	2591	2936	4212	4146	2350	3247

MONTHLY AVERAGE PRICES OF COCONUT AT KANGAYAM MARKET

(Rs.per 000' nuts)

Month / Year	2001	2002	2003	2004	2005	Average
January	2425	2500	4220	5000	4950	3819
February	2500	2500	4688	5000	4988	3935
March	2500	2500	4763	5625	4813	4040
April	2375	2500	4575	5390	4130	3794
May	2200	2500	4050	4550	3925	3445
June	2320	2500	4000	4325	3338	3297
July	2025	3025	4000	4080	4950	3616
August	2000	3250	4192	4575	2850	3373
September	NA	3062	4600	4600	3130	3848
October	2000	3500	5063	4670	3425	3732
November	2050	3710	5438	5150	3875	4045
December	2750	4213	5438	4950	3863	4243

**AVERAGE MONTHLY WHOLESALE AND RETAIL PRICES OF TENDER COCONUT IN
SELECTED MARKETS DURING 2002-03**

(Rs.per 000' nuts)

Months	East Godavari		Kanyakumari		Junagarh		Thane	
	Wholesale	Retail	Wholesale	Retail	Wholesale	Retail	Wholesale	Retail
April	2200	3750	5400	6465	2850	3450	4000	8000
May	2300	3800	5500	6575	3000	3850	4000	8000
June	2200	3650	5400	6475	3050	3950	4000	8000
July	2200	3900	5400	6462	3000	3613	4000	8000
August	2200	4000	5400	6437	2800	3300	4000	8000
September	2200	3800	6000	7175	2800	3200	4000	8000
October	2300	3800	6000	7187	2750	3175	4000	8000
November	2300	3800	5500	6587	2750	3188	4000	7500
December	2200	3900	6000	7175	2500	3063	4000	7500
January	2300	4000	8000	9175	2500	3000	3500	7500
February	2300	3900	8000	7137	2550	3175	3500	7500
March	2300	3900	8000	9187	2600	3463	3500	8000
Average	2250	3850	6217	7170	2763	3369	3875	7833

YEARLY WHOLESALE PRICE INDEX OF COCONUT, COCONUT OIL AND COPRA

(Base Year 1993-94 = 100)

Calendar Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
COCONUT										
Index	148.3	118.2	145.9	109	94.3	121.4	146.5	155.2	138.6	126.6
COCONUT OIL										
Index	146.1	131.4	143.1	108.1	95.2	111.3	148.3	175.5	162.7	138.8
COPRA										
Index	149.9	129	144.2	105	85.9	119.3	157.5	185.8	172.8	142.7

MONTHLY AVERAGE PRICE OF COPRA IN INTERNATIONAL MARKET

(US \$ Per MT. Phil/Indo, CIF Europe)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	506	378	471	420	205	221	311	388	645	373
February	496	371	451	411	193	232	309	415	646	393
March	489	378	451	403	182	232	291	450	710	385
April	466	380	504	353	183	244	273	500	462	372
May	428	420	530	324	189	263	276	498	445	390
June	415	414	530	395	196	289	279	471	432	387
July	399	402	449	284	223	289	279	445	420	384
August	385	403	431	279	235	290	275	440	414	404
September	403	409	421	222	210	270	274	448	338	413
October	412	439	430	210	195	274	297	447	384	411
November	412	465	436	237	203	290	335	450	384	434
December	394	474	438	228	200	301	400	427	372	486
Average	434	411	462	314	201	266	300	448	471	403

DOMESTIC PRICES OF COPRA IN JAVA- INDONESIA

(US \$ per M.T)

Month	2001	2002	2003	2004	2005
January	132	217	298	318	330
February	121	228	298	336	330
March	134	221	286	365	349
April	147	220	279	393	342
May	142	223	281	402	337
June	158	236	290	361	325
July	197	233	274	363	315
August	174	241	243	377	299
September	147	244	279	372	319
October	157	247	288	357	349
November	177	255	306	312	325
December	178	258	335	358	293
Average	155	235	288	360	326

DOMESTIC PRICES OF COPRA IN PHILIPPINES

(US \$ per M.T)

Month	2001	2002	2003	2004	2005
January	143	213	291	356	396
February	127	223	275	390	367
March	126	221	264	423	371
April	133	239	246	463	394
May	140	242	255	425	367
June	154	254	258	422	361
July	188	260	256	381	328
August	183	264	249	378	301
September	172	258	253	381	303
October	160	269	282	383	322
November	181	296	311	391	308
December	187	308	355	401	279
Average	158	254	275	400	341

DOMESTIC PRICES OF COPRA IN SRILANKA

(US \$ per M.T)

Month	2001	2002	2003	2004	2005
January	409	681	682	501	803
February	358	641	644	489	851
March	337	655	543	499	792
April	327	565	504	499	714
May	355	595	518	525	727
June	384	685	496	504	674
July	430	679	491	577	592
August	521	642	495	610	555
September	510	644	499	677	526
October	486	640	482	656	NA
November	608	645	517	761	NA
December	799	671	550	810	NA
Average	460	645	535	592	693

DOMESTIC PRICES OF COPRA IN INDIA

(US \$ per M.T)

Month	2001	2002	2003	2004	2005
January	405	505	776	919	1089
February	437	491	816	NA	1101
March	426	465	800	897	956
April	399	519	770	879	866
May	410	529	745	910	817
June	432	587	705	983	808
July	430	624	778	982	752
August	439	637	829	1018	746
September	419	615	886	970	743
October	419	627	937	980	733
November	438	740	979	1074	718
December	546	751	954	1095	717
Average	433	591	831	973	837

MONTHLY AVERAGE PRICE OF MILLING COPRA AT KOZHIKODE MARKET

(Rs. per qtl.)

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4172	3369	3339	3611	2075	2589	3741	4223	4802	3117
February	4458	3094	3466	3106	2230	2555	3898	4329	4893	3244
March	3726	2942	3585	2765	2158	2458	3801	4386	4166	3142
April	3306	2866	3651	2672	1904	2577	3528	4175	3903	3140
May	3290	2639	3445	2476	1991	2591	3516	4280	3679	3260
June	3259	2764	3543	2296	2083	2902	3449	4492	3527	3026
July	3367	2825	3625	2088	2135	3136	3629	4478	3418	2987
August	3349	2826	3955	2258	2117	3031	3940	4582	3253	3251
September	3323	2948	3833	2124	2093	3072	4218	4421	3106	3373
October	3254	3262	3985	2105	2153	3123	4619	4593	3145	3373
November	3681	3268	4085	2059	2366	3700	4626	4790	3179	3555
December	3676	3489	3883	2136	2763	3660	4496	4792	3163	3624
Average	3572	3024	3700	2475	2172	2950	3955	4462	3686	3258

MONTHLY AVERAGE PRICE OF MILLING COPRA AT KOCHI MARKET

(Rs. per qtl.)

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4065	3201	3212	3240	1914	2452	3610	4151	4900	3119
February	4238	2889	3329	2836	2063	2387	3793	NT	4954	3298
March	3623	2737	3401	2576	2012	2260	3720	4050	4303	3178
April	3349	2753	3567	2493	1885	2521	3583	3971	3897	3139
May	3241	2597	3338	2378	1935	2568	3465	4112	3679	3210
June	3268	2746	3411	2277	2040	2852	3280	4442	3639	3197
July	4905	2718	3359	2081	2031	3034	3619	4437	3383	3040
August	3270	2746	3634	2171	2072	3097	3856	4600	3358	3268
September	3294	2939	3603	2066	1981	2986	4119	4382	3344	3396
October	3149	3254	3785	1900	1979	3047	4357	4427	3297	3648
November	3493	3153	3800	1994	2068	3598	4552	4851	3233	3620
December	3470	3360	3635	2009	2577	3648	4438	4948	3228	3639
Average	3614	2924	3506	2335	2046	2871	3866	4397	3768	3313

MONTHLY AVERAGE PRICE OF MILLING COPRA AT ALLEPPEY MARKET

(Rs. per qtl.)

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4289	3358	3450	3746	2140	2588	3744	4070	4788	3150
February	4468	3068	3519	3142	2227	2555	3925	4143	4851	3272
March	3827	2807	3564	2838	2154	2470	3833	4253	4032	3070
April	3386	2820	3689	2732	2011	2544	3700	4111	3851	3120
May	3288	2631	3473	2608	1997	2577	3537	4267	3625	3095
June	3256	2785	3536	2335	2135	2891	3391	4608	3584	3088
July	3368	2812	3559	2168	2207	3241	3673	4577	3466	2992
August	3330	2877	3918	2274	2178	3140	3914	4705	3410	3231
September	3330	2931	4030	2271	2086	3163	4144	4497	3179	3337
October	3233	3259	4161	2194	2176	3176	4524	4697	3177	3337
November	3570	3201	4328	2175	2312	3738	4724	4875	3183	3656
December	3640	3475	4092	2225	2728	3745	4457	4893	3187	3680
Average	3582	3002	3777	2559	2196	2986	3964	4475	3694	3252

MONTHLY AVERAGE PRICE OF MILLING COPRA AT KANGHYAM MARKET

(Rs. per qtl.)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	3900	3246	3290	N.A	2250	2625	3650	4347	4788	3025
February	4500	2945	3350	3300	2125	2600	3825	4233	4725	3238
March	3800	2825	3438	2780	2125	2600	3759	4375	4225	3210
April	3550	2790	3475	2550	1919	2553	3759	4136	3700	3125
May	3656	2650	3513	2275	1695	2572	3454	4140	3263	3113
June	3538	2638	3475	2230	1756	2831	3525	4415	3050	2840
July	3474	2700	3435	3613	1663	2941	3734	4379	3190	NA
August	3455	2725	3650	2075	2000	2975	3837	4438	3213	2838
September	3200	2800	3675	2180	N.A	2975	4200	4426	3150	3060
October	3350	3060	3820	2225	1851	2988	4480	4421	3150	3463
November	3475	3175	4093	2213	2694	2915	4499	4496	2938	3463
December	3468	3288	3970	2155	2563	3581	4419	4572	3175	3400
Average	3614	2904	3599	2509	2058	2846	3928	4365	3471	3161

MONTHLY AVERAGE PRICE OF MILLING COPRA AT MANGLORE MARKET

(Rs. per qtl.)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	NA	3650	3266	3853	2110	2598	3759	4719	5120	3275
February	NA	3289	3369	3560	2089	2552	3809	4525	5150	3476
March	NA	3241	3365	3000	1978	2601	3690	4657	5000	3600
April	NA	3250	3539	2900	1751	2610	3685	4501	5401	NA
May	NA	3000	3546	3050	1807	2550	3670	4750	5250	NA
June	NA	3000	3430	2280	1996	2550	3660	4828	4350	NA
July	NA	2736	3478	2200	1900	3000	3525	4480	3500	NA
August	3000	2550	3600	2020	1850	3000	3714	4451	3400	NA
September	3250	2736	3620	2363	2004	3096	3500	4465	3100	NA
October	NA	3165	3680	1820	2011	3262	4511	4701	3200	NA
November	NA	3112	4006	2048	2352	3818	4602	4576	3100	NA
December	3900	3266	3881	2201	2529	3660	4510	4800	3450	NA
Average	3383	3083	3565	2608	2031	2941	3886	4621	4168	3450

MONTHLY AVERAGE PRICE OF MILLING COPRA AT ALAPUZHA MARKET

(Rs. per qtl.)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4400	3358	3450	3746	2131	2586	NA	4070	4788	3103
February	4260	3068	3519	3142	2227	2557	NA	4143	4851	3273
March	3430	2807	3564	2838	2155	2466	NA	4253	4032	3070
April	3500	2820	3689	2732	2004	2587	3575	4111	3851	NA
May	3120	2631	3473	2608	1998	2678	3450	4267	3625	NA
June	3550	2788	3526	2335	2137	3009	3403	4608	3584	NA
July	3350	2812	3559	2168	2031	3240	3673	4577	3466	NA
August	3280	2878	3918	2274	2156	3180	3914	4705	3410	NA
September	3300	2931	4030	2275	2085	3167	4144	4497	3179	NA
October	3420	3259	4161	2194	2171	3219	4524	4697	3177	NA
November	3980	3201	4328	2175	2312	3803	4724	4815	3183	NA
December	3900	3475	4093	2225	2728	3745	4420	4855	3187	NA
Average	3624	3002	3776	2559	2178	3020	3981	4467	3694	3149

MONTHLY AVERAGE PRICE OF BALL COPRA AT KOZHIKODE MARKET

(Rs. per qtl.)

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4502	4740	3705	4367	2400	3011	3750	4783	6009	4996
February	4676	4454	3683	3948	2325	2916	3636	5002	5757	4506
March	4682	4173	3516	3767	2105	2862	3528	4850	5400	3986
April	5092	3751	3671	3624	1895	2742	3704	5030	5744	NA
May	5594	3423	3671	3337	2084	2878	3805	5666	5783	NA
June	5680	3493	3780	3554	2060	3435	4006	5776	5864	NA
July	5540	3582	4032	3428	2223	3419	3915	5757	5948	NA
August	5496	3529	4098	3648	2200	3538	4149	5870	5902	NA
September	5308	3623	4070	3578	2190	3668	4909	6304	5772	NA
October	5355	3930	4632	3317	2520	4206	5279	6492	6160	NA
November	5004	3868	4715	2910	2836	4336	5207	6567	5712	NA
December	4763	3846	4605	2825	3248	3942	5148	5988	5416	NA
Average	5141	3868	4015	3525	2341	3413	4253	5674	5789	4496

MONTHLY AVERAGE PRICE OF BALL COPRA AT TIPTUR MARKET

(Rs. per qtl.)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4300	5000	4000	4300	3100	3200	4100	5700	7390	7164
February	4300	5000	3950	4200	3200	3000	4000	5800	7249	6739
March	4550	5500	4100	3900	1700	3100	3800	5700	6977	5835
April	4700	5200	4000	3800	2400	2800	3900	5500	6987	5308
May	5100	5500	4300	3700	2200	3000	3700	6300	7034	4733
June	5300	5300	3800	3600	2300	3800	3900	6200	6921	4536
July	5000	4800	3800	3600	1400	3700	4035	6000	7072	4541
August	5100	4200	3750	3600	2200	3600	4460	6025	7405	4538
September	5000	3800	3600	3600	2200	3600	4980	7100	7506	4719
October	5300	4000	3600	3550	2300	4400	5275	7275	7485	4645
November	5400	4000	3600	3500	2700	4400	5315	7416	7539	4090
December	5000	3800	3650	3500	3200	4400	5595	7500	7292	4091
Average	4921	4675	3846	3738	2408	3583	4422	6376	7238	5078

MONTHLY AVERAGE PRICE OF BALL COPRA AT ARISEKERE MARKET

(Rs. per qtl.)

Month / Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4740	5550	4250	4200	3000	3050	3950	5100	7760	7503
February	5100	5000	4000	4100	3010	3200	3800	5350	7846	7081
March	4200	5000	4100	3800	2770	3550	3750	5500	7111	6139
April	4600	NA	3850	4000	2350	2850	3800	5594	7709	NA
May	5000	4450	3750	3700	2100	3400	3600	6156	7455	NA
June	5050	4200	3650	3600	2050	3600	3750	6343	7253	NA
July	5300	4150	3550	3600	2300	3600	3500	6165	7624	NA
August	5500	3875	3650	3650	2050	3550	4500	6536	7810	NA
September	5400	3253	3575	3600	2100	3700	4800	7440	8023	NA
October	5020	7515	4300	3400	2500	3900	5000	7835	8001	NA
November	5100	3250	4500	3400	2850	4100	5200	7961	7965	NA
December	5300	5888	4500	3250	3250	4000	5300	7891	7796	NA
Average	5026	4739	3973	3692	2528	3542	4246	6489	7696	6908

MONTHLY AVERAGE PRICE OF EDIBLE GRADE COPRA (DILPASS GRADE)
AT KOZHIKODE MARKET

(Rs. per qtl.)

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4317	3611	3564	3888	3048	2776	4239	4386	4946	3315
February	4626	3282	3604	3335	2393	2734	3971	4489	5013	3373
March	3930	3078	3722	2988	2287	2595	3925	4555	4363	NA
April	3633	3066	3880	2818	2058	2720	3761	4363	4118	NA
May	3813	2950	3786	2755	2133	2771	3662	4461	3881	NA
June	3760	3104	3824	2648	2238	3102	3592	4640	3758	NA
July	3782	3200	3857	2393	2296	3296	3745	4627	3617	NA
August	3694	3202	4112	2462	2301	3183	4061	4713	3500	NA
September	3546	3218	4028	2286	2205	3217	4385	4549	3330	NA
October	3482	3514	4178	2328	2221	3254	4828	4717	3301	NA
November	3898	3446	4273	2325	2537	3829	4839	5034	3322	NA
December	3921	3644	4104	2350	2996	3810	4675	4933	3315	NA
Average	3867	3276	3911	2715	2393	3107	4140	4622	3872	3344

MONTHLY AVERAGE PRICE OF EDIBLE GRADE COPRA (RAJPUR GRADE)
AT KOZHIKODE MARKET

(Rs. per qtl.)

Month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	4800	4806	3907	4610	2454	3245	4238	5322	6574	4880
February	4875	4435	3822	4131	2422	3171	4076	5495	6352	4528
March	4883	4231	3718	3902	2207	3073	3928	5292	5957	NA
April	5181	3888	3830	3796	1987	3011	4094	5495	6219	NA
May	5928	3615	3909	3501	2192	3163	4211	6161	6224	NA
June	5949	3701	4022	3766	2178	3779	4063	6269	6295	NA
July	5844	3818	4294	3730	2369	3860	4352	6353	6384	NA
August	5790	3785	4351	3898	2366	4251	4639	6430	6355	NA
September	5611	3925	4295	3813	2347	4148	5442	6992	6238	NA
October	5698	4192	5039	3516	2705	4691	5854	7313	6796	NA
November	5378	4089	4905	3242	3118	4809	5820	7469	6090	NA
December	5098	4122	4916	2941	3528	4405	5755	6724	5860	NA
Average	5420	4051	4251	3737	2489	3795	4706	6276	6279	4704

MONTHLY WHOLESALE PRICE INDEX OF COPRA

(Base Year 1993-94 = 100)

Month / Year	January	February	March	April	May	Jun	July	August	September	October	November	December
1997	173.1	173.7	152.6	138.7	141.3	141.2	146	143.4	144.1	139.9	151.7	153.5
1998	147.2	136.7	127.1	126.4	118.4	122.1	120.4	120.2	122.7	135	132.4	139.6
1999	136.1	139.1	140.8	144.5	139.3	138.1	138.6	145.6	147	155.6	151.6	154.2
2000	144.8	124	115	110.9	106.5	99	93.4	96.6	94.1	91.3	91.4	92.7
2001	87.8	90.7	87.3	79.3	77.3	81.9	82.6	81.5	81	82.8	89.6	108.7
2002	104.4	103.7	101.9	105	105	116.9	128.1	124.1	123.7	128.1	143.8	147.3
2003	146.3	150.6	147.2	144.3	138.1	134.7	143.4	156.1	174.8	182.6	190.8	181.5
2004	170.6	169.8	173.3	170.6	174.2	187.8	185.5	191.8	188.7	199.4	207.8	210.6
2006	152.2	154.7	143.6	139.6	136.7	135.7	133.2	140.3	142.6	147.3	144	143.1

INTERNATIONAL VEGETABLE OIL PRICES

(US \$ per M.T)

Year	Soyabean				Cottonseed		Sunseed		Peanut		Palm	Canola	Coconut	Corn
	U.S.	Brz	Arg	Rott	U.S.	Rott	U.S.	Rott	U.S.	Rott	Malay	Rott	Rott	U.S
1-Oct	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1996/97	496	515	564	588	564	588	499	545	963	959	526	539	693	530
1997/98	569	608	614	633	636	693	595	730	1080	964	601	637	625	638
1998/99	438	452	453	483	602	632	444	560	876	801	486	482	748	558
1999/00	344	328	332	356	474	496	363	413	780	744	309	359	539	393
2000/01	311	295	295	336	352	428	350	428	768	685	235	372	323	299
2001/02	363	376	376	412	396	445	513	587	716	659	329	451	388	422
2002/03	486	489	491	534	832	883	731	592	1024	1139	421	588	449	621
2003/04	661	567	542	633	688	752	738	663	1317	1178	481	670	630	625
2004/05	507	466	471	545	609	649	962	703	1711	1102	392	660	636	614
2005/06	516	474	467	573	649	669	832	635	981	931	416	770	583	555
2006/07	604	605	607	680	670	692	NA	709	1105	1143	532	810	702	599

INTERNATIONAL PRICE OF COCONUT OIL

(Us \$ Per MT, Cif Rotterdam)

MONTH	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	768	558	763	654	319	362	494	573	645	569
February	768	559	745	591	285	376	477	642	646	591
March	737	578	700	552	289	366	441	685	710	575
April	710	618	827	550	293	411	421	736	679	578
May	654	723	874	481	295	240	440	749	648	583
June	637	652	796	437	317	446	459	658	639	575
July	597	667	656	400	358	445	439	669	606	583
August	567	667	684	371	363	443	421	627	553	606
September	615	652	704	332	323	410	431	657	521	609
October	627	695	690	340	307	343	487	642	577	626
November	616	752	703	367	330	457	515	659	659	656
December	586	774	715	329	330	482	583	652	657	732
Average.	657	658	738	450	317	398	467	662	628	607

INTERNATIONAL PRICE OF SELECTED VEGETABLE OILS

(Price : US \$ Per MT)

Sl. No.	Year	Soyabean oil Dutch Fob	Palm Oil Phil / Indo, Cif Rott	Sunflower Oil Cif Europe	Palm Kernel Oil Cif Europe	Coconut Oil Cif Europe
1.	1992-93	432	400	585	519	513
2.	1993-94	518	373	642	462	483
3.	1994-95	634	597	675	639	623
4.	1995-96	596	592	566	687	693
5.	1996-97	548	542	628	738	760
6.	1997-98	591	566	687	616	609
7.	1998-99	590	649	479	712	701
8.	1999-00	395	382	388	666	704
9.	2000-01	325	287	524	367	375
10.	2001-02	369	306	524	316	336
11.	2002-03	493	418	597	445	446
12.	2003-04	600	463	623	495	508
13.	2004-05	545	392	703	416	636

Source : APCC Year Book, 2002

DOMESTIC PRICES OF COCONUT OIL IN INDIA

(Rs.per qtl.)

MONTH	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	6139	4816	4978	4965	2831	3706	5451	6306	7280	4536
February	6410	4350	5174	4287	3079	3604	5709	NT	7198	4965
March	5428	4090	5292	3832	3013	3398	5543	6193	6199	4753
April	5031	4164	5565	3691	2848	3801	5361	5985	5763	4735
May	4844	3869	5188	3360	2963	3874	5177	6219	5394	4851
June	5018	4102	5319	3226	3118	4323	5037	6736	5539	4853
July	5016	4050	5223	3016	3110	4607	5536	6740	5212	4566
August	4957	4140	5647	3176	3169	4716	5886	7009	5154	4810
September	4951	4433	5589	2997	3020	4554	6286	6680	5125	5073
October	4742	4886	5883	2867	3018	4637	6664	6753	4862	5510
November	5308	4725	5888	2964	3153	5476	6950	7077	4864	5462
December	5261	5215	5600	2981	3911	5525	6754	7224	4765	5474
Average	5259	4403	5446	3447	3103	4352	5863	6629	5613	4966

MONTHLY AVERAGE PRICE OF COCONUT OIL AT KOCHI MARKET

(Rs.per qtl.)

MONTH/YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	6139	4816	4978	4965	2831	3706	5451	6306	7280	4536
February	6410	4350	5174	4287	3079	3604	5709	NT	7198	4965
March	5428	4090	5292	3832	3013	3398	5543	6193	6199	4753
April	5031	4164	5565	3691	2848	3801	5361	5985	5763	4735
May	4844	3869	5188	3360	2963	3874	5177	6219	5394	4851
June	5018	4102	5319	3226	3118	4323	5037	6736	5539	4853
July	5016	4050	5223	3016	3110	4607	5536	6740	5212	4566
August	4957	4140	5647	3176	3169	4716	5886	7009	5154	4810
September	4951	4433	5589	2997	3020	4554	6286	6680	5125	5073
October	4742	4886	5883	2867	3018	4637	6664	6753	4862	5510
November	5308	4725	5888	2964	3153	5476	6950	7077	4864	5462
December	5261	5215	5600	2981	3911	5525	6754	7224	4765	5474
Average	5259	4403	5446	3447	3103	4352	5863	6629	5613	4966

MONTHLY AVERAGE PRICE OF COCONUT OIL AT ALEPPEY MARKET

(Rs.per qtl.)

MONTH/YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	5962	4886	4947	4963	2830	3710	5450	6347	7285	4544
February	6393	4450	5144	4313	3104	3605	5691	6203	7207	4952
March	5520	4094	5326	3820	3016	3418	5579	6160	6188	4763
April	5034	4177	5577	3668	2886	3693	5355	5997	5778	4729
May	4840	3867	5178	3356	2975	3721	5204	6190	5438	4839
June	5054	4091	5317	3229	3122	4166	4995	6733	5557	4883
July	4837	4035	5212	2999	3086	4612	5527	6733	5208	4558
August	4957	4150	5625	3188	3177	4709	5864	7004	5158	4823
September	4926	4373	5597	2985	3019	4562	6271	6699	5131	5096
October	4714	4900	5886	2843	3017	4597	6668	6750	4855	5096
November	5317	4773	5895	2956	3137	5455	6950	7056	4871	5533
December	5232	5236	5631	2980	3908	5545	6749	7210	4794	5483
Average	5232	4419	5445	3442	3106	4316	5859	6590	5623	4942

MONTHLY AVERAGE PRICE OF COCONUT OIL AT KOZHIKODE MARKET

(Rs.per qtl.)

MONTH/YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	6425	5030	5065	5466	3090	3909	5562	6352	7184	4703
February	6714	4592	5276	4698	3287	3787	5833	6448	7342	4,885
March	5569	4394	5394	4164	3277	3651	5739	6359	6323	4730
April	5027	4324	5614	3951	3020	3903	5464	6241	6113	4749
May	4874	3974	5300	3754	3023	3944	5259	6477	5568	4709
June	5249	4230	5425	3612	3240	4434	5181	6838	5546	4836
July	5242	4323	5504	3291	3313	4854	5936	6793	5296	4657
August	5089	4340	5989	3394	3406	4763	5933	7040	5154	5151
September	5000	4495	5784	3201	3247	4690	6250	6633	4907	5197
October	4857	5013	5904	3084	3231	4604	6874	6923	4772	5197
November	5436	4926	5978	3149	3498	5535	6945	7196	4780	5482
December	5453	5374	5820	3139	4151	5512	6689	7158	4756	5474
Average	5411	4585	5588	3742	3315	4466	5975	6705	5976	4981

MONTHLY AVERAGE PRICE OF COCONUT OIL AT KANGAYAM MARKET

(Rs.per qtl.)

MONTH/YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	6933	5033	5733	6417	3133	3867	5667	6427	7250	4692
February	7333	4559	5967	5550	3133	3867	5734	6333	7768	5017
March	6408	4267	6100	5306	3133	4053	5900	6450	7400	5013
April	5667	4292	6100	4133	3333	4000	5467	6220	6907	5000
May	5934	4000	6267	4000	3433	4000	5467	6350	6383	5042
June	6067	4167	6267	3794	3533	4000	5333	6592	5650	5387
July	6067	4747	6160	4000	3533	4608	5417	6640	5227	NA
August	5947	5233	6283	3901	3559	4800	5734	6700	4967	5284
September	6381	5333	6533	3587	3600	4830	6000	6684	5433	5507
October	5871	5333	6334	3200	3684	4800	6400	6567	4798	5734
November	5784	5066	7050	3634	3613	4880	6600	6649	4667	5867
December	5717	5499	7200	3120	4017	5358	6533	6733	4625	5906
Average	6176	4794	6333	4220	3475	4422	5854	6529	5923	5314

MONTHLY WHOLESALE PRICE INDEX OF COCONUT OIL

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1997	157.9	162	155.9	147.9	146.7	137.8	139.9	135.6	139.1	136.5	144.2	149.9
1998	145.3	134.3	132.4	128.2	124.8	125.7	126.7	128.8	130	134.4	131.9	134.3
1999	133.7	136.6	138.2	143.4	141.4	140.8	138.4	143.3	143.6	151.2	154	152.1
2000	148.9	131.8	121.7	116.1	102.9	98.4	95.6	94.4	94.7	97.1	98.1	97.7
2001	95.7	96.6	97.3	93.6	93.7	92.7	94.4	94.6	94	93.3	92.3	104
2002	101.1	94.9	92	100.8	103.9	109.1	115.5	115.4	114.5	114.7	132.1	141.6
2003	138.9	137.4	135.1	133.8	135.6	137.2	141.9	148.2	162.8	166.2	170.5	172.1
2004	168.2	166.3	171.1	172.4	174.6	176.1	179.5	181.2	178.2	175.6	179.7	182.8
2005	183.6	185	177.2	170.8	163.6	166.3	161.1	158	155.3	150.6	144.5	136.4
2006	132.2	135.9	133.2	131.8	134.6	138.2	134.1	137.2	140.8	147.6	149.6	150.8
2007	149.1	147	139.6	138.8	140.4	137.8	140.2	140.6	N.A	N.A.	N.A.	N.A.

YEARLY WHOLESALE PRICE INDEX COCONUT OIL

Calendar Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Index	146.1	131.4	143.1	108.1	95.2	111.3	148.3	175.5	162.7	138.8

SEASONAL INDICES OF COCONUT OIL PRICES AT SELECTED CENTRES

	Kochi	Aleppey	Kozhikode	Kangayam
January	89.46	99.12	99.11	98.54
February	96.99	101.07	101.64	101.13
March	95.78	95.69	96.79	101.43
April	93.79	93.44	94.9	98.2
May	93.73	93.21	93.26	97.4
June	97.44	96.77	96.79	96.82
July	97.99	97.66	98.93	96.86
August	101.19	100.99	101.19	98.56
September	101.17	101.13	99.51	101.76
October	103.50	101.8	101.7	101.53
November	108.56	108.42	107.6	101.01
December	110.77	110.69	108.5	105.32
Average	100	100	100	100

SEASONAL VARIATIONS OF COCONUT OIL PRICES

(Rs.per qtl.)

	Kochi Market	Aleppey Market	Kozhikode Market	Kangayam Market	Indian average	Percentile diff.
January	5018	5028	5133	5173	5018	100
February	4911	5127	5264	5309	4911	98
March	4850	4854	5013	5325	4850	99
April	4749	4740	4915	5155	4749	98
May	4746	4728	4830	5113	4746	100
June	4934	4909	5013	5083	4934	104
July	4962	4954	5124	5085	4962	101
August	5124	5123	5241	5174	5124	103
September	5123	5130	5154	5342	5123	100
October	5241	5164	5267	5330	5241	102
November	5497	5500	5573	5379	5497	105
December	5609	5615	5623	5529	5609	102

INTERNATIONAL: MONTHLY PRICES OF COPRA MEAL

(US \$ per MT, Phil/Indo. CIF Hamberg)

MONTH	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	157	112	115	100	97	102	92	84	103	NA
February	150	109	111	96	94	108	119	87	91	NA
March	138	105	110	92	84	100	114	94	96	NA
April	140	98	111	86	84	105	106	98	96	84
May	132	98	NA	86	94	107	103	96	86	93
June	121	101	NA	85	96	107	NA	83	80	NA
July	112	101	NA	79	95	105	NA	92	80	NA
August	110	92	101	78	99	105	NA	84	72	NA
September	116	NA	104	82	101	104	NA	80	67	NA
October	117	NA	NA	84	98	112	NA	80	NA	NA
November	117	112	100	86	93	114	NA	74	NA	130
December	118	117	NA	94	93	111	NA	73	NA	NA
Average.	127	105	107	87	94	107	107	85	86	102

AVERAGE MONTHLY WHOLESALE PRICE OF COCONUT OIL CAKE

(Rs.per quintal)

MONTH	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	999	854	860	963	753	850	1000	1200	1250	900
February	996	846	851	906	750	850	1024	1200	1246	900
March	994	820	858	879	780	850	1050	1231	1200	900
April	947	816	881	898	750	849	1050	1250	1200	879
May	934	800	871	853	702	850	1050	1250	1127	850
June	819	818	849	819	700	850	981	1244	968	850
July	810	821	849	745	705	850	950	1179	861	850
August	820	802	885	699	704	822	948	1150	850	850
September	853	806	912	721	700	800	1000	1106	850	850
October	845	812	946	741	700	800	1032	1100	855	895
November	837	813	976	772	700	884	1183	1174	875	900
December	864	831	989	799	839	1040	1200	1240	899	921
Average.	893	820	894	816	732	858	1039	1194	1015	879

MONTHLY AVERAGE PRICE OF COCONUT OIL CAKE AT KOCHI MARKET

(Rs.per quintal)

MONTH	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	NA	814	810	950	750	850	NA	1200	1250	900
February	NA	800	810	936	750	850	1017	NT	1243	900
March	NA	814	812	903	750	850	NA	1231	NA	900
April	NA	826	830	901	738	850	1050	1250	NA	879
May	NA	810	818	882	662	850	NA	1250	1119	854
June	NA	796	810	846	700	850	NA	1241	964	850
July	NA	800	821	751	700	850	950	1177	858	850
August	NA	775	856	750	654	800	NA	NA	850	850
September	NA	750	860	750	700	800	1001	1104	850	850
October	NA	761	897	750	700	800	1028	1173	854	NA
November	NA	775	929	713	702	875	1186	875	874	897
December	797	789	950	747	841	NA	NA	1241	900	924
Average.	797	793	850	823	721	839	1039	1174	976	878

MONTHLY AVERAGE PRICE OF COCONUT OIL CAKE AT ALAPPUZHA MARKET

(Rs.per quintal)

MONTH	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	NA	900	895	990	900	1000	NA	1200	1217	944
February	NA	900	936	950	900	1000	1050	1200	1250	950
March	NA	884	1000	950	900	1000	NA	1200	NA	948
April	NA	850	1000	950	900	1000	1050	1200	NA	940
May	NA	850	1000	941	900	900	NA	1200	1200	950
June	NA	833	1000	900	900	900	NA	1200	1080	950
July	NA	850	935	771	850	900	952	1190	970	912
August	NA	850	900	750	855	NA	NA	NA	950	900
September	NA	850	900	750	850	900	1036	1113	950	900
October	NA	850	915	750	813	900	1050	NA	950	NA
November	NA	850	1000	756	802	857	1189	1195	950	946
December	921	860	1000	832	939	NA	NA	1200	947	1100
Average.	921	861	957	858	876	936	1055	1190	1046	949

MONTHLY AVERAGE PRICE OF COCONUT OIL CAKE AT KOZHIKODE MARKET

(Rs.per quintal)

MONTH	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
January	NA	825	895	1000	675	871	NA	1837	1241	950
February	NA	875	864	921	675	854	1084	1240	1256	950
March	NA	900	850	875	696	875	NA	1246	NA	950
April	NA	818	884	750	697	771	1114	1217	NA	928
May	NA	784	888	714	718	750	NA	1176	958	838
June	NA	810	830	764	715	850	NA	1222	950	848
July	NA	822	819	715	677	750	1047	1140	941	813
August	NA	743	911	650	655	750	NA	NA	853	779
September	NA	779	932	700	650	NA	1020	1101	840	930
October	NA	819	1013	620	670	871	1175	NA	959	NA
November	NA	819	1084	621	791	1010	1182	1278	985	1032
December	893	852	1064	675	854	NA	NA	1310	953	1157
Average.	893	821	920	750	706	835	1104	1277	994	925

SEASONAL INDICES OF COCONUT OIL CAKE PRICES AT SELECTED CENTRES

(for the Quinquennium 2001-2005)

Month	Kochi	Alappuzha	Kozhikode	Average
January	110.46	107.04	120.54	100
February	105.23	107.14	109.7	100
March	102.94	102.48	97.91	100
April	106.00	102.98	99.06	100
May	105.98	104.17	93.85	100
June	83.32	101.19	97.39	100
July	98.91	96.43	95	100
August	83.75	89.58	78.52	100
September	97.16	96.23	94.16	100
October	99.34	92.06	95.83	100
November	98.36	99.1	109.38	100
December	108.40	102.08	108.34	100

AVERAGE PRICE SPREAD OF COCONUT TRADING IN ORISSA

(Rs. Per '000' nuts)

Particulars share/cost/margin/ Price	Regulated market	Un-regulated market.
Producers net share in consumers rupee	2145.67 (53.64)	2063.33 (51.55)
Expenses of Village Merchant itinerant	33.83 (0.85)	22.50 (0.56)
Expenses of Wholesaler-I	294.90 (7.37)	324.20 (8.10)
Expenses of Wholesaler-II	212.57 (5.31)	202.57 (5.06)
Expenses of retailer	175.93 (4.40)	167.83 (4.19)
Total Marketing Cost.	717.23 (17.93)	717.10 (17.91)
Margin of Village merchant	53.93 (1.35)	49.50 (1.24)
Margin of Wholesaler-I	311.90 (7.80)	401.17 (10.02)
Margin of Wholesaler-II	225.80 (5.64)	225.60 (5.64)
Margin of retailer	545.47 (13.64)	546.00 (13.64)
Total Marketing Margin	1137.10 (28.43)	1222.27 (30.54)
Consumer Price	4000.00 (100.00)	4002.67 (100.00)

COCONUT YIELD PER ANNUM IN INDIA

Sl. No.	Name of State	Per Palm Per Annum	Per Hector Per Annum	Yield for Hybrid Palm per H.P.A.
1	Tamil Nadu	55 – 200	9625 – 22750	
2	Pondichery	100	- 17500	
3	Kerala	60 – 100	5000 – 9000	
4	Andhra Pradesh	80 – 100	7500 – 12000	19000
5	Karnataka	35 – 40	- 6000	
6	Gujarat	75 – 200	5000 – 12000	12000 – 30000
7	Due	40 – 60	-	
8	Daman	30 – 75	-	
9	Assam	75 – 78	6500 – 7500	
10	West Bengal	--	- 5580	
11	Orissa	- 40	-	
12	Maharashtra	55 – 100	6500 – 7300	
13	Goa	- 29	- 5000	125 Million Nut
14		30 – 200	5000 – 22750	

STATE LEVEL INFORMATION (CULTIVATION)

Sl. No.		Name of State		
		Tamil Nadu (1)	Pondichery (2)	Kerala (3)
1.	Variety – Type grown Tall – Dwari – Hybrid	COD/WCT Chandra Shankara ECT/DG (UH-C-1) ECT/MYD (UH/C-2)	East Coast Tall	West Coast Tall TXD, DXT COD/WCT (Chandra Shankara). E.O./COD (Chandra Laksha). 15.1 Cm. to 36.7 Cm. A.O./G.B. Annual Ganga. WCT/GB Kera Ganga. WCT/COD Kera Shankara. L.O./GB Laksha Ganda. WCT/MYD Kera Suree. WCT X SS Kera Saughagya.
2.	Average Rain fall (cms)	69 to 110 cm.	Upto 120 cm.	15.1 cm. to 36.7 cm.
3.	Temperature range in °C Humidity	2000 hours or more for year 120 hours of sum shine per month RH – 20 % to 91 %	17.0 °C to 41.0 °C (RH) 65 to 83 %	23 °C to 37 °C 60 to 75 %
4.	Type of soil	Red loamy, Black cotton soil Alluvial, Sandy & Loam	Red loam, Black cotton, Sandy to Sandy loam.	Coastal sandy, Laterite, loamy Alluvial, River Alluvial.
5.	Method of Cultivation Nursery Technique/ Nursery. Paly-bag	Nursery	Nursery	Nursery
6.	Transplanting Practice – I. Planting Distance – Tall Dwarf Hybrid II. Method of Planting – Square/Triangular III. Technique of Planting.	7.5 x 7.5 mtr. -- -- Square / System. 1x1x1 mtr. Pit.	7.5 x 7.5 mtr. -- -- Square / System. 1x1x1 mtr. Pit.	7.6 x 9.0 mts. Square / System. 1x1x1 mtr. Pit.
7.	Maintenance practice followed for adult plantation. I. Manuring of adult palms. II. Fertilizer treatment given to Palms in the area. III. Organic manures used. IV. Green Manures used. V. Intercultivation in practice.	Compost 50 to 60 kg. Urea – 1300 kg. NPK 1 to 3 kg. Super Phospet – 2kg. Potash 2 kg. Compost 10 to 50 kg. Sun Hemp, Neem. Black Gram, Groundnut, Gingelly, Banana, Jawar, Pulses, Cocoa.	Farm Yard – 50 kg. Urea – 1.5 kg. Super phospet 2.00, mop 2 kg. Compost. Pulses. Ragi, Paddy.	Fertilizer and manure are applied. NPK 0.34 to 0.5, 0.17 to 0.30 K – 0.68 to 1.000 kg. Cattle manure 10 to 50 kg. Wild green leaves, Sun hemp. Tapica, Sweet Potato, Yam ginger, Turmeric, Pulses, Banana, Pineapple, Veg.
8.	Cover cropping followed in coconut gardens.	N.A.	Ragi, Paddy less than 10 years old palm.	Mango, Jack fruits.

Sl. No.		Name of State			
		Andhra Pradesh. (4)	Karnataka (5)	Gujaratq (6)	Diu (7)
1.	Variety – Type grown Tall – Dwari – Hybrid	East Coast Tall. Ect x GB (Godawari Ganga) WCT x COD (Kera Sankara)	West coast Tall. Tall & Dwarf COD x WCT Chandra Shankar LO x COD Chandra Laksha	West Coast Tall Hybrid – TDX, DXT	West Coast Tall TDX, DXT
2.	Average Rain fall (cms)	100 to 225 cm.	70 to 80 cm.	47 cms. To 300 cms.	43.3 to 69.1 cms.
3.	Temperature range in °C Humidity	27 °C RH 1000 M.	27 °C -	21 to 47 °C Humidity – 12 to 90	35 to 38 °C 60 &
4.	Type of soil	Costal allivium, Red soil, Black allivium, sowdy.	Costtal allivium, Red soil	Read loomy, Black	Grayish brown sandy.
5.	Method of Cultivation Nursery Technique/ Paly-bag Nursery.	Sand bed Nursery Technique	Nursery Technique.	Nursery Technique.	Nursery Technique.
6.	I. Transplanting Practice – Tall Dwarf Hybrid II. Method of Planting – Square/Triangular III. Technique of Planting.	7.5 x 7.5 to 8 x 10 mtr. Square. 3 x 3 x 3 foot pits.	7.5 x 7.5 to 10 x 10 Square. 3 x 3 x 3 foot pits.	7.5 x 7.5 mtrs. 7.0 x 7.0 mtr. Square. 1 x 1 x 1 mtr. Pit.	4 x 4 mtr. 4 x 4 mtr. Square. 1 x 1 x 1 mtr. Pit.
7.	Maintenance practice followed for adult plantation. I. Manuring of adult palms. II. Fertilizer treatment given to Palms in the area. III. Organic manures used. IV. Green Manures used. V. Intercultivation in practice.	Compost 10 kg. per Tree. DPK 1 kg., Uria 1.5 kg., Phosphates 2.5 kg. 160 Varmi compost. Dhamicha, Green Manure. Ploughing weeding.	50 kg. per palm manuring. 2 to 3 kg. of NPK given two times. Farm yard manure. Sun hemp, horse grass, green manure. Ploughing weeding.	-- UREA NPK AMMO PH 2.00 kg 1.5 kg 1.00 kg 1.25 kg -- Sun hemp. Ploughing weeding.	-- Ammo Su fasp Potesh 1.0 kg 1.0 kg. 1.0 kg. -- -- Ploughing.
8.	Cover cropping followed in coconut gardens.	Green gram, Sun hems, Dhamicha, Capalgomium.	Turmeric, Ginger, Banana, Vegetables, Coco, Ragi, Jawar.	Groundnut, Gram, Vegetables, Methi, Pineapple.	Bajara, Jawar, Vegetables.

Sl. No.		Name of State			
		Daman (8)	Assam (9)	West Bengal (10)	Orissa (11)
1.	Variety – Type grown Tall – Dwari – Hybrid	West coast Tall TDX, DXT	Assam Tall		
2.	Average Rain fall (cms)	183 cms.	160.12 cms.		
3.	Temperature range in °C Humidity	11.4 to 38.80 °C 55 to 65 %	(RH) 75 to 85 %		
4.	Type of soil	Black cotton soil.	Sandy		
5.	Method of Cultivation Nursery Technique/ Nursery.	Traditional method.	Nursery Technique		
6.	Transplanting Practice – I. Planting Distance – Tall Dwarf Hybrid II. Method of Planting – Square/Triangular III. Technique of Planting.	10 x 15 feet. -- 8 x 10 feet Square. 1 x 1 x 1 meter pit.	7.5 m. x 7.5 m -- -- Penipheral Planting in homestate garden. Planting in pits.		
7.	Maintenance practice followed for adult plantation. I. Manuring of adult palms. II. Fertilizer treatment given to Palms in the area. III. Organic manures used. IV. Green Manures used. V. Intercultivation in practice.	Farm yard 50 kg. Ammono Su fasp. Potesh 2.0 kg. 2.5 kg. 2.0 kg. --- Yes Ploughing	Once in a year. Ring method.		
8.	Cover cropping followed in coconut gardens.	Vegetables & Flowers pulses.			

DIFFERENCE BETWEEN ANNUAL AVERAGE WHOLESALE PRICES AND MINIMUM SUPPORT PRICES OF MILLING COPRA AND BALL COPRA

(Rs. per quintal)

Sl. No.	Year	Milling Copra				Ball Copra			
		MSP	WSP	Absolute difference (WSP – MSP)	Percentage difference	MSP	WSP	Absolute difference (WSP – MSP)	Percentage difference
1	1997	2700	3542	842	31.18	2925	5029	2104	71.93
2	1998	2900	3038	138	4.76	3125	4427	1302	41.66
3	1999	3100	3708	608	19.61	3325	3945	620	18.65
4	2000	3250	2415	- 835	- 25.69	3500	3652	152	4.34
5	2001	3300	2145	- 1155	- 35.00	3550	2426	- 1124	- 31.66
6	2002	3300	3086	- 214	- 6.48	3550	3513	- 37	- 1.04
7	2003	3320	4055	735	22.14	3570	4307	737	20.64
8	2004	3500	4598	1098	31.37	3750	6180	2430	6.48
9	2005	3570	3698	128	3.58	3820	5075	1255	32.85
10	2006	3590	3264	- 326	- 9.08	3840	4024	184	4.79

BALANCE OF PAYMENT IN INDIAN EXPORT AND IMPORT OF COCONUT PRODUCTS

Year	Import	Percentage change over previous year	Export	Percentage change over previous year	Trade Deficit/Surplus
1992-93	155.72	7.32	103.67	140.87	-52.06
1993-94	587.04	276.98	373.17	259.96	-213.87
1994-95	786.27	33.94	581.23	55.75	-205.04
1995-96	810.06	3.03	472.77	-18.66	-337.29
1996-97	1298.27	60.27	840.13	77.70	-458.14
1997-98	571.05	-56.01	1173.78	39.71	602.73
1998-99	432.78	-24.21	998.33	-14.95	565.55
1999-2000	1364.86	215.37	1933.72	93.70	568.86
2000-2001	3197.52	134.27	2742.19	41.81	-455.33
2001-2002	4134.56	29.31	2530.00	-7.74	-1604.56
2002-2003	7707.25	86.41	4189.77	-	-3517.47
Growth rate	33.50		20.71		

NUTRIENT CONTENTS OF TENDER COCONUT

Nutrient	Units	Value per 100 grams of edible portion
1.	2.	3.
Proximates		
Water	g	94.99
Energy	keal	19
Energy	kj	79
Protein	g	0.72
Total lipid (fat)	g	0.20
Ash	g	0.39
Carbohydrate, by difference	g	3.71
Fiber, total dietary	g	1.1
Sugars, total	g	2.61
Minerals		
Calcium, Ca	mg	24
Iron, Fe	mg	0.29
Magnesium, Mg	mg	25
Phosphorus, P	mg	20
Potassium, K	mg	250
Sodium, Na	mg	105
me,/n	mg	0.10
Copper, Cu	mg	0.040
Manganese, Mn	mg	0.142
Selenium	meg	1.0
Vitamins		
Vitamin C, total ascorbic acid	mg	2.4
Thiamin	mg	0.030
Riboflavin	mg	0.057
Niacin	mg	0.080
Pantothenic acid	mg	0.043

:: 2 ::

1.	2.	3.
Vitamin B-6	mg	0.032
Folate, total	meg	3
Folic acid	meg	0
Folate, food	meg	3
Folac, DFE	meg-DTE	3
Vitamin B-12	meg	0.00
Vitamin A, IU	IU	0
Vitamin A, RAE	meg-RAE	0
Retinol	meg	0
Vitamin E (alpha-tocopherol)	mg	0.00
Vitamin K (phylloquinone)	meg	0.0
Lipids		
Fatty acids, total monounsaturated	g	0.176
4:0	g	0.000
6:0	g	0.001
8:0	g	0.014
10:0	g	0.011
12:0	g	0.088
14:0	g	0.035
16:0	g	0.017
18:0	g	0.010
Fatty acids, total monounsaturated	g	0.008
16:1 undifferentiated	g	0.000
18:1 undifferentiated	g	0.008
20:1	g	0.000
22:1 undifferentiated	g	0.000
Fatty acids, total polyunsaturated	g	0.002
18:2 undifferentiated	g	0.002
18:3 undifferentiated	g	0.002
18:4	g	0.000
20:4 undifferentiated	g	0.000

Contd..3/-

:: 3 ::

1.	2.	3.
20:5 n-3	g	0.000
22:5 n-3	g	0.000
22:6 n-3	g	0.000
Cholesterol	mg	0
Amino acids		
Tryptophan	g	0.008
Threonine	g	0.026
Isoleucine	g	0.028
Leucine	g	0.053
Lysine	g	0.032
Methionine	g	0.013
Cystine	g	0.014
Phenylalanine	g	0.037
Tyrosine	g	0.022
Valine	g	0.044
Arginine	g	0.118
Histidine	g	0.017
Alanine	g	0.037
Aspartic acid	g	0.070
Glutamic acid	g	0.165
Glycine	g	0.034
Proline	g	0.030
Serine	g	0.037
Other		
Alcohol, ethyl	g	0.0
Caffeine	mg	0
Theobromine	mg	0
Carotene, beta	meg	0
Carotene, alpha	meg	0
Cryptoxanthin, beta	meg	0
Lycopene	meg	0
Lutein + zeaxanthin	meg	0

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Special thanks are due to all the staff at the Sub-Offices of the Directorate of Marketing and Inspection, associated with the field survey, data collection and compilation related to this report.

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