A STUDY ON THE PROSPECTS AND PROBLEMS OF COCOA CULTIVATORS IN KERALA WITH SPECIAL REFERENCE TO MARKETING

Thesis
Submitted to the University of Calicut
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By

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CERTIFICATE

Certified that the thesis entitled **A STUDY ON THE PROSPECTS AND PROBLEMS OF COCOA CULTIVATORS IN KERALA WITH SPECIAL REFERENCE TO MARKETING**, which is being submitted for the award of the Degree of Doctor of Philosophy in Commerce is an authentic record of the work carried out by **Mr. P.K. Abdul Khader,** under my supervision and guidance.

He is allowed to submit this thesis.

Dr. E.P. SAINUL ABIDEEN

DECLARATION

I do hereby declare that this thesis entitled **A STUDY ON THE PROSPECTS AND PROBLEMS OF COCOA CULTIVATORS IN KERALA WITH SPECIAL REFERENCE TO MARKETING** is a bonafide record of the research work done by me and that no part of this thesis has been presented earlier by me for the award of any degree, diploma, associateship, fellowship or other similar title of any other institution.

C.U. Campus,
Date: 11.03.2005.

P.K. ABDUL KHADER

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LIST OF ABBREVIATIONS USED

CAMPCO	:	The Central Arecanut and Cocoa Marketing and Processing Co-operatives Ltd.
CDC	:	Cocoa Development Council
CPCRI	:	Central Plantation Crops Research Institute
DCCD	:	Directorate of Cashewnut and Cocoa Development
DES	:	Directorate of Economics and Statistics
Ha	:	Hectares
HYV	:	High Yielding Variety
ICA	:	International Cocoa Agreement
ICCO	:	International Cocoa Organisation
KAU	:	Kerala Agricultural University
MARKETFED	:	Kerala State Co-operative Marketing Federation
MT	:	Metric Tonne
NR	:	Natural Rubber
R & D	:	Research and Development
SR	:	Synthetic Rubber
UNCTAD	:	The United Nations Conference on Trade and Development

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Chapter 1

INTRODUCTION

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INTRODUCTION

Cocoa is a crop of the tropics. India offers considerable scope for its development. The commercial cultivation of cocoa commenced in the 1960's through large scale production and distribution of cocoa seedlings. The attractive price and the extended support from the Government helped to expand the area which reached 29000 hectares in 1980-81. This trend in area expansion did not continue further and started declining year after year and by 2002-03, the area was reduced to the level of 17800 hectares.

Congenial conditions for the growth of cocoa can be found in various parts of Kerala. It is the leading state, both in area and in production. The 1977 price spiral of cocoa induced Kerala farmers to bring more land under cocoa, which reached 24118 hectares in 1979-80. But the decline of cocoa price during 1980-81 adversely affected cocoa cultivation and production. The present area under

the crop (2002-03) is 8700 hectares producing about 6500 tonnes of cocoa beans.

The demand for cocoa-based product is on the increase. While the domestic production of cocoa during 2002-03 was around 10200 tonnes, the demand from processing industries has been estimated to be around 23000 tonnes.

At this juncture, there is a need to take a serious look at the whole situation with proper management practice and measures, that the production of cocoa can be substantially increased.

The present study is being undertaken to analyse the problems confronted by the growers in promoting cultivation of cocoa in Kerala. The study analyses the state of cocoa in the agricultural economy of Kerala. Lack of planning, both in production and marketing, is highlighted. A strategy for the future is suggested at the end of the study, keeping in view, the prevailing situations in the international and domestic markets. Detailed discussions

on various aspects of cocoa has been made in the forthcoming chapters.

Significance of the study

So far no serious attempt has been made to analyse the problems of cocoa cultivators in Kerala. This study is to find out the various constraints in the production of cocoa. It may also be borne in mind that though quite many studies were made on cocoa, only a few of them were on cocoa production and marketing.

Kerala's climate, soil and agricultural conditions are best suited for the successful cultivation of cocoa as a commercial crop. It is convinced that cocoa formed a very effective inter crop with arecanut and coconut gardens. Despite the fact that Kerala has enormous potential in terms of suitable agricultural land, cocoa has failed to become a significant crop. In this connection a study, evaluating the production, marketing and problems of cocoa cultivators in Kerala, merits consideration.

With the economic liberalisation policies of the Government of India, well in place and due to the increased marketing investment and change in the consumers' attitude towards chocolates, the demand for cocoa-based products in the country has been growing at a rapid rate. This will provide further impetus to the demand.

Cocoa has vast potential for exports. This potential has not been tapped so far. The world demand for cocoa products increases every year.

Development of this sector will generate more employment opportunity, more income, foreign exchange through exports and finally economic development.

STATEMENT OF THE PROBLEM

Cocoa growers of Kerala showed much interest in the cocoa cultivation upto 1980. The initial interest in the plantation of cocoa gradually declined because of various reasons, such as pests and diseases, lack of primary processing facilities, poor marketing system, steep fluctuation in prices and presence of other profitable crops.

Production oriented programmes with a project approach and integrated measures were highly lacking.

The production of cocoa in the country is not keeping pace with the increased demand and it is found that there is a wide demand-supply gap. As the domestic production of cocoa is not sufficient to meet the increased demand, the industry has to resort to significant imports.

Though there are so many problems which made hindrances in the development of cocoa sector, those in the area of marketing are the most important.

There are only a few literature on the subject. No comprehensive studies were made on the problems and conditions of cocoa growers in Kerala. Thus this study is planned with the following objectives.

OBJECTIVES OF THE STUDY

On the basis of the problems stated above, the following objectives have been set for the study.

1. To examine the pattern of cocoa production, the factors which influence the production and to explore the reasons for the shortage of cocoa production.
2. To examine the existing marketing structure so as to find out the defects in marketing, if any
3. To ascertain the assistance, if any, from the Government for the development of this sector.
4. To suggest appropriate measures for the improvement of this sector.

Hypothesis

Based on the above mentioned objectives the following hypotheses have been framed.

1. The development of cocoa industry depends on the existence of an efficient marketing network.
2. The domestic production of cocoa beans is not sufficient to meet the increased demand and the demand-supply gap is widening year by year.
3. Majority of cocoa growers are small and medium scale cultivators. They have to sell their cocoa to the

processing agencies in the form of 'wet beans' without any price bargaining due to lack of farm level processing facilities.

SURVEY OF LITERATURE

A review on the related studies on production and marketing of cocoa is done in this chapter. This section consists of a review on the studies in India and in other countries.

Research done by Cadbury India Limited at the company's research centres found that the forastero variety of Cocoa was more suitable for cultivators in the country. Trials were done at Chundale of Wayanad district.

CPCRI, Kasargod has conducted study to find out the profitability of cocoa cultivation in India. They have worked out the cost and returns of a plantation with coconut, pepper and cocoa, in 1982.

A pioneering work on production and marketing of cocoa in India has been carried out by Profs. V.N. Asopa and S. Narayanan during 1990 at Centre for Management

in Agriculture, Indian Institute of Management, Ahamedabad. The study was undertaken during a period which was very crucial in the history of cocoa cultivation in the country. The study was published by Mohan Primlani for Oxford & IBH Publishing Company Private Limited, New Delhi, titled as *"Cocoa Production and Marketing in India"*. In the above study, the production, demand and supply, spreading the cultivation to additional areas, suitable government policy - packages, production of both intermediate and final products were discussed.

Dias and Avila (1993) found that fermentation was the fastest when turning was done every 24 hours and fermentation was the fastest in pods stored for 5 days and with turning process done every 24 hours.

Augier (1998) reported that a gentle drying at 40°C led to substantial reduction in acidity.

Kumaran (1981) studied the effectiveness of small scale method of fermentation of Cocoa and found that three methods viz., tray, box and basket methods are suitable and the best method among is the tray method.

Flavour analysis was carried out by Cadbury Limited, Bourne-Ville, U.K. It was found that unfermented beans were low in Chocolate flavour. Fermentation for 3-4 days produced well-fermented beans with adequate chocolate flavour.

Yasian (1995) reported that conventional high temperature drying resulted in low chocolate flavour and strong off-flavours.

The studies conducted by Gopinathan (1981) indicated that cocoa seedlings must be shaded and well watered for better germination. The optimum shade level was 50-55 per cent.

The studies conducted by Cadbury - KAU Co-operative Cocoa Research Project (started in 1987) found out the occurrence of different diseases. During the survey a number of diseases were identified. Of these, Black-Pod was the most serious disease of cocoa throughout Kerala.

Studies were taken up at the Kerala Agricultural University on different aspects of cocoa management.

They have released many improved cocoa clones. The standardisation of "viable vegetative propagation method" enables large scale production. Details are described in *Package of Practices Recommendation,* published by Kerala Agricultural University, in different issues.

METHODOLOGY

The present study has been designed as a descriptive one based on both secondary and primary data.

SECONDARY DATA

The Secondary data necessary for the study have been collected from the following sources.

1. Economic Reviews, published by the State Planning Board, Kerala.
2. Statistics For Planning, Agricultural Statistics - published by Directorate of Economics and Statistics, Kerala.
3. Farm Guide, published by Kerala Agricultural Department.

4. Survey of Indian Agriculture, Survey of Indian Industry-published by 'The Hindu'.

5. Paper presented in Seminars and conferences.

6. Studies by Kerala Agricultural University and CPCRI.

7. Reports from cocoa processing industries.

8. Books on the subject.

9. Newspapers and periodicals like Facts For You, ICCO Bulletin, Cocoa Growers Bulletin, Business Line and other leading journals.

Primary data

Since most of the information necessary to fulfil the objectives of the study are not available from secondary sources, the study is mainly based on primary data, collected through a sample survey of cocoa growers using structured and pre-tested questionnaire. Discussions were conducted with the officials and experts who are in the field of cocoa production and marketing.

Sample Design:

The unit selected for the study is cocoa cultivators. The study adopts stratified random sampling techniques for studying cocoa cultivators.

At the first stage, six districts were chosen as these districts have large number of cocoa cultivators. The districts of Idukki, Kottayam, Ernakulam, Pathanamthitta, Alappuzha and Kozhikode were thus selected. Wayanad district was also included in the study as they were considered to be the first promoters of cocoa cultivation in Kerala.

At the second stage, 2 taluks were selected from each districts of Idukki, Kottayam and Ernamkulam as they are contributing 76 per cent of total cocoa production in Kerala. One taluk each was chosen from the districts of Pathanamthitta, Alappuzha, Kozhikode and Wayanad for the study.

At the third stage, Two Grama Panchayaths each were identified from the 10 taluks on the basis of the

number of cocoa growers. Two more panchyaths were included from Idukki district, for being the highest cocoa producer in Kerala. In total 22 Grama Panchayaths were selected for the study. Locations were chosen from each selected Panchayaths. The selection of locations were made with the help of official records at the agricultural departments and cocoa industries. Approximately 17000 growers were seen to be involved in the cocoa cultivation in Kerala.

From each selected panchayath, sample size of 70 cultivators were selected for the study. Growers were selected at random by using simple random method. Growers were classified as small, medium, big and large farmers. Growers coming under the class, 0 to 2 acres of cocoa land were treated as small growers, growers possessing 2 to 6 acres of cocoa land were treated as middle class growers, land holding size 6 to 10 acres were considered as big growers and growers holding more than 10 acres of cocoa land were treated as large scale growers.

Samples were taken from all groups to include all types of farmers for better representation.

The following table shows the Districts, Taluks, the number of Panchayaths and the number of cultivators sampled.

Districts	Taluks	No. of Panchayaths	No. of cultivators sampled
Idukki	Devikulam	3	210
	Thodupuzha	3	210
Kottayam	Changanassery	2	140
	Kanhirappally	2	140
Ernakulam	Kothamangalam	2	140
	Paravoor	2	140
Pathanamthitta	Ranni	2	140
Alappuzha	Kuttanad	2	140
Kozhikode	Kozhikode	2	140
Wayanad	Vythiri	2	140
Total	10	22	1540

Tools used for data collection

Field survey was conducted to collect primary data from cultivators by using structured interview schedule. For the purpose of the study, a pilot survey was conducted, among cocoa cultivators of Thamarassery panchayath of Kozhikode District and Adimali panchayath of Idukki

district. On the basis of experience of the pilot survey, the questions were revised and the schedule was re-drafted. Interview schedules, mailed letters and field notes, specially developed for the purpose of the study are the tools used for data collection.

ANALYSIS OF DATA

The focus of analysis of data has been on the dimensions of cocoa production, marketing and cultivators' problems. The data on the area under cocoa crop and production were analysed to find out the present and future developments and policies in this sector. The analysis of farm level processing, marketing, demand and supply was held to broaden the understanding of the working of the cocoa sector.

Tools for Data Analysis

For the purpose of data analysis, simple mathematical techniques such as percentages and ratios and statistical techniques of time series are used. Time

series analysis is used to study the trend in demand and supply of cocoa.

For the purpose of time series the following formula is used.

$$y = a + bx$$

where

$$a = \frac{2S1}{n}$$

$$b = \frac{4(S2 - S1)}{n^2}$$

Where S1 = First sub total

S2 = Second sub total

n = Number of years

PERIOD OF STUDY

The period kept in view for intensive study is from 1999 to 2003 (5 years). However, a long duration has been considered when the trend could be studied in its historical perspective.

LIMITATIONS OF THE STUDY

As in the case of almost all social science researches, this study is also not free from certain inherent limitations, as stated below.

1. The backwardness of the area under study reflected in the responding nature of farmers. Most of primary data collected from respondents are based on their memories, and may be subject to memory errors.
2. The study is highly relied on sampling techniques, and hence sampling errors are bound to occur.
3. Most of the promoting agencies are private sector enterprises. They hesitate to provide data relating to production and marketing.
4. Some of the organisations were reluctant to reveal all the necessary information, inspite of assurance that the data would be used only for research purpose.
5. A few of the sample respondents were found to be inconsistent
6. Being a social study, the study is also not free from defects of social investigation.

However, earnest attempt has been made to overcome the above limitations and to reach at meaningful inferences.

PRESENTATION OF THE REPORT

The study has been presented in six chapters as outlined below.

Chapter I provides the introduction to the topic of study and explains the significance, objectives, hypothesis, methodology, sample design and limitations of the study. This chapter also contains a brief review of literature.

Chapter II gives a brief description of important plantation crops in Kerala, as cocoa comes under the definition of plantation crops.

Chapter III provides a profile of cocoa industry. This part deals with the geographical and climatic conditions for the cultivation of cocoa, farm level processing, production of cocoa, trends in area and production over the years and the present position.

Chapter IV analyses the structure of cocoa market. This chapter discusses domestic and international market for cocoa, cocoa products and demand and supply of cocoa.

Chapter V examines the problems of cocoa cultivators in the production and marketing.

Chapter VI, the last chapter, summarises the whole study, lists the findings and offers a few suggestions.

PLANTATION CROPS

P.K. Abdul Khader “A study on the prospects and problems of cocoa cultivators in Kerala with special reference to marketing” Thesis. Department of Commerce and Management Studies, University of Calicut, 2005

Chapter II

PLANTATION CROPS

CHAPTER - II

PLANTATION CROPS

Plantations are essentially large agricultural undertakings, but they also have certain industrial characteristics. Plantations provide the silver lining to our agriculture, with high level of productivity and employment, apart from their catalysing contributions towards rural development. Being a labour intensive enterprise, supplying modern technology and management tactics, plantation make the optimum use of the marginal land resources. They generate considerable foreign exchange earnings by way of export.

Kerala produces several plantation crops of which the most important are Rubber, Tea, Coffee, Coconuts, Arecanuts and Cocoa. This chapter is devoted to provide a brief description of plantation crops in Kerala.

RUBBER

'Hevea brasiliensis' is a native of Brazil and was introduced into tropical Asia in 1876 through the Kew Gardens (England) with the seeds brought from Brazil by Sir Henry Wickhem. The tree is now grown in the tropical regions of Asia, Africa and America. It is a hardy, tall, quick-growing tree, reaching 18 to 30 meters in height, with a straight trunk producing branches 3 to 5 metres from above the ground and forming a spreading or conical canopy. The optimum ecological requirements consist of a fairly distributed annual rainfall of not less than 200 cm, a warm, humid and equable climate (21° to 35°C) and a well-drained deep loamy soil. Though the tree can withstand a short dry spell of one or two months, longer droughts are unfavourable. It flourishes from the sea-level up to altitudes ranging from 450 to 600 metres. [1]

Since its commercial beginning in 1902, the rubber plantation industry in India has made significant strides in

[1] K.J. Mathew, 'Promise of Small Holding', Survey of Indian Agriculture, 'The Hindu', Chennai, 1999, p.85.

terms of area, productivity and production. Considerable expansion of area took place during the fifties and sixties in Kerala, which now produces 93 per cent of the NR in India.

Kerala, together with the Kanyakumari district of Tamil Nadu, is the traditional rubber growing region in the country. As much as 98 per cent of the area during 1950-51 was accounted for by this region. To meet the increasing demand for NR, the commercial cultivation of this crop was extended beyond the traditional region, especially in the north-east, from the Sixties onwards. The traditional area now accounts for 89 per cent of the area under rubber.

An important characteristic of India's plantation industry since 1957-58 is the dominance of the small holding sector. Currently, the small holding sector accounts for 86 per cent of the total area under rubber. The average size of small holding is less than half a hectare. Though the small size possess many constraints, the level of adoption of technology in this sector is

comparable to that attained by estates. More than 95 per cent of the area in the small holding sector is cultivated with high yielding varieties (HYV) of planting materials. In the estate sector 99.6 per cent of the cultivated area is under HYV. [2]

Further, with reference to the adoption of short-term productivity enhancement measures, the status of small holdings is nearly equal to that of estates. Such an impressive position occupied by this dominant sector has no parallel in other major producing countries. This is a factor having crucial implications for productivity of rubber in India. The productivity, measured in terms of average yield per unit hectare of yielding area, which was 1,549 kg., is the highest among the major NR producing countries.[3]

Though manufacture of rubber-based products started in India as early as 1922, till the middle of the thirties the industry was not strong enough to absorb the

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[2] Dr. V.K. Bhaskaran Nair, 'Hand book of Agriculture'. Indian Council of Agriculture Research, New Delhi, 2000, p.26.

[3] K.J. Mathew, *Op. cit.*, p. 86.

entire volume of NR produced in the country. Thereafter, owing to a host of promotional factors, the situation changed and export-oriented Indian plantation gradually found the domestic market sufficient. When the absorptive capacity of the domestic manufacturing sector was further expanded, supply was found inadequate and by 1947 India became an importer of NR.

A reasonably stable and remunerative price realized by the farming community has always been a key factor behind the rapid expansion of the rubber plantation industry in India. In this context, an important aspect that distinguishes Indian growers from their counterparts in other major producing countries is the extent of market price realized at the farm gate. Even small rubber growers in India are able to realize about 94 per cent of the terminal market price at their farm gate whereas this is only 70 to 80 pre cent in other countries.

Though the market price of rubber in India is mostly governed by the demand generated by the domestic industry, it has also been influenced by the regulatory and

price protection measures of the government since 1942. However, a critical determinant of the market price during the nineties has been the new economic policies introduced by the Government.

The price movement of rubber after 1991 has more or less been in tandem with that of the international market. However, Indian farmers can take satisfaction from the fact that during the last 50 years, Indian prices have remained considerably higher than the international price with few exceptions and their farm gate prices have been considerably higher than what their counterparts in other countries could get.

The most important merit of rubber plantation is that it helps to purify the atmosphere by absorbing carbon dioxide through the process of photosynthesis. Though its primary processing results in fairly large quantity of liquid effluents, this can be handled effectively at the processing site itself. Further, as NR production of effluents are small and are scattered over large areas, the chances of localized concentration of effluents are much less. Furthermore, it

is possible to generate bio-gas by utilizing this effluent. Among the different eco-friendly qualities of NR the most important is the lower requirement of energy inputs as compared to SR production.

The structure and quality of the soil is a matter of prime consideration in planning for sustainable agriculture. From this angle also, NR has many advantages over SR. Litter recycling effectively taking place in rubber plantations, improves the organic content and nutrient status of the soil. This also helps the soil microbes which are crucial to a balanced eco-system. Studies have proved that the bacterial count in rubber plantation is comparable to that in natural forest soil. The thick foliage of rubber plantation helps to retain soil moisture by preventing direct radiation from falling on soil surface.

Further, as the foliage intercepts rainfall, it is helpful in preventing soil erosion. Planting of rubber in elevated lands after terracing (contour planting), establishment of leguminous cover crops, formation of silt pits and bunding

are some other practices which help to prevent soil erosion in rubber plantations. The excessive application of fertilizers and pesticides is another aspect of concern in sustaining the eco-system. Compared to annual crops and seasonal crops as the nutrient requirement of rubber plantations is much less, fertilizer application is at a lower level. The application of insecticides and pesticides is also substantially less in rubber plantations.

Tea

It is an important beverage and the world drinks more of it than any other beverage. It is made from the tender or young leaves and unopened buds of the evergreen tea-plant, which is popularly acclaimed as a 'healthful herb'.

The tea-plant, in its natural state, grows into a small or medium-sized tree, but in commercial plantation it is pruned and trained to form a many-branched low bush and is encouraged to produce vigorous vegetative growth by adopting an appropriate schedule of the fertilizer applications.

The important tea-growing countries are India, Sri Lanka and East Africa. Japan and Indonesia also produce sizeable quantities of tea. It is also grown in Bangladesh, China, Georgia, Argentina and some other countries. In India, the crop is grown in Assam, West Bengal, Kerala, Karnataka and Tamil Nadu and to some extent in Tripura and Himachal Pradesh. The total area under tea in our country is about 507200 hectares (2002).[4] India is not only the largest producer of tea but also one of the important exporters. Indian tea accounted for 30.4 per cent of the world production and 18 per cent of the world export.

The tea industry in India is about 160 years old. It occupies an important place and plays a useful part in the national economy. Tea cultivation on commercial scale was first started in Assam in 1839. Thereafter, it was extended to other parts of the country between the fifties and the sixties of the last century. However, owing to

[4] G. Boriah, Survey of India Agriculture, 'The Hindu', Chennai, 2002, p.125.

certain specific soil and climatic requirements, its cultivation was confined to certain parts.

Both the historical circumstances and the general characteristics of the product itself have helped to shape the present structure of the industry. After the loss by the East India Co. in 1833 of their monopoly of the China tea trade, the British turned their attention in earnest to the cultivation of tea in India on a commercial scale.

Tea plantations are essentially large agricultural undertakings; but they also have certain industrial characteristics. They employ a large labour force which is mainly resident on the estates and under the control of a more or less elaborate management.

The requirements of capital, technical equipment and an organized marketing service explain why, by and large, the units of production in the tea industry have taken the shape of comparatively large estates or plantations, instead of small holdings. The areas of the estates themselves, however, vary within wide margins, and there are also, in

certain regions, large number of small holdings with problems peculiar to themselves.[5]

While the part it plays as an earner of foreign exchange by itself makes tea an industry of great importance to the economy, the fact that it provides gainful employment to a large number of people, makes it particularly more important. The tea plantation industry provides direct employment to more than a million workers. It is thus the largest employer of organized labour force drawn from tribal and socially weaker sections of the society.

The difference between the growth rates adequately reflects the task before the Indian tea industry, namely sustained and accelerated augmentation of production and productivity. The challenge before the industry is to increase production, improve quality and ensure that tea is available at a price remunerative to the producer and affordable to domestic consumers and yet has sufficient surplus to meet the export requirements.

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[5] S.S. Ahuja, Survey of Indian Agriculture, 'The Hindu', Chennai, 1999, p.109.

About half the labour force consists of women workers. As the tea plantation areas in India were in the initial stages sparsely populated, the workers had to be recruited from considerable distances. In North India a majority came from Bihar and Orissa and in South India from the plain districts.

Besides foreign exchange, the tea industry contributes substantially to the Central and State exchequers by way of corporate tax, agricultural income tax, sales tax and plantation tax.

The tea industry has also played a valuable part in opening up and developing what were previously inaccessible jungles and forests. The areas, which were retrieved and developed into flourishing tea gardens, were not areas where food grains could ordinarily have been grown. In the development of tea as an important commercial crop, therefore, there was no question of a cash crop competing for land required for more essential food crops.

Fortunately tea being a perennial crop grown under shade trees, the replacement of forests and jungles by tea does not, to any extent, lead to soil erosion and other evils, which are often the result of extensive denudation of forests for purposes of cultivation. On the other hand, being located in backward and rural areas, the plantations supplement the economic life of these regions and greatly contribute towards maintenance of ecological balance of the areas.

Tea has had many incarnations over the last one hundred years- from loose teas to blended, to packet teas, to tea bags and instant teas, ready-to-drink teas and flavoured teas and recently bio-tea. Tea is beginning to reveal incredible properties as a health beverage even as the world becomes more conscious of natural food items. As the penetrating vision of science and technology probes deeper into the chemical and metabolic processes triggered by the consumption of tea, it promises to be the beverage of the 21st century.

The Tea Board is also gearing itself to move ahead to the 21st Century and to act as a facilitator rather than a regulator of the industry which it has been serving since the fifties.

The plantation development scheme will aim at motivating the tea garden owners to undertake production oriented field developmental activities covering extension planting, replacement planting, replanting, rejuvenation, pruning, infilling and irrigation and drainage.

The tea processing and packaging development scheme will provide necessary financial assistance to the needy tea gardens/factories for renovation as well as augmenting the processing capabilities including setting up of new tea factories in the co-operative sector, replacement of worn out tea processing machinery in existing factories, creation of facilities for packaging and bagging, generation of power required for processing and transport vehicles such as tractors, trailers and light commercial vehicles.

The new area development schemes will aim at encouraging new plantations in areas found suitable but remain hitherto unexploited for tea cultivation in the traditional growing areas.

The small grower development scheme: will provide a comprehensive developmental package to the overall development of the small grower sector which will include imparting training in modern aspects of tea cultivation and manufacture, supply of inputs such as planting materials at subsidized cost, organizing study tours and field advisory visits.

The marketing development and export promotion scheme: will cover market research survey, uninational campaign for Indian tea in select markets, brand promotion support to Indian companies for launching the brands in international markets, generic campaign in new markets and setting up of an umbrella unit in India to meet the requirements of product and packaging standards in international markets.

Research and Development will cover agricultural/ agronomical aspects including bio-technology and plant protection measures, manufacture and quality improvement, product diversification development of multiple tea products made from regular tea, processed tea and tea extracts, health aspects of tea drinking, strengthening extension service and use of non-conventional energy resources.

It is hoped that the tea industry will be able to deliver the goods and rise above the inevitable cyclical ups and downs that affect it in the short run. Being an agro-industry with a long gestation period and urgent need for re-plantation, the industry has many challenges ahead.

COFFEE

It was in 1799 that the possibilities of coffee as a commercial crop attracted the attention of the East India Company. An experimental plantation appeared in Tellicherry in the same year, and in its wake, regular plantations sprang up all over the slopes of the hills of South India known as the Western Ghats.

The cultivation of coffee was systematically started by the British from 1820 onwards. In about 50 years, thousands of acres of wild jungle land at inaccessible heights of the mountain ranges were cleared and converted into coffee lands. By 1872, India had reached the level of production wherein it could export about half a million bags of coffee.

Thereafter, a series of reverses followed. The impact of leaf-rust and coffee stem borer was devastating and coffee cultivation became more difficult. Keen competition in the world markets coupled with the general depression of the world economy in the thirties resulted in the coffee growing area shrinking from 1.2 lakh hectares to 60,000 hectares. Thereafter, the Coffee Board of India was set up by an Act in 1941 and the coffee industry entered a period of recovery and stability.[6]

The hills of Southern India are ideally suited for the growth of coffee. High altitude, sunny slopes, a tropical

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[6] S.V. Ranganath, 'The Smell of Success', Survey of Indian Agriculture, 'The Hindu', Chennai, 1999, p.105.

sun, plentiful rains, a good forest-soil rich in humus content and a well drained subsoil form an excellent environment for growing high quality coffee. As of now, India grows both Arabica and Robusta coffee. The Arabica coffee is grown at higher altitudes, that is, at about 1,250 m above sea level where the annual rainfall is about 200 cm. Robusta is grown at a lower altitude, 750 m above sea level where the rainfall is about 150 cm.[7]

In the fifties, 73 per cent of the planted area was covered by Arabica and 27 per cent of the planted area by Robusta. Since then, the total area which was then about 92523 hectares has steadily increased to 3.05 lakh hectares in 1997; though the proportion of Arabica and Robusta in the planted area has considerably changed. Arabica now constitutes 48 per cent of the planted area and Robusta constitutes 52 per cent of the planted area.

Indian coffee is grown only in the shade, making it not only eco-friendly but also superior in quality. Pests

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[7] K.M. Pillai, 'A text book of plantation crops', Viskas Publishing House, New Delhi, 1984, p.45.

and diseases are controlled by adopting an integrated disease and pest management approach. Indiscriminate and blanket spraying is not encouraged. Solar energy is used for drying coffee and the moisture level is around 10-11 per cent. The excellent cup quality of Indian coffee is well appreciated throughout the coffee world. India is a departmental store for coffee. All the varieties are available under one roof.

The quality control department of the Board has set up rigid standards for quality parameters and these parameters have been kept as guidelines and are being implemented in the present liberalized economy. The freight rates from India to any part of the world are competitive and shipping to European markets consumes reasonable transit time.

Coffee is grown in South India predominantly, fifty five per cent of the planted area is in the state of Karnataka, 27 per cent in Kerala and 11 per cent in Tamil Nadu. However, Karnataka accounts for 69 per cent of the

country's production, Kerala for 23 per cent and Tamil Nadu for 8 per cent.

The Coffee Board of India was vested with the responsibility of the growth and welfare of the industry, its main function pertained to marketing, production, research, extension, development and labour welfare.

The Board was vested with the responsibility of marketing the entire coffee grown in India. Coffee growers had to statutorily register their estates and surrender their crop to the Board after retaining a small permissible limit for domestic consumption and seed purposes. The coffee thus procured was processed and "cured" by the Board and sold through domestic and export auctions.

The money realized on the sale of coffee was distributed back to the growers deducting the marketing expenses and the initial payment made at the time of procurement. In fact only four per cent of the money realized was deducted as marketing charges of Board and the balance 96 per cent was re-distributed among the growers.

However, the winds of liberalization swept the country in the mid Eighties. In accordance with the liberalization policy of the Government, the Coffee Board allowed partial liberalization in the year 1992, whereby the coffee growers could sell 30 per cent of their output directly. Thereafter, the scope of liberalization was gradually enhanced.

In 1996, all restrictions were abolished and the pool marketing system ceased to function. Coffee growers are now allowed to sell their coffee both in the domestic and international markets.

In the post-liberalization scenario, most small growers prefer to sell their coffee in the form of dry cherry or parchment to exporters, who in turn get it processed, "cured" and sell it to foreign buyers. The large growers, after getting their coffee processed, sell it directly to the exporters or by way of private auction.

The Indian Coffee Traders' Association with the assistance of the Coffee Board holds weekly auctions in Bangalore, wherein a grower can get his coffee auctioned.

The coffee at these auctions is processed to the Board's quality specifications before it is put up for auction. In order to improve quality, the Board has taken steps to encourage processing houses ("curing works") to go in for the ISO certification.

The Board also issues "Certificate of Excellence" to processing factories which maintain international standards. These steps are intended to help foreign buyers to negotiate for coffee processed by certified processing factories.

The producers have been given training in the preparation of speciality coffees and the concept of "cupping" at the estate level has been introduced in a big way. Systematic training sessions organized by the Board has certainly contributed to improving quality awareness among the growers. These initiatives have resulted in a significant increase in the production of high-grade superior quality coffee which has got excellent cup characteristics.

The Board issues licenses to the exporters and the presence of efficient and experienced private exporting houses is one of the strengths of the Indian coffee industry.

The Board reserves the right to blacklist an exporter after verifying complaints of malpractices received by foreign buyers. The production of environment-friendly and organic coffee is another noteworthy effort taken up by the Board after liberalization.

The Board has been assisting the export of coffee in several ways. It is entirely responsible for promoting exports. Reliable crop forecasting is important for enabling export houses to take up positions and fulfil commitments on supply and shipping of coffee to foreign markets.

The Board prepares a Market Intelligence Report and this is made available to the growers on the payment of a small fee. The Board also organizes visits of foreign buyers to India so that they can see for themselves how the coffee industry functions. It is felt that these measures will boost the confidence of foreign buyers.

With the advent of free marketing, the Board studied the alternative marketing systems available to the industry. Such an alternative should not only be efficient and transparent but also help in price discovery and price risk managements.

Coconut

Coconut (*Cocos nucifera* L.) is a majestic perennial palm. It is grown extensively in numerous islands and also in the humid coastal tracts of tropical countries. India, with a total annual production of 12252 million nuts from 1.78 million hectares, ranks second in the world in coconut production.[8]

The coconut-palm, rightly known as the 'Kalpa Vriksha' or the 'Tree of Heaven" provides many necessities of life, including food and shelter. Of all the tropical palms providing numerous useful products, it is perhaps the outstanding one. It is mainly cultivated for the nuts from which two important commercial products, copra and fibre,

[8] R.K. Singh, 'Coconut', Survey of Indian Agriculture, 'The Hindu', Chennai, 2002, p.109.

are obtained. Copra yields oil and oil-cake. The trunk of the mature palm is used as timber for constructing houses and the plaited leaves are used for thatching houses, fencing etc. The unopened spathe is tapped for toddy. Fresh toddy called "Neera" is a tonic. Whereas sweet toddy can be converted into jaggery and sugar, fermented toddy is a mild alcoholic drink and vinegar can also be prepared from it. Water from tender coconut is a refreshing and delicious drink. In Kerala, the extraction of coir from the husk of nuts, and the manufacture of coir-products provides employment for thousands of people, particularly in the backwater tracts where facilities for retting husks are available. The coconut shell is largely used as a fuel and for the production of charcoal and making a variety of curios. The shell flour is used as a filler in plastics. Thus every part of the palm is useful in one way or another.

Coconut palm is the most useful cultivated palm in the world and it is grown in 86 countries. As an edible food, oil seed, beverage and as a source of natural fibre and

timber, coconut enjoys a unique status among horticultural crops.[9]

Coconut contributes about six per cent to the total vegetable oil pool in the country. Coconut oil has made a niche in foreign markets as a premium quality oil, especially for toiletry purpose. The crop sustains nearly 10 million families and earns foreign exchange through various coconut products, the major share being from coir and coir-products.

Coconut contributes more than Rs.7,000 crores to the GDP. Coconut palm parts like leaves, fronds, shell, husks, and the like satisfy the fuel requirements of small and marginal farmers. It is the only plantation crop which allows maximum bio-diversity within its inter space, maintaining ecological balance.

The coconut scenario in the country has undergone a great transformation in the recent past, especially in the spread of the crop to interior zones and non-traditional

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[9] Jayasree Krishnankutty, 'Kalpadhenu', Kerala Agricultural University, 2002, p.16.

belts in the country. Its cultivation in the past was mainly confined to the west coast and pockets in the east coast. The spread of coconut from traditional states like Kerala, Tamil Nadu, Andhra Pradesh, Karnataka and West Bengal to non-traditional states in North and the North-east like Madhya Pradesh, Bihar, Assam, Tripura and Arunachal Pradesh has been fast. Even in the traditional states, the cultivation has crossed over from the traditional coastal belts to interior zones.

Among the coconut growing states in India, Kerala has the longest history of coconut cultivation followed by Andaman and Nicobar, Lakshadweep and Goa. In the State of Kerala coconut provides livelihood to nearly five million families.

The State's economy is dependent on coconut to a great extent. Nearly 15 per cent of the State's annual income and 35 per cent of the agricultural income is derived from coconut alone. Coconut and coconut-products are in demand throughout the country. The demand for household and religious purposes will further

increase in the coming years with the increase in population.

The coconut processed for commercial copra production is only 35-40 per cent while 55-60 per cent is consumed for food and beverage purposes in the raw form. Milling copra continues to be the major coconut product from which oil is extracted. Coconut oil extraction is mainly confined to Kerala and certain upcountry centres.[10]

The coconut industry in the country is in the process of revival. Traditional copra and coconut oil sectors have become better organized. Apart from the traditional oil milling confined to certain pockets, Government agencies, cooperative societies and oil millers are entering the area of large-scale processing and marketing of copra and coconut oil.

New trading centres are also opening up in and outside Kerala. Modern methods are being put to use in copra drying techniques, new coconut products are being

[10] K.C. Ahammed Bavappa, 'Hand Book of Agriculture', by Indian Council of Agricultural Research, New Delhi, 2000, p.102.

developed and marketed. The packing and branding of edible coconut oil are recent developments in marketing. In short, the industry is on a revival path.

The revival process is on in the coir industry too. Among the by-products of coconut, only husk has so far been utilized for fibre extraction on a commercial scale. There have been significant developments in all the sectors of the coir industry in the recent past.[11]

The mechanization of the coir industry and the removal of controls in the movement of the husk has helped to boost the production and export of coir and coir products.

Kerala accounts for more than 90 per cent of the total quantity of coir products exported from the country and the industry in the State is set for a leap forward with the modernization of various processes and the introduction of new products such as coir mattresses, coirply and coir-pith

[11] Farm Information Bureau, Government of Kerala, Trivandrum, Pamphlet, 2001, p.6.

manure. It has gained international acceptance as an excellent raw material for various industrial uses.

The emphasis on R & D efforts of the Coconut Development Board, formed in 1981, for the integrated development of the industry led to the development of technology for the manufacture of coconut cream, spray dried coconut milk powder, preserved and packed tender nut water, coconut vinegar, and the like.[12]

Commercial production of these products started in various States, imported technology is also being used in coconut processing industries.

Products like, coconut milk, "coco sip" coconut pudding and coconut water concentrate have been developed. The Board's thrust is on developing technology for product diversification to stabilize the coconut based economy and to make Indian products globally competitive.

In spite of the great strides made in improving the area, production and productivity of coconut, the industry

[12] Different coconut products, 'Coconut' by Central Plantation Crops Research Institute, Kasaragod, 2002, pp.40-43.

is beset by bottlenecks. The prevalence of the 'Mandari' disease is in more than 50 per cent of the area in the major contributing State of Kerala and the delay in evolving a perfect control measure, the spread of similar dreaded diseases like the Thanjavur wilt and Tatipaka in other States, the sudden appearance of various pest infestation in major growing belts causing severe damages to the crop, the high price of Indian coconut products in international markets owing to the higher cost of cultivation and the bleak export performance are a few impediments faced by the industry here.

Besides, the present liberalization policy which allows unrestricted import of coconut products, import of other cheaper edible oil substitutes for coconut oil, the reduction in import duty and the like also pose problems for the industry. Indian products need to be more competitive both cost-wise and quality-wise.

ARECANUT:

The arecanut (*Areca catechu* L.) is an important crop of India. The economic produce is the fruit called 'betel nut' and used mainly for masticatory purposes. It is used in India in several socio-religious ceremonies. Its cultivation is concentrated in South Western and North Eastern regions of the county. Arecanut industry forms the economic backbone of nearly six million people in the country, and for many of them it is the sole means of livelihood.

The Areca palm is a monocot belonging to the family "Palmae". India ranks first in the world in the area of cultivation and production. In India it is cultivated in an area of 2.68 lakh hectares with a production of 3.33 lakh tonnes (2001-02). It is mainly grown in Karnataka, Kerala, Assam and West Bengal. The area is extended to Tamil Nadu, Maharashtra and Andhra Pradhesh as well.[13]

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[13] V. Rajagopal and D. Bala Simha, Survey of Indian Agriculture, 'The Hindu', Chennai, 2002, p.115.

While Karnataka accounts for nearly 40 per cent of the total arecanut production, Kerala accounts for 25 per cent, Assam 20 per cent, and rest is accounted for by West Bengal, Meghalaya, Tamil Nadu and other States. It is estimated that small and marginal farmers hold about 85 per cent of the area under arecanut. About six million persons are engaged in the production, processing and marketing of arecanuts.

In Kerala Arecanut is grown in about 90000 hectares with a production of 85000 tonnes (2001-02).

India is also the largest consumer of arecanuts. In the fifties, since domestic production was not sufficient to meet the demand, India had to import large quantities from Singapore, Sri Lanka and Malaysia. In an effort to minimize the drain on foreign exchange the Centre strengthened the measures undertaken by State Governments particularly Karnataka and Kerala, to increase production. As a result of such R & D measures, the area under arecanut and its production steadily increased.

India thus became self-sufficient and imports were stopped from 1969. But the gradual increase in production over and above the requirement caused a glut in the market. Towards the end of 1973, the prices of arecanuts fell to rock bottom, almost half the 1969-70 prices. In contrast, the cost of various inputs required for arecanut cultivation increased making it an unviable venture.

The situation warranted an in-depth study of the problems of arecanut growers in Karnataka and Kerala. The two State Governments constituted committees to look into the problems of arecanut growers and make suitable recommendation. The committee constituted by the Karnataka Government visited various arecanut growing and marketing centres and had detailed discussions with growers, traders and others. The committee attributed the fall in prices to increased production, poor export potential, lack of alternative uses, market speculation, manipulation by intermediaries, poor holding capacity of growers and inadequate marketing arrangements. It recommended that

the Government of Karnataka should set up an apex institution to ensure better marketing facilities, economical prices and take up processing of arecanut, were possible. The committee constituted by the Government of Kerala also endorsed the views of the Karnataka expert committee.

The State Governments of Kerala and Karnataka decided to jointly establish a central co-operative institution to improve the marketing system and ensure a reasonable price to growers in the two States-The Central Arecanut Marketing and Processing Co-operative Ltd.

CAMPCO had an initial share capital of only Rs.100 lakhs with the Karnataka and Kerala State Governments contributing Rs. 37.50 lakhs each and the remaining coming from co-operative marketing societies dealing in arecanuts, co-operative banks, traders, growers etc. The main objectives of CAMPCO are:

1. To procure arecanuts from members and from other growers on agency basis or outright purchase basis.

2. To arrange for the sale of arecanuts to the best advantages of the members and also advance loans to members.

3. To promote the production, marketing and processing of arecanuts.

The other objectives include undertaking research on the potential uses of arecanuts, distribution of seed materials, implements, fertilizers, pesticides and other agricultural and industrial requirements to arecanut growers. Initially, the area of operation of this co-operative covered the States of Karnataka and Kerala, and was later extended to the other major arecanut growing State of Assam. However, the marketing of arecanuts covers the entire country.[14]

To overcome some of the problems like pre-bearing period, low return during the initial bearing stage, fluctuations in market prices and unexpected loss due to pests, diseases and natural calamities, it was advised to

[14] Records, Directorate of Arecanut and Spices Development, Government of India, Calicut.

grow inter crops in arecanut gardens. An adult areca palm intercept approximately 60 per cent of the light. By growing inter crops this can be increased to about 95 per cent. Studies have revealed that areca uses only 35 per cent of the space and the remaining can be used for raising inter crops. Cocoa, banana, pepper and vanilla could be grown together in the areca gardens. This system would give more income per unit area.

Cocoa appears to be introduced in India as early as in 1793. However, as a commercial crop it was introduced during 1960. Cultivation was initiated in the Southern states of Kerala, Tamil Nadu and Karnataka. The area expansion gathered momentum from the seventies.

At present, cocoa is grown in the inter spaces of coconut and arecanut gardens as a mixed garden.

TABLE 2.1

Cocoa cultivation as pure crop and as a Mixed Garden

Status	Number	Per cent	Area in acres	Per cent
Cocoa as pure crop	42	2.73	358	8.21
Cocoa as mixed garden	1498	97.27	3998	91.79
Total	1540	100.00	4356	100.00

Source: Survey Data.

The above table illustrates the cultivation of cocoa as pure crop and as a mixed garden. As per the sample studied, it is clear that 97.27 per cent of cocoa growers are cultivating cocoa as a mixed garden.

Even though cocoa comes under the definition of plantation crops, pure plantation of cocoa as such is practically very few in Kerala. Cocoa is generally taken up as an inter crop in the irrigated coconut and arecanut gardens. A detailed discussion about the production and processing aspects of cocoa is done in the next chapter.

COCOA INDUSTRY - A PROFILE

P.K. Abdul Khader "A study on the prospects and problems of cocoa cultivators in Kerala with special reference to marketing" Thesis. Department of Commerce and Management Studies, University of Calicut, 2005

Chapter III

COCOA INDUSTRY – A PROFILE

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COCOA INDUSTRY - A PROFILE

Cocoa, botanically called, *Theobroma cacao*, belongs to 'Sterculiasea species'. The original habitat of cocoa is believed to be in the midst of the Amazon wild forests in South America. Centuries ago, the Maya and Aztec had realized the importance of cocoa beans. They cultivated the trees and, apart from consuming the fruits as a delicacy, used the beans as a medium of exchange, money. The Spaniards, who colonized most of the South American continent, were the first to introduce cocoa to the Europeans, and cocoa began to be cultivated in the tropical America. Cocoa had become an important plantation crop by the sixteenth century in the South and Central America and the Caribbean Islands. Cocoa cultivation in the world largely owes itself to the efforts of the colonial nations such as Spain, Portugal, Holland, Britain and France, spread over about three centuries.

Christopher Columbus is believed to be the first man to bring cocoa to Europe. The plantation of cocoa was limited, for a long period of time, to the areas of Europe and Africa. Then the plantation slowly extended to West Indies and Asia.

Cocoa is a crop of the tropics. In India cocoa is mainly cultivated in the Southern parts for the last 40 years. Most of the cocoa plantations in Kerala, Karnataka, Tamil Nadu and Andhra Pradesh are mixed gardens along with arecanut and coconut palms. In a few cases, it is grown in forest cleanings. Due to the high nutritional value, good taste and flavour, cocoa products have got a good demand.

GEOGRAPHICAL CONDITIONS

Temperature and rainfall are crucial factors affecting cocoa plant growth. Cocoa plants grow well in regions with a mean monthly temperature of 15°C-32°C. The areas should also be endowed with a good rainfall. These conditions have made the cultivation of cocoa restricted to areas falling 20° from either side of the equator. Areas

falling within 10°, account for the bulk of the production. In natural habitat, cocoa has been found growing well on the low lands and among the forest trees in the warm and humid areas. However, cocoa can be grown even at an altitude of 1,500 metres. But the lower temperature in these areas, mist, and overcast skies make the trees very vulnerable to fungus diseases, particularly Black-pod. Areas below 650 metres are considered to be the best.

The amount of rainfall and its distribution are very important in the determination of the tree's growth and yield. On unirrigated tracts, a rainfall in the range of 100-150 cm is considered to be adequate for the healthy growth.[15]

Cocoa needs a soil which can be easily penetrated by its roots. The soil must be capable of retaining moisture during the dry season and the air circulation should be easy. Various nutrients like nitrogen, potassium, phosphorus, calcium and magnesium should be present in

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[15] K. Bhaskaran Nair, 'Cocoa', State Institute of Languages, Kerala, Trivandrum, 1979, p.7.

the soil for the growth of the tree. Clay-loams, loams, and sandy loams are the most suitable soil types. Alluvial soil, particularly those found on the banks of rivers, are very suitable. These soil become rich in fertility as a result of silt deposits. Even if a cocoa plantation is flooded for several weeks, the trees are not affected unless the water does not flow rapidly.

Shade requirements of cocoa plants are related to temperature, light, and wind which can have a bearing on the yield. A study reveals that cultivation of cocoa is limited to those areas where the minimum day temperature does not fall below 15°C and the mean temperature requirement over a period in a year should not be lesser than 21°C.[16] Shade arrangements for cocoa can be done in such a way so as to meet the temperature requirements in general. Shades reduce temperature in the plantations. Artificial shade can depress the maximum temperature. Pods grow rapidly from March to June compared to the

[16] Kotey, RA *et al.* (ed). 'The Economics of Cocoa Production and Marketing', Institute of Statistical, Social and Economic Research, University of Ghana, Legon 1974, pp.49-51.

month of July to September, cocoa plants require more shade than the trees. So, with the growth of the plants, it is essential that shade is regulated. The general practice is to have perennial trees to provide permanent shade. Temporary shade is provided by short duration plants like banana, cassava, etc. The ideal spacing for the permanent trees is said to be 20 metres. In the beginning, these arrangements will provide about 75 per cent shade and reach a level of 25 per cent when cocoa plants come to the bearing stage. This can be done by the removal of the temporary shade. However, such a manipulation of shade intensity may not be possible in Kerala where cocoa is cultivated along with other crops.

Luxuriant growth habit and short bearing period along with rising prices, have made the crop attractive to the farmers of Kerala and Karnataka.

PRODUCTION OF COCOA

There are three major variant groups of cocoa namely, Forastero, Criollo and Trinitario. Among them the

forastero type is the one that is commercially grown all over the world.[17]

Forastero type will have red or reddish violet colour for its tender leaves and fruits will be comparatively smaller. Green fruits are one of its peculiarities. When it grows ripe it gets yellow colour.

The tender leaves of criollo type will have either white colour or light reddish colour. The fruit will be bigger and red in colour. When it is ripe it will be orange in colour. There are other types of cocoa, which have derived either from forastero or from cross pollination between forastero and criollo.[18] The Trinitario populations are considered to be from Forasteros although they are descended from a cross combination between Criollo and Forastero. In International market criollo type has more demand and price. Its aroma, taste and special features are the reasons. But its overall production is only in a small scale.

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[17] K. Bhaskaran Nair, *Op. cit.*, p.6.

[18] M.K. Nair and V.R. Bhat, Status of Cocoa, 'Cocoa Special' published by Directorate of Cocoa, Arecanut and Spices Development, Government of India, Calicut, 1995, p.16.

Cultivation practices vary according to climate, soil, labour availability etc. However, there are a few basic practices and principles to be adopted for the successful cultivation of cocoa.

Cocoa is planted as a pure crop in forest areas by thinning and regulating the shade. But it can be grown advantageously as an inter crop in arecanut as well as coconut gardens. Raising of Cocoa as a pure crop is not recommended especially in Kerala due to high pressure on land. Cocoa is planted as an inter crop in coconut and arecanut gardens.[19]

Cocoa can be propagated through seeds or by vegetative means. For commercial purpose, cocoa is grown from seedlings raised in nurseries. Soil conditions should be assessed first to find out the suitability for cocoa. Preliminary operations like clearing or thinning of trees (In the case of forests) would follow. If the land to be planted does not have shade, permanent shade should be raised.

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[19] Central Plantation Crops Research Institute, Kasargod, Cocoa: Package of practices, Pamphlet, 2000, p.5.

Proper drainage facilities should be provided and measures to prevent soil erosion will have to be adopted.

A nursery may be necessary either the seeds are not available on time or it is cheaper to grow plants in the nursery than supervise them in the field. The seeds to be planted are rubbed with sand and wood ash to remove the mucilage which is not essential. The seeds have to be planted with the scar-end downwards; any other way of planting will distort the plant growth. In the case of nurseries, the seedlings are raised in baskets which could be easily planted without disturbing the roots. They are easy in handling and transportation.

Cocoa population arising from seedling shows a high degree of variability in all the characters including yield. Estimates show that about 25 per cent of the cocoa plants in a population will be high yielders, 25 per cent poor yielders and the remaining 50 per cent average yielders. There is, therefore, a lot of scope for increasing productivity of this crop through vegetative propagation of identified superior plants. In fact this method is commercially being

used in many of the major producing countries with advantage.[20]

The two vegetative propagation methods that are feasible in cocoa for large scale multiplication are budding and grafting. Conversion of old, poor yielding cocoa plants to a high yielding group is possible through top working. In as much as root system remains intact, top-worked plants grow much faster than freshly budded plants and come to bearing earlier. This technique helps in the rejuvenation of old and unproductive cocoa plantations. A poor yielding cocoa tree of any age can be converted to a high yielder by the simple procedure of top working. The tree to be top worked is snapped back just below the Jorquette (1 - 1.5 m above the ground) after cutting half way through the width. Top working can be done during all seasons. Still it may be more convenient if this operation is done in a rain-free period in irrigated gardens. For rain fed situations, this may preferably be done after

[20] R.Vikraman Nair, 'Clonal Propagation of Cocoa', Paper presented at National Seminar on Development of Cocoa Industry in India, held at Bangalore, Oct., 1995.

the receipt of pre-monsoon showers. Top worked trees start yielding heavily from the second year onwards while a budded cocoa plant of the same age may take five years for the same.[21]

Cocoa is amenable to other methods of propagation like rooting of cuttings, nurse-seed grafting and micro propagation through tissue culture. However the percentage of success by these methods are comparatively low and inconsistent.

Cocoa cropping system under arecanut and coconut gardens can be adopted advantageously in Kerala, Karnataka and Tamil Nadu. Experimental results indicates that cocoa can be introduced as a profitable inter crop in grown up arecanut garden where the spacing is 2.7m x 2.7 m.

Cocoa is inter planted in alternate rows at a spacing of 5.4 m x2.7m when cocoa is to be raised as an inter crop in coconut gardens. There can be an average of 500 cocoa

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[21] R.V. Nair, V.K. Mallika, and M. Swapna, 'A Procedure for Top working in Cocoa', Int. symp. plantation crops (PLACROSYM XI) (Abstr.) National Research Centre for Spices, Calicut, p.54.

plants per hectare in coconut gardens and 600 cocoa plants in arecanut gardens. When it is grown as a pure crop, there will be about 1100 to 1300 plants per hectare.

Yields are maximum between 15 and 30 years. Yields may continue to be high even after this period depending upon soil fertility. Apart from this natural aging process, the life of cocoa tree would be shortened because of diseases. Cocoa grows upto a height of about 10 metres. It starts yielding from the fourth or fifth year. In some places in Kerala, the irrigated and well managed plants begin to yield even before the fourth year.

The important inputs in cocoa cultivation are organic manures, chemical fertilizers, irrigation and pesticides/ insecticides. In spite of intensive research, no clear guidelines on the manuring of cocoa are available. Experiments have shown that the adequate quantities of nitrogen, phosphorus, potassium, calcium, magnesium and sulphur are essential for cocoa growth.[22]

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[22] 'Cocoa, A farmers diary', Cadbury India Ltd, Bombay, Pamphlet, 1994, p.8.

In Kerala, farmers apply fertilizers and organic manures. In the course of the survey, it was found that 80 per cent of the respondents have used organic manures and 20 per cent have used organic manures and chemical fertilizers. Table 3.1 presents details of respondents using various inputs.

TABLE 3.1

Input Use in Kerala - District-Wise-2000

Percentage of Users

Sl. No.	District	Irrigation	Organic manures	Organic manures and Fertilizers	Pesticides and insecticides
1.	Idukki	24	64	36	28
2.	Kottayam	61	88	12	29
3.	Ernakulam	74	90	10	30
4.	Alappuzha	78	91	9	31
5.	Pathanamthitta	68	82	18	30
6.	Kozhikode	52	70	30	34
7.	Wayanad	50	72	28	33
		58	80	20	31

Source: Survey Data.

Fifty eight per cent of the sample growers practiced irrigation and about 31 per cent used pesticides and insecticides.

From the above table it can be seen that Alappuzha district stands first in the use of organic manures, accounts 91 per cent. Ernakulam and Kottayam districts come next which account 90 per cent and 88 per cent respectively. The use of organic manures and chemical fertilizers is high in Idukki and Kozhikode districts.

In those countries/areas where rainfall is well distributed all year round and the soil retains moisture, irrigation is not necessary. In Kerala, these conditions are different and irrigation becomes necessary in many parts. Once in five to seven days during the summer days irrigation is recommended to cocoa growing in the state.

Cocoa grows in a series of storeys. The chupon or vertical branch of the seedlings terminates at the jorquette when four or five branches develop. Further chupon develops just below the jorquette and continues its vertical growth till another jorquette develops and so on. The first

jorquette develops normally at a height of about 1.5 metres. The canopy will form at a height convenient for harvesting as well as for plant protection operation. It is ideal to limit the trees at that level by periodical removal of chupon growth. However it is desirable to develop one more jorquette by allowing a healthy chupon to grow further for obtaining higher yields. In such cases the trees will have two tiers with a total height of 2 to 3 meters.[23]

Cocoa starts flowering from the second year onwards. It takes about 150-170 days from flower opening to pod ripening stage. Ripening takes about 25 days during which stage the pods change colour depending on the variety. There are two main crops in a year, the first from September to January and the second from April to June. Off season corps may be seen almost all through the year, under irrigated condition. All the pods in the tree do not ripen at a time. The ripe pods remain on the tree without damage for about 5 to 7 days. The harvesting is to be done

[23] V.N. Asopa and S. Narayanan, 'Cocoa Production and Marketing in India', Oxford & IBH publishing Co. Pvt. Ltd., New Delhi, 1990, pp.33-34.

at regular intervals of 10-15 days. Only ripe pods have to be harvested by cutting the stalk with the help of a knife without causing injury to the 'Cushion' from which they have developed. [24]

The harvested pods should be kept for a minimum period of two days before opening for fermentation. However pods should not be kept beyond four days. The pods are forced open by hitting on a hard surface or using a wooden mallet. Knife if not used for this purpose as it may cut the beans inside and impair the quality of processed beans. The beans are scooped out from the pod with the help of fingers. A pod will have about 30 to 50 seeds covered with pulp mucilage. The damaged, unripe and infected pods have to be separated out to ensure better quality of beans after processing.

Farm level processing of cocoa

Several factors influence the quality of cocoa beans. Recent studies indicate that there is distinct genetic

[24] M.K. Nair and V.R. Bhat, Status of cocoa research and future needs, 'Cocoa speical' Directorate of Cocoa, Arecanut and Spices Development, Calicut, 1995, p.116.

contribution to quality. The agrotechniques adopted, environmental conditions during the development of the pod and the processing technology also contribute significantly to the quality of the finished product. This indicates that good quality cocoa can be produced if care is bestowed in cultivation, processing and drying techniques. As chocolate is sold in a highly competitive market, it is very important to produce good quality beans.[25]

Cocoa beans have to be necessarily subjected to an initial process of fermentation and drying before being used for the manufacture of chocolate or other products. Chocolate flavour is developed by the two processes, fermentation of the beans at the producer's level and roasting of them by the manufacturers.

Fermentation

The beans should be fermented to help to produce chocolate flavour, reduce bitterness, loose its viability, remove the mucilage coating and enable the cotyledons to

[25] A. Arikiah, Y.P. Tan and Sharma, 'Experiments to determine influence of primary processing parameters and planting materials on the flavour of cocoa beans', Cocoa Growers Bulletin, England, 1994, p.21.

expand. For proper fermentation there should be sufficient aeration to the beans, provision for drainage of sweatings and maintenance of temperature in the system. Fermentation is done immediately after collecting the beans from the pods.

Fermentation involves keeping a mass of cocoa beans well insulated so that heat is retained while allowing air to pass through it during the process which lasts six to seven days. The pulp or mucilage adhering to the beans disappears and the colour of the cotyledons which is originally purple or violet (for forestero variety) changes to light brown. The chemical changes involved are complex and rather incompletely understood.[26]

Raw beans are covered by the sugary mucilaginous pulp and the beans with pulp around are called 'wet beans'. The kernel or 'nib' is the economic part and is bitter without any aroma or flavour. In practice, the method of fermentation varies from place to place. But all

[26] 'Fermentation and Drying of cocoa beans', Directorate of Cocoa and Arecanut and spices development, Calicut Pamphlet, 1985, pp.1-3.

standard methods of fermentation essentially involve keeping together a mass of reasonable quantity of wet beans for periods ranging from four to six days. The beans are to be mixed thoroughly, usually on alternate days. The pulp around the beans is lost and a series of bio-chemical changes occur in the beans, which are necessary for imparting chocolate flavour. Heat is produced by keeping fresh beans compactly and the heat must be conserved so that chemical changes inside the bean are completed.

In practice several methods are employed in the fermentation of cocoa beans, the choice being dependent on the quantity of beans available for fermentation and the circumstances prevailing. Whatever may be the method adopted, it needs to be ensured that the beans are put for fermentation immediately after taking out of the pods. The four methods of fermentation usually employed involve the use of baskets, heaps, boxes and trays for filling up the beans.[27]

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[27] G.A.R, Wood, R.A, Lass, 'Cocoa', 4th edition, Longman, 1985, p.52.

Heap method involves keeping a mass of not less than 50kg. of wet beans over a layer of banana leaves. The banana leaves are spread over a few sticks to keep them a little raised over the ground level to facilitate the flow of sweating. The leaves are folded and kept over a heap of beans and a few wooden pieces kept over it to keep the leaves in position. The heaps are dismantled and the beans are mixed on the third and fifth days. It needs about six days for the completion of fermentation and the beans can be taken out for drying on the seventh day.

Even though the minimum quantity of beans required for effective fermentation is 50kg., a further increase in quantity of beans in a heap will be beneficial. However, heaps of more than about 500 kg.may be difficult to handle.

The best method suitable for small quantities of beans is the tray fermentation. Wooden trays, 10cm deep with split cane bottoms are divided into a number of sections by means of a wooden partition that will fit into appropriate grooves at required distances. The capacity of

the tray can be adjusted depending upon the availability of beans by keeping the wooden plank in the appropriate grooves. A convenient tray can be of 25cm width and 60cm length. Wet beans are filled in the tray and levelled. About 10kg of wet beans may be required to load one tray.

In basket method, bean lots ranging from two to six kg. can be fermented successfully. Mini baskets may be made of bamboo matting, closely woven and should have a diameter of 20 cm and height of 15 cm for a capacity of two kg. For slightly larger lots, proportionately deeper baskets may be used (eg. for six kg., the depth may be about 40 cm). The baskets are lined with one or two layers of torn banana leaves to facilitate drainage of sweatings. Wet beans are then filled, compacted and covered with banana leaves. The baskets are placed on raised platform to allow flow of drippings. After 24 hours, it is covered with gunny sacking and weighed down. The beans are to be taken out and stirred well 48 hours and 96 hours after the initial setting. Fermentation will be completed in six days and the beans can be taken for drying on the seventh day.

Box is the traditional method used for the fermentation of beans. Boxes in wide varieties of shapes and sizes are used. The smallest one has the measurement of 60cm x 60cm and will hold about 150 kg. of wet beans. The bottom of the box has a number of holes of 1cm diameter spaced at about 10 cm apart. Three such boxes are arranged in a row so that beans can be transferred from one box to the other. The beans are placed in the top most box and covered with banana leaves or gunny bags. After 2 days, the beans should be uncovered and transferred in to the second box, and then to the third box after another two days. On the sixth day, fermentation is completed and beans can be taken out for drying.

Under normal conditions the duration of fermentation can be taken as a satisfactory guideline for judging the end point of fermentation, when a particular method is followed. Nevertheless seasonal variations, quantity of the beans etc. may lead to changes in the fermentation

process. The following checks may therefore be made to ascertain the proper fermentation of the beans.[28]

- Portions of pulp adhering to the beans should be red brown as against original dull white.
- The fermented beans when squeezed, the colour of the liquid that comes out should be reddish brown.
- Fermented beans when cut, the colour inside should be brown as against the original purple. The cut half of the bean, when bent should reveal irregular cracks on the cut surface.

Drying of Cocoa beans

Cocoa beans are dried after fermentation in order to reduce the moisture content from about 60 per cent to about 7-8 per cent. Drying must be carried out carefully to ensure that off-flavours are not developed. There are two methods for drying the beans – sun drying and artificial drying.

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[28] 'Cocoa', Department of Agriculture, Government of Kerala, 1990, p.15.

For sun drying, the beans are spread out on mats, trays or concrete floors. In some countries in the West Indies and South America, drying takes place on wooden drying floors with movable roofs. The beans are normally turned or raked to ensure uniformity of drying and the beans need to be covered when it rains. Sun drying is used in countries where harvesting occurs in a dry period such as West Africa or the West Indies. With adequate sunshine, sun drying may take about one week, but if the weather is dull or rainy, the time taken will be longer. For good result the following schedule may be followed.

Ist day	8-10 hours drying
2nd to 5th day	4-8 hours drying per day
6th day	No drying
7th day	8-10 hours drying

Source: 'Fermentation and Drying of cocoa beans' By Directorate of Cocoa, Arecanut and Spices Development, Government of India, Calicut, 1983.

Artificial drying may be resorted in countries where there is a lack of pronounced dry periods after harvesting and fermentation such as Brazil, Ecuador and South East

Asia and sometimes in West Africa. Artificially dried beans can be of poor quality due to contamination from the smoke of fire or because the cocoa is dried too quickly. The simplest forms of artificial driers are convection driers or samoan driers which consists of a simple flue in a plenum chamber and a permeable drying platform above. Air inlets must be provided in order to allow the convection current to flow without allowing smoke to taint the beans.[29]

Other artificial driers are platform driers using heat exchangers, where the hot air is kept separate from the products of combustion which pass to the atmosphere or direct fired heaters, where the products of combustion mix with the hot air and are blown through the beans. These driers can use oil or solid fuels as a source of power.

Another type of dryer uses conduction. Drying platforms built of slate or cement are heated at one end by a fire or heat source. Small versions of these using oil drums with flues embedded in cement were used in

[29] 'Fermentation and Drying of cocoa beans', Directorate of Cocoa, Arecanut and Spices Development, Calicut, Kerala, Pamphlet-1990, pp.3-4.

Cameroon at one time and were known as Cameroon Dryers. Heat distribution is not uniform with this type of dryer.

Other techniques have been used in association with the above to overcome the problem of turning or raking the beans in the dryer-stirring the beans in a circular bed or turning the beans in a rotary drum. As far as possible sun drying should be adopted which gives superior quality produce when compared to that by artificial drying. During periods when sunshine is not available, artificial drying could be adopted.[30]

Under the conditions prevailing in the cocoa growing belts of India the humidity is too high that the beans absorb moisture and attain equilibrium moisture content which is not safe for long term storage. Therefore the beans can be stored without spoilage only for short periods. Dried beans with moisture content of 6to 8 per

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[30] 'COCOA' Directorate of Cocoa, Arecanut and Spices Development, Calicut, 1979, p.5-8.

cent may be packed in polythene bags or polythene lined gunny bags. Some special conditions are to be provided in the store to maintain the quality of beans. The store should be sufficiently ventilated and the bags are to be kept on a wooden platform with air space of about 15-20 cm below the wooden planks set over the floor. The humidity should not exceed 8 per cent so as to prevent mould development and pest incidents in beans. Before storage, the store should be made clean and insect free by application of pesticides well in advance. However, pesticides should neither be applied nor be kept with beans inside the store. As cocoa can absorb and retain permanently any odour in its surroundings, other food stuffs should not be kept with cocoa. Nearness to smoke or kerosene fumes should be avoided.

Cocoa growing countries of the world

Cocoa is a native of Amazon river basin, which later spread to all over the tropical regions of the world in the 18th and 19th centuries. Commercial cultivation was

commenced in Ghana in 1879. From Ghana, it spread to other African countries; the most important of which are the Ivory Coast, Nigeria and Cameroon. In these countries, there was immediate extension in area and they eventually turned out to be the largest producers of cocoa in the world. Today, about 67 per cent of the total world production of cocoa beans come from these African countries into which this crop was introduced relatively very late. At present, bulk of world production comes from the developing countries of the world. However, bulk of the cocoa is consumed in the developed countries. Table 3.2 provides production details of major cocoa producing countries during 2001-02.

TABLE 3.2

Main cocoa producing countries and their cocoa bean production

Country	Production 2001-02 (in tonnes)
Ivory Coast	1,265,000
Ghana	341,000
Indonesia	455,000
Nigeria	180,000
Brazil	124,000
Cameroon	126,000
Ecuador	81,000
Dominican Republic	45,000
Papua New Guinea	41,000
Malaysia	25,000
Colombia	38,000
Mexico	35,000
Others	99,000
TOTAL	2855,000

Source: ICCO Quarterly Bulletin of Cocoa Statistics, 29 (3) September 2003.

From the table it can be seen that the world production of dry cocoa beans has been around 2.855 million tonnes in the year 2001-02. Based on 2001-02 statistics, the major producing countries are the Ivory Coast, Ghana, Indonesia, Brazil, Nigeria, Cameroon and

Ecuador, their contribution being 90 per cent of the world total. Ivory Coast is the largest producer of cocoa, which accounts to 44.30 per cent. Indonesia and Ghana produce, 15.93 per cent and 11.94 per cent respectively towards the world cocoa production. Among Asian countries, Malaysia is the largest producer of cocoa.

The African countries contribute 66.97 per cent, the American countries 11.31 per cent, the Asian countries 16.81 per cent. Papua New Guinea 1.44 per cent and others 3.47 per cent. The contribution of India is negligible (0.23 per cent).

Two distinct sets of countries are involved in large scale cocoa bean production; Western African and Latin American Nations. It is the latter group of producers which have boosted cocoa bean production significantly in the post sixties. Cocoa production in the African group of nations as a whole have been relatively stagnant. Asian countries are also finding their place in cocoa production.

Except for a small setback in 1982-83 and 1983-84, world production of cocoa beans increased continuously

each year from 1660 thousand tonnes in 1980-81 to 1946 thousand tonnes in 1984-85. It remained stagnant during 1985-87 and rose to 2855 thousand tonnes by 2001-02. Table 3.3 presents the world production of cocoa for the 10 years period.

TABLE 3.3

Trends in the world cocoa production

Year	Production (in '000 tonnes)
1992/93	2484.5
1993/94	2435.4
1994/95	2348.0
1995/96	2913.3
1996/97	2711.6
1997/98	2689.8
1998/99	2808.3
1999/00	3077.6
2000/01	2853.4
2001/02	2855.3

Source: ICCO Quarterly Bulletin of Cocoa Statistics 26 (4) 1999/00 and 29(3) 2002-03.

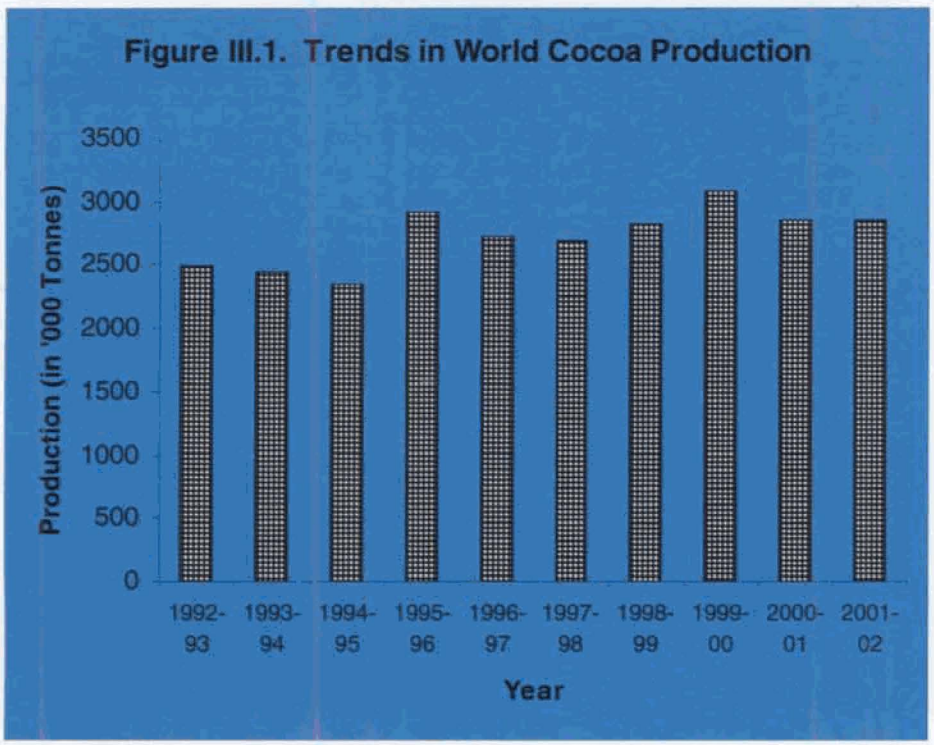
From the above table it can be seen that during 1992-93 the world cocoa production was around 2484

thousand tonnes. From 1993-94 to 1994-95, world production decreased by 2 per cent and 3.58 per cent respectively. During 1995-96 the production of cocoa showed a steep increase by 24 per cent. Heavy demand from processing industries and rise in price caused the increase in the production of cocoa. The production decreased around 7 per cent in 1996-97 and it further decreased by one per cent in 1997-98. From 1998-99 to 1999-00, cocoa production showed a gradual increase at the rate of 4.4 per cent and 9.58 per cent respectively. 1999-00, the price of cocoa decreased and production came down by 7.28 per cent in 2000-01. Though the price of cocoa highly increased during 2002, the production remained stagnant around 2855 thousand tonnes due to civil disturbances in African countries.

Considerable efforts are being made to increase the productivity of cocoa beans in the major producing countries of the world. Research and extension work are also intensified towards this end. In the Ivory Coast and

Brazil the cocoa is expected to remain a major crop and attempts are made to improve the quality of the beans.

The trend in world cocoa production is diagrammatically presented in Figure III-1.



PRODUCTION IN INDIA

Cocoa was introduced into India in the early 20th century but its cultivation was limited to a few Government farms. Both Criollos and Forasteros were introduced into the country in the 1930's. The criollos which were

maintained in the farms, failed to come up well and were damaged by pests and diseases. A few plants continued to survive though their yields were low. Cocoa cultivation was resumed in a big way in the 1960's with pods of Forastero type. The initial introduction was made by pods mainly from Malaysia. These were then followed by introduction from the African countries.

Cocoa being a tropical crop, India offers considerable scope for its development. This has been found well adaptive as a companion crop in irrigated coconut and arecanut gardens because of its need for partial shade. States like Kerala, Karnataka, Goa, some parts of Maharashtra, Pondichery, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal will therefore offer considerable scope for its development as these areas are coastal belts where coconut is grown under irrigated condition. Of the 15 lakh hectares of coconut gardens in India, the coconut areas in Karanataka, Pondicherry, Tamil Nadu and Andhra Pradesh are mostly irrigated in nature. In respect to other states, nearly 30-40 per cent are under irrigation.

Therefore not less than 3 lakh hectares will definitely be suitable for growing cocoa as an inter crop.[31]

Research on cocoa in India was initiated by the research-cum-demonstration unit of the Cadbury India Ltd. established at Chundale in Kerala in 1965. the researches were made on management aspects, especially shade regulation, planting density, pruning, some aspects of propagation, fermentation and drying of cocoa beans. The research activity was taken over by the Central Plantation Crops Research Institute in early 1960's, and Kerala Agricultural University in 1970's. At CPCRI and KAU, crop improvement had its mandate of introduction, selection, hybridization and evaluation of cocoa. The biggest assembly of germplasm in India is being maintained at the Kerala Agricultural University which is one of the strongest in the world.[32]

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[31] P.P. Balasubrahmanian, 'Indian Cocoa Scenario' paper presented at National Seminar on 'Cocoa Development in India', June 2000 Trichur, p.10.

[32] Records, Kerala Agricultural University, Trichur, 2001.

Area and Production

In India cocoa cultivation on commercial scale started with meagre acreage in the states of Kerala, Karnataka and Tamil Nadu in the 1960's. Further expansion was sluggish up to 1970's, but by the middle of 1970's, consequent on the impressive rise in the price of raw beans in Indian and international markets, there was a boost in the acceptance of cocoa as a crop. Starting from a few hundred hectares during 1960's the area under the crop increased to 1927 hectares by 1970-71 and to 29,000 hectares by 1980-81. From this peak in area there was a drastic decline to about 22,500 hectares by 1982-83. Present area under cocoa in India is 17800 hectares (2002-03). Decline in price of the produce was the reason for such a lack of interest in this crop and the consequent decrease in area under cultivation.

The current area under the crop also is a meagre fraction of the area under coconut and arecanut in the country. The potential of area expansion is immense as an

inter crop of these two main crops. Table 3.4 shows the area under cocoa in India.

TABLE 3.4

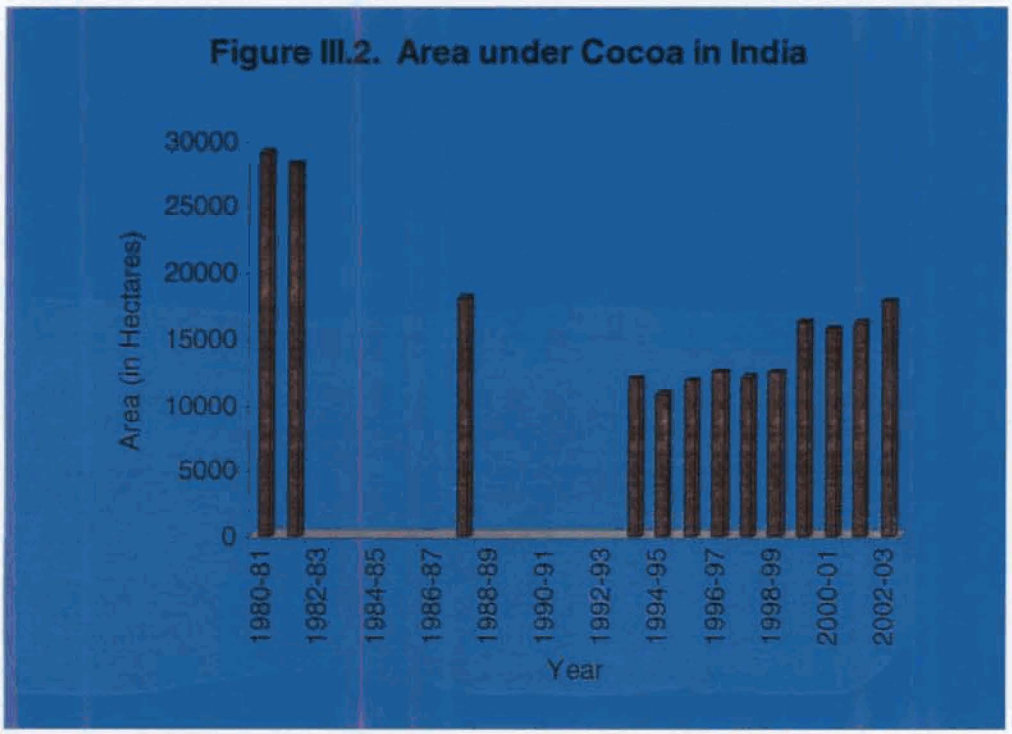
Area Under Cocoa in India

Year	Area (in hectares)
1980-81	29000
1981-82	28175
1987-88	18016
1993-94	11883
1994-95	10727
1995-96	11780
1996-97	12394
1997-98	12038
1998-99	12402
1999-00	16185
2000-01	15740
2001-02	16130
2002-03	17800

Source: Compiled from the records of Directorate of Cashewnut and Cocoa Development, Cochin.

A glance at the data in the above table indicates that during 1980-81 the area under cocoa cultivation in the country reached the highest level of 29000 hectares. Due to the sharp decrease in the price of cocoa and poor marketing system, the decline in area started from the

following year and at the end of 1987-88, the area under the crop came to only about 18016 hectares. The area reached the lowest position of 10727 hectares in 1994-95. The price of cocoa started reviving and cocoa cultivation slowly increased. From 1995-96 to 1996-97, the area increased by 9.8 per cent and 5.21 per cent respectively. The area showed a decrease of 2.87 per cent in 1997-98. During 1998-99 the area under cocoa again started to increase by 3 per cent. The area marked a steep increase by 30.5 per cent in 1999-2000 and reached to 16200 hectares. From 2000-01 to 2001-02, the area expansion became stagnant around 16000 hectares. The area expansion showed a slow increase by 10.35 per cent and came to 17800 hectares in 2002-03. The area under cocoa in India is provided in Figure III.2.



Being a tree crop, cocoa takes about four to five years to yield in sizable quantities. The production is usually measured in terms of dry beans. The output of dry beans was only about 40 tonnes in 1974-75 which shot up to about 3750 tonnes by 1980-81. Production of cocoa in India has been constrained by several factors affecting both the area and yield in terms of quantity and quality. Production of cocoa in India is presented in table 3.5.

TABLE 3.5

Production of Cocoa in India

Year	Production (in tonnes)
1980-81	3750
1981-82	3580
1987-88	7474
1993-94	6742
1994-95	5772
1995-96	6882
1996-97	5697
1997-98	5281
1998-99	5198
1999-00	6361
2000-01	6540
2001-02	6750
2002-03	10200

Source: Agricultural Statistics, Directorate of Economics and Statistics, Govt. of Kerala and Records, Directorate of Cashewnut and Cocoa Development, Cochin.

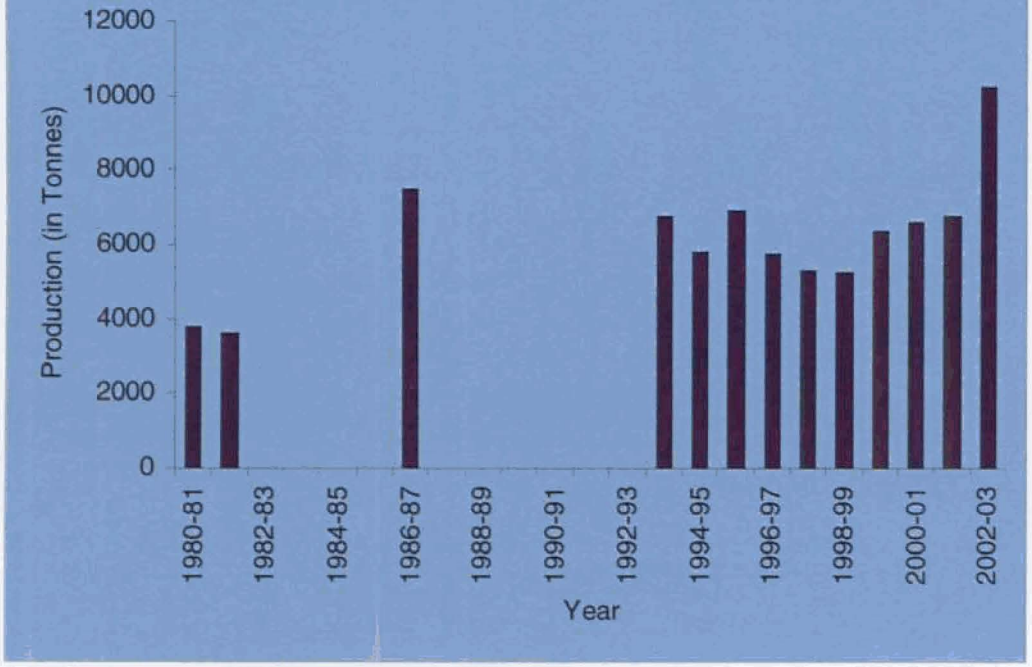
The above table illustrates the production of cocoa over years. Production registered a steady increase over the years to reach 7474 tonnes of dry beans by 1987-88. The decreasing trend in the area is also reflected in the production. The production of cocoa was around 6700 tonnes in 1993-94. It decreased by 14.38 per cent in 1994-95. During 1995-96 production marked an increase

of 19.23 per cent. From 1996-97 to 1998-99, production gradually decreased by 17.2 per cent, 7.3 per cent and 1.57 per cent respectively.

During 1999 price of cocoa started rising and production gradually increased. From 1999-00 to 2001-02 the production marked an increase at the rate of 22.37 per cent, 2.81 per cent and 3.21 per cent respectively. During the year 2002-03, cocoa production increased by 51.11 per cent and came to 10200 tonnes.

Figure III.3 provides the production of cocoa in India.

Figure III.3. Productin of Cocoa in India



STATE-WISE AREA AND PRODUCTION OF COCOA

Cocoa cultivation, confined to Kerala until few years back is now spreading in Karnataka, Tamil Nadu and Andhra Pradesh. They have taken up cocoa cultivation seriously during the current decade. Government and private enterprises are considering development of cocoa in Goa, Maharashtra, Pondicherry, Orissa, Meghalaya and West Bengal.[33]

Commercial farming of cocoa in Karnataka stand second in the production of cocoa in the country. The Districts of Dakshina Kannada is leading in the cultivation of cocoa. The other cocoa growing districts in Karnataka are Bangalore, Shimoga, Devagere, Chikkamangalore, Coorg, Mysore, Chamaraj Nagar, Mandya and Udupi. The Karnataka forest department raised a cocoa plantation on an area of about 37 hectares in Dakshin Kannada District in1968. After 1977 this responsibility was taken over by

[33] G.K. Nair, 'Area Under Cocoa expanding Outside Kerala', Business Line, March 23, 2003.

the Karnataka Forest Plantation Corporation. Later on this plantations were handed over to CAMPCO.

Dakshina Kannada district in Karnataka accounts for about 38 per cent of the states total area under cocoa and contributes about 37.8 per cent of the total production. Mysore and Chamaraj Nagar districts contribute about 20 per cent each under cocoa cultivating area. Chikkamangalore district accounts for about 18 per cent area in the state. It may be seen that Dakshina Kannada District borders with the state of Kerala on its southern parts.

Cocoa was introduced in Tamil Nadu during the early part of the nineteenth century. Cocoa was planted at the Kallar and Burliar fruit stations, in the Nilgiri foothills and the lower Palani Hills, all in Tirunelveli district. Cultivation was almost extinct by 1970 as the yield was very low. The procurement and marketing facilities offered by Hindustan Cocoa helped to bring an area of about 200 hectares under cocoa by 1978-79. By 1980, about 600 hectares were under cocoa in the state.

The crop was raised in coconut and arecanut gardens in Kanyakumari district. Cultivation was confined to the coffee plantations as mixed crop in lower Palani Hills and to a limited extent as an inter crop in coconut gardens in the foothills. Cultivation received a setback because of the stoppage of cocoa procurement by Hindustan Cocoa and the price crisis during 1980-81. From 1999-00 cocoa cultivation in Tamilnadu showed an increase and the area under cocoa came to around 400 hectares by 2002-03.

Andhra Pradesh has taken up cocoa cultivation only during the current decade. Cadbury, in 1990's, successfully pioneered the extension of cocoa crop in the irrigated coconut gardens of west and east Godawari districts in Andhra Pradesh. The other cocoa growing districts are Krishna, Visaghapatanam, Khamam and Sreekakkulam.

Appendix I furnishes state-wise area and production of cocoa for a period of ten years. A glance at the data indicates that Kerala is the leading state both in area and

production, followed by Karnataka, Andhra Pradesh and Tamil Nadu.

The area expansion in Karnataka was highly encouraging during 1978-79. From 1993-94 to 1998-99, the area expansion came to a stagnation to around 2800 hectares with a production of around 1400 tonnes. During 1999-00, the area increased by 58.27 per cent. From 2000-01 to 2001-02, it stood stagnant around 4400 hectares with a production of 1700 tonnes. The area increased by 36.36 per cent and the production by 47.05 per cent during 2002-03.

In Tamil Nadu, from 1993-94 to 1996-97 the area expansion was stagnant around 48 hectares and the production by 43 tonnes. During 1997-98, the area under cocoa declined by 12.24 per cent and production by 13.95 per cent. From 1999-2000 to 2002-03, the area and production gradually increased. The area reached 40 hectares and production 200 tonnes in 2002-03.

The area and production in Andhra Pradesh showed a slow increase upto 1996-97. During 1997-98, the area

under cocoa decreased by 44.53 per cent. The area showed a steep increase by 309.55 per cent and production by 414 per cent in 1999-2000. The area remained stagnant upto 2002-03 and the production reached 1000 tonnes in 2002-03.

AREA AND PRODUCTION IN KERALA

Congenial conditions for the growth of cocoa can be found in all parts of Kerala. The South West and South East monsoons result in heavy rain fall over a long period and the soil are well drained but capable of retaining moisture. The plains adjoining the hills and stretching to the coasts are renowned for profitable cultivation of a number of plantation crops such as coconut, arecanut, rubber and cashew which provide shade for cocoa plants. Both in terms of geographical area and plant population, Kerala is the leading cocoa producer in the country.

Till the early sixties, there was no awareness among the farmers of the potentialities of cocoa farming, Hindustan Cocoa (today's Cadbury India Ltd.) took interest in its commercial cultivation. The firm had a controlling

interest in the cocoa industry throughout the world. Hindustan Cocoa raised 10 hectares of cocoa plantation in Kalpetta, in 1958. The area increased to 500 hectares by 1971-72. Commercial cultivation of cocoa began only during the Third Five Year Plan period.

The criollo variety of cocoa was found not very suitable for cultivation in Kerala. Forastero variety gained an upper hand in adoption. There was dearth of adequate seedlings in the initial years. Hindustan Cocoa imported seedlings from Malaysia for distribution to farmers. The Government of Kerala, meanwhile, started to evolve suitable varieties of cocoa. A programme to distribute the seedlings to the farmers was drawn up during 1972-73. By 1974, the programme of bringing more and more area under cocoa gathered momentum in Kerala.

The 1977 price spiral of cocoa beans in the international market induced the State Government to organise special campaigns to promote cocoa cultivation. The State Government was striving to increase the area under cocoa in Kerala and reached the level of 24118

hectares by 1979-80. Cocoa farming was presented as a very lucrative position to the planters by pointing out that the wet beans enjoyed a price between Rs.10/- and 17 per kg. It was predicted that the increasing trend of the price would continue. The farmers responded by bringing more and more land under cocoa to reap the profits from the rising prices. The price of the dry beans was ruling at about Rs.40/- per kg. during 1978-79.

But the sharp decline of cocoa prices in the international market during the first half of 1980, sent shock waves throughout the state. The price stump, from Rs.40/- to 18 per kg., began to be reflected on the area extension. From 1980-81 to 1981-82; the planted area under cocoa remained stagnant. Unfortunately, during the international price crisis, Hindustan Cocoa declared a lock-out in their chocolate factory due to labour troubles. The company which was the major consumer of cocoa beans stopped procurements from the growers and the entire trade in cocoa beans was disrupted. The only way left was to export the beans. The Governments of both Kerala and

Karnataka through the Kerala State Co-operative Marketing Federation and CAMPCO attempted to procure the beans. The efforts were not successful, mainly because of the low procurement price fixed in relation with the international price of cocoa. These agencies could not cover all the producing areas and lack of experience in the trade added to the difficulties. Growers began to replace cocoa with other crops. Large scale damage inflicted by rodent pests like rats and squirrels made the cultivation uneconomical in many areas. The unprecedented drought in the state during 1981 to 1983 also hastened the decline in the area under cocoa. Table 3.6 provides the area under cocoa cultivation in Kerala.

TABLE 3.6

Area Under Cocoa in Kerala

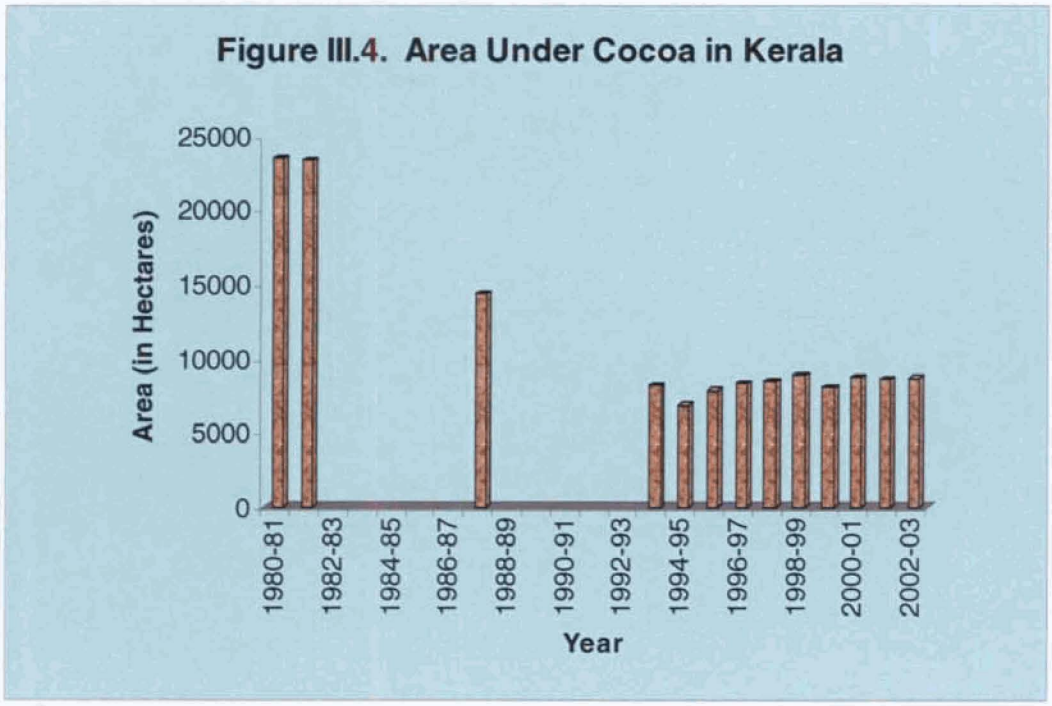
Year	Area (in hectares)
1980-81	23506
1981-82	23381
1987-88	14410
1993-94	8240
1994-95	6907
1995-96	7862
1996-97	8364
1997-98	8525
1998-99	8909
1999-00	8094
2000-01	8759
2001-02	8676
2002-03	8700

Source: Agricultural Statistics, Directorate of Economics and Statistics, Govt. of Kerala and Records, Directorate of Cashewnut and Cocoa Development, Cochin.

The analysis of the above table shows that during 1980-81, the area under cocoa in Kerala reached the highest level of 23506 hectares. But the sharp decline of cocoa price and lack of effective marketing system during the first half of 1980's resulted in decreasing in the area under this crop. By 1987-88, only about 14410 hectares were under cocoa in the state. From 1987-88 the area

under cocoa started declining and reached 8240 hectares in 1993-94. The area decreased by 16.17 per cent in 1994-95. Cocoa cultivation started to increase due to the rise in prices. From 1995-96 to 1998-99, the area gradually increased by 13.82 per cent, 6.38 per cent, 1.91 per cent, and 4.5 per cent respectively. During 1999-2000 it decreased by 9.14 per cent. From 2001-02 to 2002-03 the area under cocoa remained stagnant around 8700 hectares. The area under cocoa in Kerala is presented in Figure III.4.

Figure III.4. Area Under Cocoa in Kerala



Production statistics of cocoa in Kerala show that the state's share in the total production in India is very substantial. Kerala, which produced barely 25 tonnes of cocoa in 1974-75 could increase it to a very large extent. Being a tree crop, cocoa production cannot be appreciably adjusted to the market behaviour in the short run. It is seen that the production of dry beans was almost doubling every year from 1974-75 till 1980-81.[34] Thereafter it appears that the rate of growth of production has slowed down. The variations in the area under cocoa in the state are reflected with corresponding variations in production as well. Table 3.7 presents the production of cocoa in Kerala.

[34] V.N. Asopa, S. Narayan, op. cit., p.21.

TABLE 3.7

Production of Cocoa in Kerala

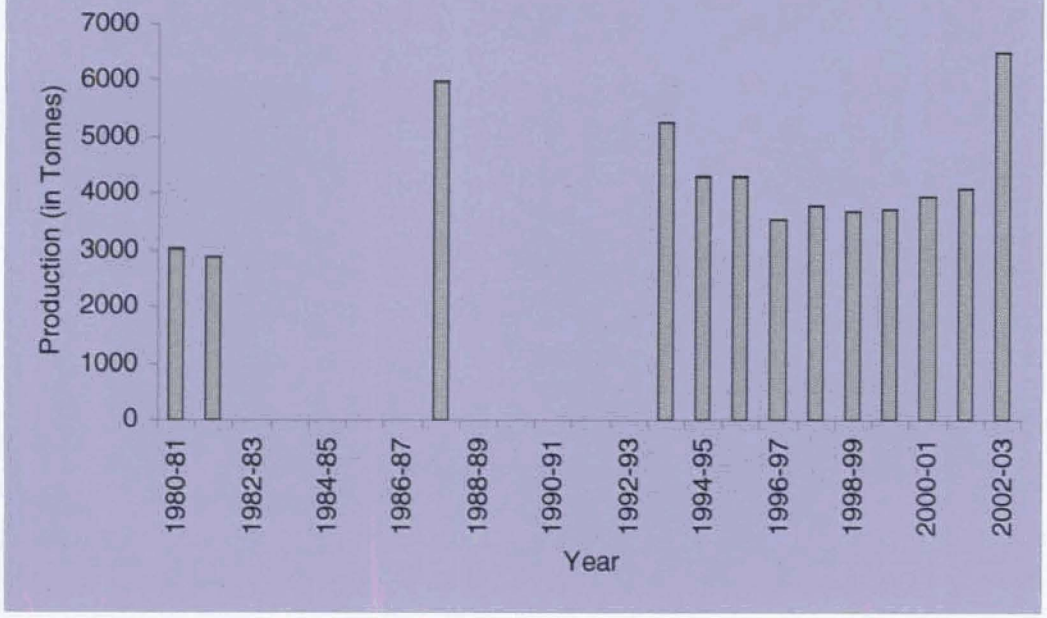
Year	Production (in tonnes)
1980-81	3020
1981-82	2894
1987-88	5980
1993-94	5262
1994-95	4288
1995-96	4319
1996-97	3537
1997-98	3794
1998-99	3688
1999-00	3710
2000-01	3924
2001-02	4100
2002-03	6500

Source: Agricultural Statistics, Directorate of Economics and Statistics, Govt. of Kerala and Records, Directorate of Cashewnut and Cocoa Development, Cochin.

The analysis of the above table shows that during 1980-81 the production of cocoa in Kerala was around 3020 tonnes. It is decreased by 4.17 per cent in 1981-82. Production gradually increased to 5980 tonnes in 1987-88. The declining interest of growers in the cultivation of cocoa are reflected with the decrease in production. During 1993-94 production came down to 5262 tonnes. The year 1994-

95 marked a steep decrease by 18.51 per cent. During 1995-96 production remained stagnant around 4300 tonnes. It again decreased by 18.1 per cent in 1996-97. From 1997-98 to 1999-00, production remained stagnant around 3700 tonnes. From 2000-01 to 2002-03, production gradually increased by 5.76 per cent, 4.48 per cent and 58.53 per cent respectively, due to a favourable rise in price. Production of cocoa in Kerala is diagrammatically presented in figure III.5.

Figure III.5. Production of Cocoa in Kerala



Cocoa is cultivated in all the districts of Kerala. Idukki, Kottayam, Ernakulam, Pathanamthitta, are the major cocoa producing districts. Production and area of cocoa in respect of 14 districts of Kerala for a period of ten years is shown in Appendix II and III.

At present (2002-03) Idukki district which has about 39 per cent of the state's cocoa area, accounts for about 39.17 per cent of the total production. It enjoys the highest position in area and production of cocoa. Kottayam has a share of 19.82 per cent, Ernakulam 15 per cent and Pathanamthitta 9.2 per cent in the cocoa area of the state. The contributions of which are 20.91 per cent, 18.6 per cent and 8.52 per cent respectively. These 4 districts together contribute about 87 per cent of the cocoa production of the state and cover about 83 per cent of the total cocoa land. These districts are located adjacent to each other and form central Kerala, which is both agriculturally and industrially prosperous compared to other parts of the State. The remaining 17 per cent of cocoa

land is shared by the other 10 districts and their total production is around 13 percent.

The contribution from the districts in Malabar area is negligible, they possess about 11 per cent of cocoa area and contribute about 8.5 per cent of total production. Among these, Kozhikode district stands first, contributing about 5.6 per cent of land and 4.5 per cent of cocoa production. Malappuram district stands lowest in both area and production.

The total land holding and cocoa cultivating area of cocoa growers observed during the survey is provided in table 3.8.

TABLE 3.8

District-wise land holding and cocoa cultivating land in Kerala

Districts	Sample Number	Land holding in Acres	Cocoa cultivation land in Acres	Per cent of land used for cocoa
Idukki	420	4482	1783	39.78
Kottayam	280	3042	1177	38.69
Ernakulam	280	2154	653	30.31
Pathanamthitta	140	1124	336	29.89
Kozhikode	140	824	231	28.03
Kannur	140	425	105	24.70
Wayanad	140	282	71	25.17
Total	1540	12333	4356	35.31

Source: Survey data.

From the analysis of the above table it is found that out of 12333 acres of land holdings of the respondents, only 35.31 per cent of land is used for cocoa cultivation. The study shows that the proportion between land holding and cocoa cultivating land is the highest in Idukki and Kottayam districts. Wayanad and Kannur districts stand in the lowest position for utilisation of land for cocoa cultivation. To bridge the demand-supply gap, total cocoa area is to be increased. Therefore efforts are required on

the part of the Government and the industry to bring more area under cocoa cultivation.

PRODUCTIVITY

Cocoa is cultivated as an inter crop in coconut and arecanut gardens. Hence the number of trees per hectare will vary according to the spacing given for the coconut or arecanut gardens selected for cocoa planting. The number of trees per hectare in an inter crop system will vary from 400 to 600 while as pure crop it will be around 1100 trees per hectare.

The yield of cocoa trees varies to a considerable extent depending upon many factors like season, soil and climatic condition, agronomic practices, incidence of pests and diseases and age of the trees. Table 3.9 shows average annual yield of cocoa-pods per tree in different districts.

TABLE 3.9

Average Annual Yield of Cocoa-Pods per Tree per Annum in Different Districts

District	Average Yield of Pods per Tree
IDUKKI	50
KOTTAYAM	40
ERNAKULAM	48
PATHANAMTHITTA	45
KOZHIKODE	45
KANNUR	40
WAYANAD	45

Source: Survey Data.

Idukki district stands first in the yield per tree. It contributes an average yield of 50 pods per tree. Kannur and Kottayam stand in the lowest position, contributing 40 pods per tree per annum.

Based on this data, the average yield of pods per plant can be estimated at 45 pods per plant annually. Taking 400 plants per hectare as for inter crop, the average yield of pods per hectare will be about 18,000 pods. On an average, 9 pods will give 1 kg. of wet beans. The percentage of recovery of wet beans to dry beans is

estimated at about 30 percentage. Hence 18000 pods will give 600 kg. of dry beans per hectare.

PROSPECTS

The domestic demand for cocoa has been growing fast during the past few years. But the internal production is limited to 30 per cent of the current demand. In order to attain self sufficiency, massive area coverage is possible through the cultivation of cocoa in 9 lakh hectares of coconut and 90 thousand hectares of arecanut gardens in Kerala. Cocoa can be raised in these gardens without much difficulty and extra cost.[35]

Cocoa is hardly grown as a mono crop. Its imminent capacity to share the alley space of tall growing coconut and arecanut palms and its combining ability with the microclimatic conditions available in such perennial gardens helps in cultivation in utilising such areas without exacting for an independent growing climate of its own. In any groves of tall growing palms where 40-50 per cent

[35] G.K. Nair, 'Business Line', March 23, 2003.

sunlight penetration is possible, cocoa stands first to absorb such solar energy, remaining symbiosis to the main crop and generating additional income as well, besides helping the amelioration of the soil conditions making beneficial not only for its own growth but also for the benefit of the main crop under which it takes shelter.

Agronomic trials have shown the profitabiliy of growing cocoa in arecanut gardens as an inter crop. In cocoa a fertilizer dose of 100:40:140 gram NPK/tree per year with 20 litres water/day/tree was found to be suitable. This combination of fertilizer and irrigation has given 1002 kg. dry beans/ hectare/year.[36]

A central sector scheme, providing training to farmers and laying out field demonstrations on scientific methods of cultivation and a farm level processing of cocoa beans, was made in the 5th Five Year Plan and the same was continued in the subsequent Five Year Plans. In order to strengthen the present marketing system in cocoa,

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[36] V. Rajagopal, D. Balasimha, Survey of Indian Agriculture, 'The Hindu', 2002, p.116.

adequate infrastructure for the formation of marketing co-operative societies is envisaged in the 9th Five Year Plan. Transfer of modern technology in cocoa cultivation through demonstration, farmers' training and plant protection campaigns are envisaged in 10th Five Year Plan.[37]

In order to attain self sufficiency, increasing the area by inter-cropping cocoa in the available irrigated coconut/arecanut gardens both in traditional and non-traditional areas is the only way to increase production of cocoa beans. Therefore inter cropping cocoa in 15,000 hectares of irrigated coconut and arecanut gardens with F1 hybrid seedlings/grafts have been suggested in the 10th Five Year Plan. To increase the production, the unthrifty nature of existing garden is to be replanted/rejuvenated by top working method standardized by the research infrastructural support by way of establishment of regional nurseries and transfer of technology through

[37] P.P. Balasubramanian, 'Indian Cocoa Scenario', paper presented at National Seminar on Cocoa Development in India - 'Problems and Prospects' at Trichur, June, 2000, and District Agricultural Office, Kozhikode.

demonstration, farmers training and plant protection campaigns are also envisaged in 10th Five Year Plan.

The cocoa industry had been facing the problems of price instability which affected both cocoa producing and consuming countries. Efforts were made during 1930 to bring both producers and consumers together and initiate action to mitigate the ill effects.

The United Nations Conference on Trade and Development (UNCTAD) in 1972 was successful in concluding an agreement as a result of the negotiations at the United Nations Cocoa Conference in Geneva. Almost all major producers and consumers were parties to this agreement. International Cocoa Agreement (ICA) was aimed at reducing wide price fluctuations, stabilizing export revenues and assuring adequate supplies of cocoa.[38]

The International Cocoa Organization (ICCO) under the International Cocoa Agreement 1993, has forty two members. The membership comprised nineteen cocoa

[38] ICCO Quarterly Bulletin of Cocoa Statistics, Volume XXVIII, Sept. 2002.

exporting and twenty two cocoa importing countries and the European Union. The ICCO is working with other organizations on projects aimed at improving the structural conditions of cocoa market and enhancing long term competitiveness and prospects in the cocoa economy.

With a view to give cocoa the required importance and growth, the Government of India has brought cocoa under the Directorate of Cashewnut and Cocoa Development.

The Directorate of Cashewnut Development established in 1966 as a primary field functionary under the Union Ministry of Agriculture gave a greater impetus for the development of cashew in a more scientifically oriented manner. This marked the first step towards the integration and co-ordination of cashew development in association with developmental agencies of States and Research Institutes. Now cashew development and research go hand in hand conceiving whatever technological advancements taken place in the research front becoming an integral part of the developmental

efforts. The Directorate of Cashewnut Development which was handling only cashew got the mandate for development of cocoa in 1997. Though cashew and cocoa enjoy different parameters, both are economical cash crops of the country and in 1997-98 the Directorate of Cashewnut and Cocoa Development started driving both the crops on similar tracks.[39]

The following programmes will be directly monitored by DCCD.

(a) Establishment of Regional nurseries in private sector to multiply and supply clones of elite varieties of cocoa, as a supportive measure for area expansion and replanting contemplated by the Development agencies.

(b) In the light of several technological developments taking place in the field of research, for dissemination of such technologies among farming and extension sector, training programme is contemplated involving

[39] Compiled from the records of the Directorate of Cashewnut and Cocoa Development, Cochin.

definite number of farmers and field level functionaries involved in the development of cashew and cocoa.

(c) Plant protection being vital element of protecting cocoa from serious pests, campaigns are necessary to educate the farmers about the right use of right chemicals at the right time without infringing the environment.

(d) Farmers participatory demonstrations are being arranged to demonstrate the efficacy of technologies developed by research for the benefit of farming sectors involved in cashew and cocoa cultivation.

(e) Development of infrastructure for processing and marketing for strengthening the on farm processing and marketing system for individuals.

(f) The DCCD is directly involved in the promotion of cashew and cocoa besides monitoring of the programmes funded directly by it and those implemented by the States under their work plan.

The industry has instituted a formal body, called the Cocoa Development Council under the aegis of Indian Confectionery Manufacturers Association. CDC is the cohesive body of the cocoa consuming companies in the country, formed for overall development of cocoa crop industry. CDC will be the primary interface between the industry and the Government.

Quality of Indian cocoa is about the same level as that of other South East Asian Cocoa. When the country attains sufficient production level, cocoa could become a significant foreign exchange earner.

Research on cocoa in India was initiated by Cadbury India Ltd. This research activities were taken over by the Central Plantation Crops Research Institutes and Kerala Agricultural University. Cadbury - Kerala Agricultural University Co-operative Cocoa Research Project functions in College of Horticulture, Vellanikkara, Trichur. The Research Centres have contributed different high yielding varieties of cocoa. Crop protection methods from some of

the important pests and diseases in cocoa have been developed.[40]

To overcome some of the problems like long pre-bearing period, low return during the initial bearing stages, natural calamities and diseases, it was advised to grow cocoa as an inter crop in arecanut and coconut gardens. It provides additional income, besides helping the amelioration of the soil condition.

The extent and nature of employment creation in producing-cum-processing countries will depend on the methods adopted by the factories. Employment opportunities in indirect form may also increase as the cocoa processing industry absorb different inputs. The development of this sector will give more employment to rural agricultural sector.

The discussion in this chapter highlights the existence of favourable geographical, climatic and other conditions for the development of cocoa in Kerala and its

[40] Cadbury - Kerala Agricultural University Co-operative Cocoa Research Project, Annual Report, 1999-2000.

bright future. Production of cocoa in the world, area and production in the country and Kerala have also been examined. The various aspects of cocoa marketing is delineated in the next chapter.

COCOA MARKETING

P.K. Abdul Khader “A study on the prospects and problems of cocoa cultivators in Kerala with special reference to marketing” Thesis. Department of Commerce and Management Studies, University of Calicut, 2005

Chapter IV

MARKETING OF COCOA

CHAPTER IV

COCOA MARKETING

Demand for cocoa beans depends upon the nature and extend of the demand for cocoa-based products in the country or aboard. The cocoa trade in India consists of two markets, known as the wet bean and dry bean markets.

The cocoa growers are not conversant with the techniques of Primary processing. Defective fermentation and drying will result in low quality and low price. So growers sell their wet beans in the wet bean market, established by manufacturing firms as collecting centres. Large commercial cultivators have facilities for fermentation and drying. They can store dried beans for a longer time and sell dry beans in the dry bean market, when there is a favourable price.

The discussion in this chapter highlights the structure of cocoa market in India and abroad.

WORLD SCENARIO

In the international market, cocoa trade consists of two markets, known as the physical or spot market and future or terminal market.

Contracts on the future markets are traded in lots of 10 tonnes, and constitute a commitment to deliver or receive the quantity of cocoa implied by the contracts at the expiry of the contract term. There is no specification of the country of origin or of particular quality properties of the cocoa that would be so traded; and would usually obtain material close to the minimum quality necessary to pass the market's grading test.

In Physical contracts, on the other hand, the buyer has much more control over the specification of the materials that he will receive, and consequently the prices paid tend to be higher. The amount of the difference in price compared to terminal market prices is in the first instance, governed by the country of origin of the cocoa,

since these tend to have different physical and chemical properties which determine premiums and discounts.[41]

The world cocoa market is characterized by a cycle of brief boom periods and shortages and rising prices, followed by much longer periods of excess supply and falling prices. Consumers respond more rapidly to price alterations than to producers.

The major markets of cocoa beans are the Netherlands and West Germany. Cameroon and the Ivory Coast are the major exporters to the Netherlands. Nigeria and Ghana also export to the Netherlands.

The cocoa processing industry in Germany is constantly increasing the volume of its products over the last few years. The industry produces chocolates for the country's market and the surplus cocoa-cake and powder are exported. Ghana, Nigeria, Ivory Coast and Malaysia are the important suppliers of cocoa beans to Germany.

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[41] ICCO Quarterly Bulletin of Cocoa statistics, 29(3) September 2003

The United States imports cocoa products and cocoa beans. The imports are from the Ivory Coast and the Latin American countries. Brazil and Dominica also supply cocoa beans. Russians import cocoa beans from the Ivory Coast and Brazil. They are processed for internal consumption. They also import cocoa products.

The United Kingdom grinds cocoa beans mainly imported from Ghana and Nigeria. It also imports beans from the Ivory Coast and in small quantities from other African countries. Switzerland imports small quantities of beans and large quantities of cocoa products. Belgium exports chocolate products in large quantities. Switzerland and Spain exports, chocolates produced using the intermediate products imported from Brazil. Japan imports quality cocoa mainly from Ghana.

The major cocoa consuming countries include the Netherlands, the U.S.A., Germany, the Ivory Coast, the U.K., France and others. World consumption of cocoa has been estimated as 28.51 lakh tonnes (2002) The world

consumption of cocoa during 2002 is presented in table 4.1.

TABLE 4.1

World Consumption of Cocoa 2002

Country	Consumption ('000 tones)
Netherlands	420
U.S.A.	425
Germany	200
Ivory Coast	245
Brazil	200
U.K.	170
France	125
Malaysia	110
Others (including India)	956
TOTAL	2851

Source: ICCO Quarterly Bulletin September 2003.

The analysis of the above table relating to the consumption of cocoa in 2002 shows that the United States and the Netherlands stand in the highest position in terms of cocoa consumption. The U.S.A. accounts to 14.9 per cent and the Netherlands to 14.73 per cent; The Ivory Coast, Brazil and Germany come next, which account to 8.59 per cent, 7 per cent and 7 per cent respectively. The

United Kingdom has a share of 6 per cent. Malaysia stands in the lowest position with a share of 3.85 per cent, in terms of cocoa consumption.

During 2001-02, cocoa consumption was around 0.530 kilograms per head. There are, however, wide variations in the consumption levels between the regions. Countries in Europe consume an average of 1.862 kilos per head, the Americans 1.202 kilos, Asia and Oceania 0.106 kilos and Africa 0.134 kilos. Though chocolate has reached all regions of the world, 60 per cent of all chocolate is still consumed in the chocolate markets of the USA and the European Union.[42]

The international market for cocoa is very sensitive in that, the market is prone to great fluctuation in prices, in response to supply and demand situations. This is very true in the case of the beans, but less in respect of products manufactured with intermediate products of cocoa. Table 4.2 provides the international cocoa bean prices at the London Terminal Market.

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[42] ICCO quarterly bulletin of cocoa statistics 2002 Sept.16 (3).

TABLE 4.2

International Cocoa Bean Prices

Year	Prices in US Dollars per tonne
1994	973.86
1995	945.23
1996	1002.98
1997	1177.06
1998	1236.46
1999	833.45
2000	672.76
2001	855.17
2002	1369.17
2003	1256.28

Source: ICCO quarterly Bulletin of cocoa statistics 3rd June 2003.

The above Table illustrates, the trend of cocoa prices for a period of 10 years in the world market. During 1995, price of cocoa marked a decrease of 2.93 per cent. From 1996 to 1998, price gradually increased. The price showed an increase of 6 per cent in 1996, 17.35 per cent in 1997 and 5 per cent in 1998. But from 1999 to 2000, the price of cocoa declined sharply. During 1999 the price decreased by 32.59 per cent. In 2000, the price of cocoa recorded the lowest position and reached 672.76 dollars

per tonne. The decrease in price was due to over production in the major cocoa producing countries. From 2001 to 2003 cocoa prices started to increase. The year 2002 recorded the highest price for cocoa, which reached 1369.17 dollars. During 2003 the price decreased by 8.24 per cent. The steep price rise during 2002 period, was due to the civil disturbances in the African countries which interrupted the supply of cocoa in the world market.

Cocoa Marketing - Indian Scenario

The cocoa market in the country has expanded to a considerable extent in the recent years. Cadbury India Limited was a monopolistic institution, available in the beginning. Now, a number of other companies such as Campco, Nestle, Lotus, Morde and over 15 other similar confectionery manufacturing units are in the field. This industry has a capacity to process 30,000 tonnes of cocoa beans. But the current domestic availability is around 10200 tonnes.[43]

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[43] G.K.Nair, 'Business Line' 23rd March 2003.

In India, the consumption of the cocoa based confectioneries are highly dependent on the upper and middle income classes of urban and rural areas. As the Indian middle class is growing and becoming more and more affluent, the disposable income has also increased. This class of people are shifting from traditional 'mithai' to the more exotic chocolates. The real income of these sections are destined to grow over time and along with this trend, the consumption of confectioneries and 'fad' foods is bound to increase. The same is the case of the new rural rich, who are becoming increasingly educated and urbanized.

The increase in the income of households and purchasing power has changed life-styles and tastes. The wider access to the markets with the spread of television and an efficient distribution network, has made the product easily available. Several new chocolate products have come into the market recently. The chances of intense competition among the manufacturers, to market

their products have further brightened with the liberal incentives provided by the Government.

There was an attractive price for cocoa prevalent till the 1980's. Being a crop, subject to the monopolistic exploitation of the available industrial units, has however paved ways for fall in prices in 1981-82 and 1982-83. Wet bean price of cocoa remained below Rs.10/- per kg. Inadequate marketing network and fall in price affected the cocoa production in the country. Only from the beginning of 1990's the price gradually increased, offering a price varying from Rs.12 to 17 per kg. of wet beans, which could help in resetting the cocoa cultivation. Appendix VI provides the average wholesale price of wet cocoa beans in Kerala from 1993-94 to 2002-03.

The situation has changed during 2003. Indian cocoa products manufacturing industries offered a high price to cocoa. Now the price for wet beans ranges from Rs.28 to Rs.30. The price of dried beans ranges between Rs.90/- and Rs.100 per kilogram. In certain cases, it went

up to Rs.110-120/- per kilogram.[44] The domestic prices of dry cocoa beans for a period of 8 years has been given in table 4.3.

TABLE 4.3

Price Behaviour of Dry Cocoa Beans

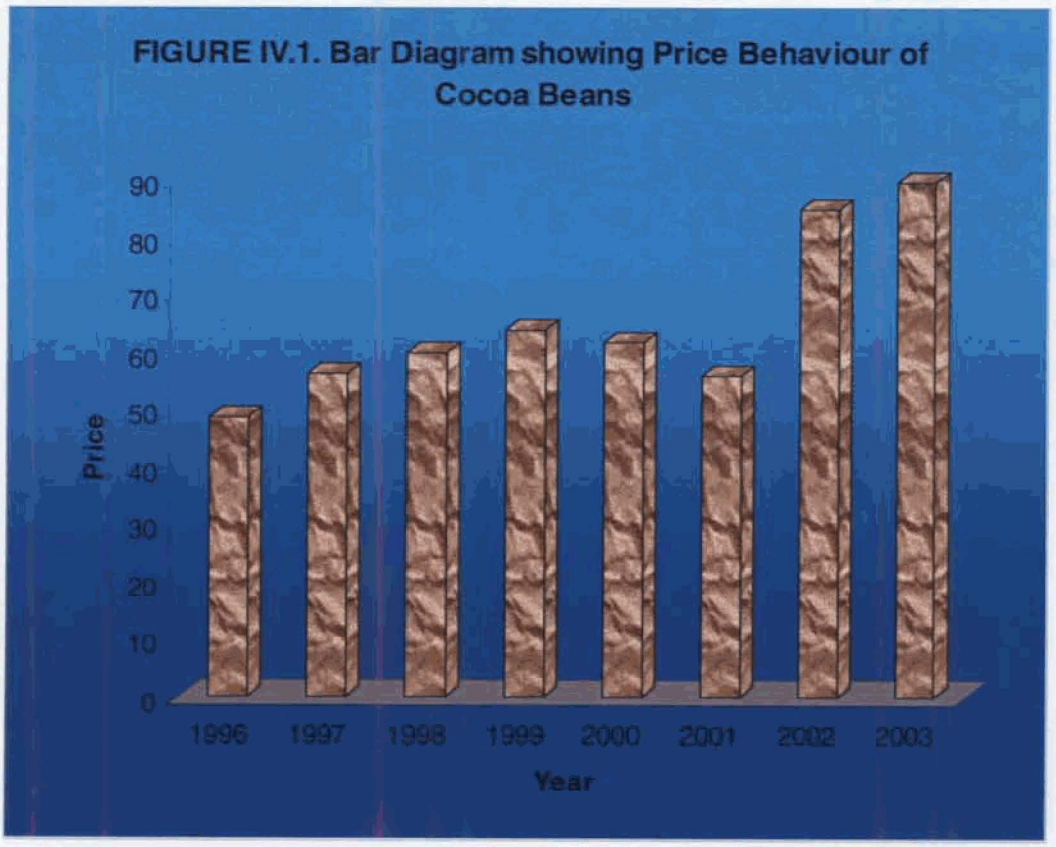
YEAR	DOMESTIC PRICE (Rs./Kg)
1996	48.95
1997	56.30
1998	60.00
1999	64.00
2000	62.00
2001	56.00
2002	85.00
2003	90.00

Source: Compiled from the records of Campco, Mangalore, Karnataka.

An analysis relating to the price behaviour of cocoa in the country shows that, the cocoa bean price has fluctuated widely. From 1996 to 1999, the price showed a gradual increase. During 1996, the price of dry cocoa beans was Rs.48.95 per kg. In the years 1997, 1998 and 1999 the prices increased by 15 per cent, 6.57 per cent

[44] Records, Department of Agriculture, Govt. of Kerala, Marketing Section, Kozhikode

and 6.67 per cent respectively. The price gradually decreased by 3.12 per cent in 2000 and 9.68 per cent in 2001. From 2002 to 2003 the price indicated an increasing trend. The price increase in the year 2002 was 51.78 per cent and in 2003 it was 5.88 per cent. The rise in prices was due to the heavy demand for cocoa from both international and domestic markets. Figure IV.1 provides the domestic prices of cocoa beans for a period of 8 years.



COCOA BEANS MARKET

Different agencies are involved in the procurement of cocoa. Initially, this task was completely under the supremacy of Cadbury's India Ltd., but later some other agencies joined it, like the Campco, (which has the largest chocolate factory in Asia) Nestle, Amul and Morde. Important processing units which purchase cocoa beans has been presented in Appendix IV.

Cadbury India Ltd. has appointed agents in different places in Kerala and Karnataka to procure the beans. The international market was buoyant in the beginning of the seventies, and the spurt in cultivation resulted in increased production. In the beginning of the eighties, the price of cocoa declined and the relaxation of duties on imports, made imported beans cheaper than the domestic produce, and the prices fell sharply in the country. Cadbury India Ltd. and probably others too imported cocoa beans for processing.[45]

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[45] Dand, R. 'The international cocoa trade', wood head publishing, 1993 - p.75.

The Kerala State Co-operative Marketing Federation (Marketfed) and Campco were asked by the Government to undertake procurements in Kerala and Karnataka respectively, Marketfed started its operations during 1980 and the dried beans were exported. The operations by Marketfed ended up in heavy loss as the international price was low and it soon stopped buying cocoa from the farmers. Again, at the instance of the state government, Marketfed entered the market in August 1981 and started procurement. It had by this time 10 co-operative societies in five districts in the state, through which procurement was made. These societies had to collect, ferment and dry the beans, which would be procured by Marketfed.

Whenever the domestic prices were found to be advantageous, Cadbury India Ltd. and other firms entered the market to procure the beans.

The Kerala Government asked Campco to enter the cocoa market in the state during June, 1980. In Karnataka too, the manufacturing firms had stopped purchase of wet beans by May 1980 in the wake of falling

international prices. At the instance of the state government, Campco started procurement operations in June 1980, through a network of co-operative societies and its own centres.

The services of member co-operative societies are presently utilized by Campco for procuring cocoa. Primary processing is done at the central procurement points. Campco has primary processing centres in Kerala and Karnataka. The domestic demand and supply and the future trend of cocoa is shown in table 4.4. This is also presented in figure IV.2.

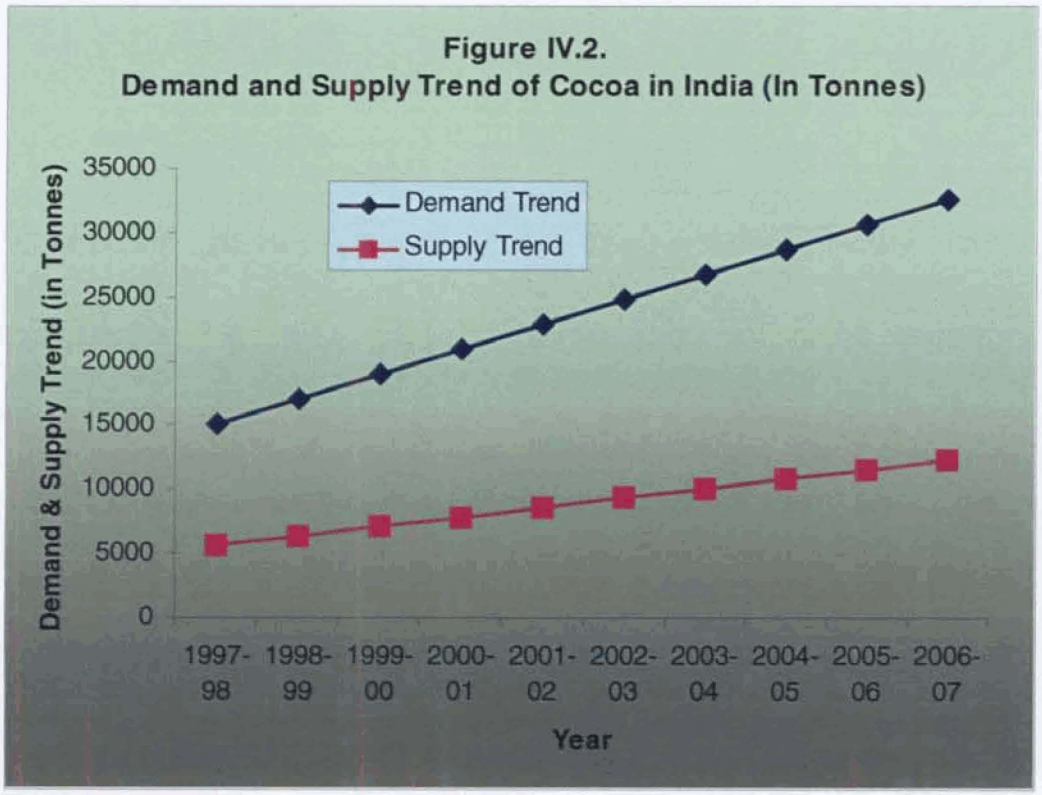

TABLE 4.4

Demand and Supply of Cocoa in India

Year	Demand (in tonnes)	Trend Value	Supply (in tonnes)	Trend Value
1997-98	13000	15067	5281	5613
1998-99	15000	17011	5198	6355
1999-00	17200	18955	6361	7097
2000-01	18900	20899	6540	7839
2001-02	20800	22843	6780	8581
2002-03	23000	24787	10200	9323
2004-05	Estimate	28675	Estimate	10807
2006-07	Estimate	32563	Estimate	12291

Source: "The Hindu", Survey of Indian Agriculture 2002, and Records, Directorate of Cashewnut and Cocoa Development, Cochin.

For the purpose of time series the following formula is used.

$$y = a + bx$$

Where $a = \frac{2S1}{n}$

$$b = \frac{4(S2 - S1)}{n^2}$$

Where S1 = First sub total

S2 = Second sub total

n = Number of years.

consider 1997-98 as Origin

Demand, a = 15067, b = 1944

Supply, a = 5613, b = 742

The demand-supply analysis for the years from 1997-98 to 2006-07 shows that the demand is increasing at a higher rate, than the supply in the country. From 1998-99 to 1999-2000, the demand increased by 15 per cent per year. From 2000-01 to 2002-03, demand again showed an upward trend at the rate of 10 per cent per year. But the supply during 1997-98 was only around 40 per cent of the demand. In 1998-99 the supply decreased by 1.57 per

cent. From 1999-00 to 2001-02, the supply showed a gradual increase at the rate of 22.37 per cent, 2.8 per cent and 3.66 per cent respectively. During the year 2002-03 the supply showed a steep increase by 50.44 per cent. During 2002-03 the deficit in the supply was 12800 tonnes. The deficit would be around 17870 tonnes in the year 2004-05 and 20270 tonnes in the year 2006-07. From the analysis it is also found that the demand-supply gap is widening significantly year by year. The increase in supply during 2002-03 was resulted by the rising tendency of prices in the previous years. hence the cultivators are now showing interest in the production of cocoa.

The domestic production of cocoa beans is not sufficient to meet the increased demand, and the industry has to resort to significant imports. The demand for cocoa beans is expected to increase rapidly every year. The import of cocoa beans by the processing industries is presented in table 4.5

TABLE 4.5

Import of Coca Beans

YEAR	QUANTITY (IN TONNES)
1998 - 99	2722
1999 - 00	1422
2000 - 01	2027
2001 - 02	2149
2002 - 03	1213

SOURCE: Compiled from the records of Directorate of Cashewnut and Cocoa Development, Cochin.

From the above table it is observed that the Indian cocoa product manufacturing Industries are importing cocoa from African countries and Malaysia, to meet their needs. During 1998-99 the import was 2722 tonnes. The import decreased to 1422 tonnes in 1999-00. From 2000-01 to 2001-02, import of cocoa gradually increased by 42.54 per cent and 6 per cent respectively The import decreased by 43.55 per cent in 2002-03 and reached the lowest level of 1213 tonnes. The decrease in the import was mainly due to high price and shortage in the supply of cocoa beans in the international market.

QUALITY REQUIREMENTS

The cocoa procuring firms have graders who analyse the samples and decide whether it has sufficient quality to be tendered on the market. Good quality cocoa will be priced higher. If the cocoa is below the standard, set by the firms, it will get a low price.

The word 'quality' includes all the important factors of flavour and purity. It also covers the physical characteristics, which have a direct influence on value and acceptability of a 'lot' of cocoa beans. the quality of a sample is primarily judged by the flavour of chocolate made from it. It is also dependent on factors such as bean size, shell percentage, fat content and the number of defective beans. Good quality cocoa will have the inherent flavour of the type of cocoa, together with the relevant physical characters and freedom from defects. The average weight of dry beans should be at least 1 gram. The manufacturers also prefer beans to the reasonably uniform in size.[46]

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[46] Less R. 'History of sweet and chocolate manufacture', specialised publications Ltd. 1988, p. 120-122.

Flavour is developed during fermentation and roasting. It is assessed by tasting the chocolate made from a sample of beans. This is normally done by a panel of experienced tasters. Samples are evaluated for strength of chocolate flavour, astringency and presence of off-flavours. The flavour varies with the type of cocoa. Criollo and Trinitario give 'fine' grade. These are highly priced by the manufacturers for making plain chocolate. Criollo gives a mild nutty flavour while Trinitarios have a full chocolate flavour with some fruitiness of other ancillary flavour. Forastero types like Amelanado, Amazon and Hybrids give 'bulk' cocoa, which constitute about 90-95% of the world's supply. The flavour of bulk cocoa varies from country to country. This variation arises due to the different practices prevalent in these countries on fermentation and drying.

Cocoa of Nigeria and Ghana are considered to be of the premier grade in bulk cocoa market. This is due to the strict enforcement of quality standards. The quality of cocoa of Cameroon and the Ivory Coast is poor due to lack of strict adherence to quality standards. Brazilian cocoa

has been remarked of making off-flavours and cocoa from the Dominican Republic has harsh astringent flavour as the beans are under fermented, Malaysian cocoa is considered to be acidic. Both fine and bulk cocoa suffer from several off-flavours.

Mouldy off-flavour arises due to the presence of moulds inside the beans and samples with as little as 4 per cent of internally moudly beans can impart an off-flavour to the chocolate. This off-flavour cannot be removed by processing. The presence of moulds inside the beans can be revealed by cut test. The moulds inside the beans increase the free fatty acid content of cocoa butter to the levels as high as 20 per cent. If the free fatty acid content of a sample of cocoa beans exceed 1 per cent, the free fatty acid derived from cocoa butter from them will exceed 1.75 per cent, there is also possibility of some moulds giving rise to the presence of mycotoxins.

A large number of mould species have been found in cocoa beans. These invade the cocoa beans before harvest,

during fermentation or drying and storage. Pods attacked by 'Botrydiplodia theobromae' produce high percentage of beans with internal mould. If fermentation is prolonged beyond seven days, the percentage of internally mouldy beans increases considerably. When sun drying is prolonged due to dull weather, moulds get into the beans. When the humidity of the store is high, the beans absorb moisture and turn mouldy.

Contamination by smoke during drying or during storage can cause smoky off-flavours. This off-flavour cannot be removed during chocolate manufacture. The smoky off-flavour is sometimes referred to as 'hammy'. Hammy off-flavours can also arise due to over fermentation. This off-flavour can be detected by crushing beans samples in hand and then sniffing them.

Acidic off-flavour is due to the presence of excessive amounts of volatile(acetic acid) and non-volatile (lactic acid) acids. During manufacture, acetic acid is reduced to an acceptable low level, but lactic acid is not removed. The presence of lactic acid in excessive amounts will cause off-

flavour. The presence of acetic acid can be readily detected by smelling the beans, but acidity due to lactic acid can only be detected by tasting the chocolate made from them.

Bitterness and astringency arise due to poor fermentation. Though bitterness and astringency form a part of the complex of chocolate flavour, their presence in excess becomes objectionable. This type of off-flavour cannot be removed by normal factory processing. Unfermented or slaty beans have none of the precursors of chocolate flavour and chocolate made from them has a bitter, astringent and thoroughly unpleasant flavour. Fully purple beans or under fermented beans will have some chocolate flavour, but they will be bitter and astringent. A change in flavour is associated with the colour change. Beans with 30 per cent fully purple beans may impart a harsh and bitter taste to the finished product. The purple beans gradually change to brown during storage.

It is essential that the cocoa beans delivered to the market are pure. It should not contain anything which is harmful to human being. The use of chemical

pesticides/fungicides at different stages of maturity of pods and storage can give rise to toxic residues in the cured beans. Limits have been fixed for the level of these chemicals in cocoa beans in different countries.

During fermentation, drying and storage substantial numbers of bacteria get into the beans. Though bacteria are essential for carrying out the fermentation, the multiplication of different types of bacteria and increase in large numbers can lead to infection by pathogenic bacteria like Salmonella. Normal manufacturing process will kill major portion of bacteria.

Several species of insects infest cocoa beans. The most important one which affect the quality of the finished product is tropical warehouse moth. The presence of foreign matter may contaminate cocoa, affect flavour or cause damage to the plant and machinery, besides reducing the quantity of edible material.

The quality of cocoa in a particular site and sent to different places should be consistent. This is essential because the chocolate manufacturers aim to produce

chocolate of consistent quality. To some extent, consistency of bulk cocoa can be achieved by blending cocoa of the same grade standard.

The average weight of dry bean should be at least 1.0 gram. Small beans have high shell and low fat content.

The shell should be loose, but strong enough to remain unbroken during normal handling. It should be free from lumps of dried pulp. Main crop of West Africa usually has a shell contents of 11-12%. Shell percentage can be reduced by washing the beans after fermentation, but the shell becomes so brittle that this practice is not advisable.

The cocoa grown under optimum conditions produces beans with 56-58 per cent butter in the dry nib. This is an important factor, which decides the price of cocoa beans. For safe storage, the moisture content of cocoa beans should be around 6-7 per cent. If it is above 8 per cent,

there is risk of mould growth and if it is less than 5% the shell becomes too brittle and the beans may break.[47]

FACTORY LEVEL PROCESSING

Secondary processing denotes the steps involved in conversion of raw beans into different finished products, the main product being chocolate.

Secondary processing of cocoa beans is done in specialised factories. The essence of cocoa and chocolate manufacture, lies in the development of flavour by roasting the beans, followed by the extraction of cocoa butter from the nib to produce cocoa powder.

When the beans arrive in the factory, they are cleaned to remove any foreign matter and sorted to separate the small or broken beans by passing them over a continuously vibrating screen. This is well aerated and is filled with powerful magnets. The metallic foreign matter, dusts and broken beans are removed.

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[47] Katherine Khedorowsky and Harve Robert, 'Chocolate from A-Z' Flammarian-Barry, Callebaut, 1997, pp. 85-87

When beans are used for manufacture of cocoa powder the cocoa liquor is generally treated with alkali to improve the colour and to develop the flavour. Alkalized cocoa is known commercially as "Soluble Cocoa'. The amount of alkali used for the preparation of soluble cocoa is adjusted to bring about partial rather than complete neutralization. Saturated solutions of sodium or potassium carbonate are most generally used while, ammonia, ammonium carbonate, magnesium oxide or carbonate or bi-carbonate or mixtures of certain of the above chemicals are favoured by some manufacturers. Alkali may be introduced prior to roasting or at the nib stage or at chocolate liquor stage. However, it is more economical to mix it with chocolate liquor.

The process of alkalization involves soaking of nib in warm alkali solution until complete penetration into the nib was achieved. Both the quantity of alkali and its concentration in water used had a profound effect on the colour of the final cocoa. Alkalization temperature of 80°C to 85°C give the best flavour. The duration of alkalization

was determined by the time taken for the alkali solution to penetrate the nib. In production experiments this was found to be about an hour which was also the adequate time required for the mixture to reach 80°C.[48]

Roasting of cocoa beans, more correctly termed as treatment of cocoa beans in hot air, is one of the most important operations in the processing of cocoa and the degree of treatment required being adjusted to the degree of ripeness of the beans concerned and any other pre-treatment which they may have undergone. The true purpose of roasting is not only restricted to the loosening of the shells, but also to develop positive flavour as well as the removal of excess moisture and other undesirable volatile matter. It enables to bring down moisture content to 1.5 - 2%.

Different methods of roasting can be employed and they produce different end effects, some of which are more applicable to particular varieties of beans than others. The

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[48] Beckett, S.T. 'Industrial chocolate manufacture and use', 2nd edition, Chapman & Hall, 1994, pp- 87-90.

roasting should ensure an absolutely equal treatment of all the beans in the batch. Suggested that the main objects of roasting are colour development, aroma and flavour development, modification of the structure of the shell so as to permit easier subsequent separation, reduction of moisture content, solubilization of cocoa starch and chemical changes, especially oxidation of some minor constituent of the beans.[49]

Roasting causes some degree of loss of cocoa butter from the nib to the extent of 0.2 to 0.5 per cent by weight. The loss occurs as a result of migration of fat from the nib into the shell. The higher the temperature, the greater will be the loss. The loss of fat can be appreciably reduced if the beans are cooled immediately after roasting. There is, in any case an overall loss in weight of 5 to 7 per cent while roasting due to reduction of moisture content. It is also stated that the most favoured temperature for proper roasting of cocoa beans for chocolate making lies between 120°C and 125°C. The optimum temperature is also to

[49] L.R, Cook, E.H, Meursing, 'Chocolate Production and Use', Revised edition, Harcourt Brace Johanovich, 1982 pp. 96-97

some extent dependent on the actual time allowed for roasting. The temperature and time have considerable influence on colour and flavour. Chemical changes take place in the nib at a temperature of about 120°C to 135°C, to obtain the fine qualities of flavour, beans should usually be roasted at the lowest practical temperature. A low temperature roast can take up to 60 minutes to complete; a medium roast up to 40 minutes and a high temperature roast from 15 to 25 minutes. The discharged beans must be rapidly cooled to prevent over roasting with attendant discolouration and spoilage of flavour. There is very little loss of volatile acids from the beans during roasting. Up to 10% of acetic and propionic acids are however released from the shell. Reduction of carbohydrates and amino acids also occur during roasting to the extent of 0.2 per cent of the dry nib weight. Properly dried beans have a moisture content of 6 to 8 per cent. During storage, the beans absorb water from the atmosphere and the moisture content can rise to 10 to 20 per cent. Roasting can be done using direct or indirect heating, direct heating by gas, direct heating by steam pipes or heating by hot air.

The shell is separated from the cotyledon by a process called 'kibbling'. The purpose of winnowing is to separate the shell and germ and to split the cocoa into its natural segments (cocoa nibs). Roasted cocoa beans can contain between 10 per cent and 15 per cent shell depending on the source and about 1 per cent germ. The presence of significant amount of shell in chocolate will affect both colour and flavour and in addition reduces the effectiveness of refining. The separation of shell and germ can be carried out separately or together, depending on the choice of commercial plant. Cocoa beans are first cracked by passing through rollers or rotating cones. An air current is then used to blow away the lighter shell. The velocity of this air steam is critical, it should be sufficient to remove the undesirable shell but not too high to blow off the costly nib and must be varied to suit the changing size of cocoa bean from different sources.

Discharged cocoa shell may contain as much as 20 to 25 per cent of cocoa fat. Yields of between 80 to 86 per cent are normally achieved by winnowing. The shell butter

content of commercial shell is variable and fluctuates according to the amount of fat transferred from the nibs through roasting and the efficiency of the winnowing machine in separating nibs from shell. Cocoa shell butter is a deep yellow solid, and melts to a dark brown liquid. On account of its high acid value shell butter is not acceptable as human food.

The cotyledons (called the 'nibs' at this stage) are ground to get 'mass' or 'liquor'. Cocoa mass contains about 55-58 per cent fat, which is also called 'cocoa butter'. This butter has the characteristic of "melting at body temperature". The cocoa nibs are finely ground at a relatively high temperature. Normally cocoa is subjected to a pre-grinding stage followed by the fine grinding. The particle size of the finished product has pronounced effect on its suitability as an ingredient of different food product. During this operation heat is generated by friction, which melts the cocoa butter. Normal grinding is done by means of either cylinder rollers of 3 or 4 stages or a ball mill.

Cocoa butter is extracted from mass or liquor with the help of a hydraulic press. The cocoa butter obtained by employing any methods is filtered and if necessary, is neutralized, refined, deodorized and tempered. It is then moulded and cooled. At this stage, it is hard in consistency, waxy, slightly shiny, pale yellow in colour and oily to touch. It melts at a temperature close to 35°C giving a clear liquid.[50]

The cake left behind at the bottom of the presses after the extraction of butter, contains a further 20 per cent of butter. This cake is milled and sieved. There are two types of cocoa powder; high fat powders containing 20-25 per cent of fat and low fat powders containing 10-13 per cent of fat. High fat powder is used in drinks while low fat powder is used in cakes, biscuits, ice-creams and other chocolate-flavoured products.

Production of Chocolates

Chocolate is produced by mixing sugar with nib or mass to which cocoa butter is added to enable the

[50] Records, Campco chocolate factory, Puthur.

chocolate to be moulded. The proportion of mass sugar and cocoa butter varies with manufacture and it remains to be a trade secret.

The dried beans are cleaned and roasted uniformly to get the desired aroma. The roasted beans are broken and winnowed to get good nibs. When these nibs are ground, we get the COCOA LIQUOR or MASS. The mass can be presented to extract butter. The remaining part is called cocoa-cake which, when pulverized, becomes POWDER. The type of machineries used for roasting, winnowing, alkalizing, grinding, pressing etc. contribute considerably to the quality of the products. CAMPCO possesses the most modern machineries to perform these jobs, thus enhancing the quality of its products.

The cocoa mass obtained out of the roasted beans is used as the basic material for chocolates. This mass is mixed finely with ground sugar, milk solids, emulsifiers, flavouring agents etc. in proportionate quantities. Thereafter the paste is homogenized between fine rollers and treated to get a smooth paste with the right viscosity.

This product is conched for about 72 hours to get correct fineness and aroma which is moulded into chocolates.[51] Usually three types of chocolates are made such as, white chocolate, milk chocolate and dark chocolate. White chocolate is made from cocoa butter, sugar, milk and flavouring such as Vanila.

Milk chocolate is made from cocoa liquor, cocoa butter, sugar, milk and flavouring.

Dark chocolate is made from cocoa liquor, cocoa butter, sugar and flavourings.

The nutritional value of cocoa and chocolate

Chocolates and cocoa products, apart from the pleasure to eat, have a food value. All foods have a nutritional value that is related to the amount and kind of proteins, carbohydrates, fats, minerals and vitamins they contain.

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[51] Minifie, B.W, 'Chocolate, cocoa and confectionery science and technology', 3rd edition, Van nostrand, Rein-hold 1989 - p. 122.

Fats provide a source of energy. Cocoa and chocolate contain fat in the form of cocoa butter. The digestibility and assimilation of cocoa butter is quite high.

Chocolate is made to many different recipes and contains extra ingredients in addition to cocoa products. Therefore the nutritional value will vary with the ingredients. For example, plain chocolate has a high proportion of cocoa solids and will therefore retain more of the nutritional value of cocoa than milk chocolate, which has a lower proportion of cocoa solids. But, in milk chocolate the milk provides a rich source of proteins which the body can use and so its protein value is higher than that of the plain chocolate. Sugar in confectionery provide one of the quickest ways of restoring the balance, and so, cocoa and chocolate products are often eaten as snacks between meals. Table 4.6 provides the nutritional value of cocoa powder.

TABLE 4.6

Main Nutrient Values Contains in 100 gram Cocoa Powder

Nutrient substance	Gram	Minerals	mg
Protein	20.4	Sodium	650
Fat	25.6	Potassium	534
Carbohydrates	35.0	Calcium	51.2
Calory 452		Magnesium	192
		Iron	14.3
		Copper	3.4
		Phosphorus	685
		Sulphur	160
		Chlorin	199

Source: 'COCOA', K. Bhaskaran Nair, Published by State Institute of languages, Kerala 1979.

From this table it can be easily understood that there is high nutrient and calory value in the cocoa added chocolate. Now-a-days cocoa chocolates are used as light food. The fat content of the cocoa powder varies between 10 per cent and 24 per cent. Cocoa powder contains protein in small and varying levels. Whenever cocoa powder is manufactured from well fermented cocoa beans, and these are roasted in the correct manner, it will contain carbohydrates in the form of sugars. Cocoa powder has a high proportion of dietary fibre, upto 30 per cent. Cocoa powder contains a variety of minerals, of which potassium

and sodium are of primary importance. Cocoa powder is not an important source of vitamins as they occur in negligible quantities. The exception is Vitamin 'E', which occurs in higher quantities due to the presence of cocoa butter. The Calorific value of cocoa powder is intrinsically low and thus, it contributes little to product's total calorific value.

OTHER PRODUCTS FROM COCOA

Processing of cocoa both at primary and secondary levels leave a large quantity of waste materials. The disposal of these is one of the problems in major cocoa growing tracts. Research on utilization of these indicates that several useful by-products can be produced from cocoa wastes. The important waste materials are pod husk, sweatings and shell.[52]

Animal feed can be made from cocoa pod husks. The husks provide high fibre, low protein and moderate energy

[52] O. Sobamiwa, 'Cocoa pod husk utilisation summaries and strategies', paper presented at 12th International cocoa research conference, Brazil, Nov. 1996

feed stuff. Theobromine, a toxic alkaloid present in cocoa, is present in the husks in low quantities.

Cocoa pod husk can be used as a substitute for corn and wheat bran in feed formulations for chickens, pigs and sheep. To produce the feed the fresh cocoa pod husks are sliced into flakes. The flakes are partially dried to 60 per cent moisture content, they are then minced or pelleted and dried. It can be used as wet feed for pigs, mixed with corn and other ingredients. Wet cocoa pod husk can be mixed with grass, Cassava and other farm wastes as feed for rabbits, sheep and horses.

The use of cocoa as a source of animal feed is currently being researched in an ICCO Project on the processing of cocoa by-products at the Cocoa Research Institute of Ghana. Initial results found that pigs raised on a wet food of cocoa pod husks gained enough weight to be sold at a profit.

In the tropics the Tilapia is a promising fish for pisiculture. However, feeding the fish can be expensive for small scale producers. The pisiculture research unit in

Cameroon has developed a fish food partially made from powdered cocoa fruit husks. In research it was found that baby Tilapias fed for three weeks on mixtures of differing concentration of cocoa grew normally. The husks just need to be sun dried and then ground to a powder for use in the fish food.

The nitrogen and phosphorus content of the pod husk is comparable to farm yard manure from animals. The potash content is very high.

Sweating can be used for making jelly or jam. The pectin from sweatings show slow setting characteristics.

Mulch - coca bean shells can be used as an organic mulch and soil conditioner for the garden.

Once the beans have been fermented and dried they can be processed to produce a variety of products. These products include:-

- Cocoa butter - which is used in the manufacture of chocolate. It is also widely used in cosmetic products such as moisturizing cream and soaps.

- Cocoa Powder - which can be used as an ingredient in almost any foodstuff. For example, it is used in chocolate flavoured drinks, chocolate flavoured desserts such as ice-cream and mousse, chocolate spread and sauces, cakes and biscuits.

- Cocoa liquor - that is used, with other ingredients, to produce chocolate. It is used as a product on its own or combined with other ingredients to form confectionery products.

- Production of soft drinks and alcohol - in the preparation of soft drinks, fresh cocoa pulp juice (Sweatings) is collected, sterilised and bottled. For the production of alcoholic drinks, such as brandy, the fresh juice is boiled, cooled and fermented with yeast. After 4 days of fermentation the alcohol is distilled.

COCOA PRODUCTS MARKET

During the nineteenth century, a technique to extract fat from the cocoa beans was invented. This intermediary

product could be used for producing very palatable eatables and drinks. The introduction of Milk chocolate in Europe subsequently pushed up the demand for cocoa. Cocoa is a prominent ingredient in the production of milk chocolates, drinking chocolates and malted milk products in India. It is also used in ice-creams, biscuits, confectionery, Pharmaceutical and cosmetic industries. Different varieties of cocoa have different flavours and some of them have commanded high premium.

The chocolate market began brightening up by the beginning of 1988. Several new varieties of chocolates were introduced.

The attractive tastes and textures of chocolate and chocolate products delight the senses of all ages. The important chocolate producers are Cadbury India Ltd., CAMPCO, Nestle India Ltd., AMUL and Morde. There are other confectionery manufacturing units in the market.

Cadbury Schweppes today manufactures products in 60 countries. Cadbury India Ltd. is a subsidiary company of Cadbury Schweppes, U.K. Cadbury India Ltd. has a

licensed capacity of 15500 tonnes for the manufacture of chocolates. Cadbury accounts for the lion's share of the production of chocolate and drinking chocolates in the country. The cadbury India Ltd. has installed its processing plants in Maharashtra and Madhya Pradesh. Cadbury, a dominant consumer, has started about 150 cocoa collecting centres in different places in Kerala to procure cocoa beans. Table 4.7 shows market share of some of the chocolate manufacturers in the country.

TABLE 4.7

Chocolate Marketing Shares of Companies

	NAME OF THE COMPANY	SHARE (in percentage)
1.	CADBURY INDIA LTD.	65
2.	CAMPCO	12
3.	AMUL	8
4.	NESTLE	5
5.	PARLE	2
6.	Dr. WRITERS	1
7.	Atarifood products, Parry's, Sathe's morde, Aurofood Pvt. Ltd., Nutrine, Ravalgon etc. sharing for the left overs.	

Source: CAMPCO CHOCOLATE FACTORY STATISTICS.

The analysis of the above table indicates that the Cadbury India Ltd. is the market leader, with 65 per cent of the market share. It was the only company in the market during the initial stage of cocoa production. So they are enjoying the advantages. Campco stands in the second position sharing 12 per cent. Amul, Nestle and Parle account for 8 per cent, 5 per cent and 2 per cent of the market share respectively. The other confectionery producers share the remaining 8 per cent.

Nestle India Ltd. is the leading branded food in the country. It has a broad based presence in the food sector with leading market share in milk products, instant coffee and infant foods. It has also strengthened its presence in chocolates and confectionery market. Nestle has maintained its thrust on improving availability of its products on initiatives to increase the freshness of stock available to consumers. They are collecting cocoa from Cadbury, campco and through imports.

During 1981, Campco entered the cocoa market and started procurement of beans. It also set up processing

(primary) centres in Kerala and Karnataka. Campco was convinced of the need for having its own final processing facilities to protect the growers. It got a letter of intent to install a plant in 1980 and this was converted into a licence in 1982. Machines were imported from Italy, Denmark, Switzerland and West Germany. The plant with a capacity to process 8800 tonnes of dry beans a year already has started commercial production. The total investment comes to about Rs. 11.3 crores. The plant is most modern and offers employment to about 60 persons. It has a captive power plant and effluent treatment plants. It has facilities for carrying large inventories of inputs and outputs. The dry beans can be kept for three to four years.

The plant can process about one tonne of dry beans an hour. It has a capacity to manufacture 500 kg. of chocolates in an hour by making use of a part of its own butter. It is to become the largest cocoa processing unit in the country with the aim of achieving full capacity production. The important products will be cocoa liquor, butter and powder. These intermediate products will be

utilized for the manufacture of moulded chocolate, enrobed chocolate, toffees and instant cocoa powder. However, only a small portion of the intermediate products will be used up in the manufacture of these items.

The manufacturing plant is located at Puthoor, a centre of cocoa production, some 50 km from Mangalore. The administrative section is situated at Mangalore.

The licensed capacity of the plant is 8,800 tonnes per annum as detailed below in Table 4.8

TABLE 4.8

Capacity Position of Campco

PRODUCT	LICENSED CAPACITY (In tonnes)
1. Cocoa Liquor	1,600
2. Cocoa butter	1,600
3. Cocoa powder including instant cocoa Powder	2,310
4. Moulded chocolates	1,620
5. Enrobed chocolates	810
6. Chocolate toffee	860
Total	8,800

Source: Compiled from the records of CAMPCO Chocolate Factory, Puthur.

One significant indicator of innovative growth of Market was the growth of a new market - speciality

chocolates. These are fast replacing the traditional 'mithais' gifted during festivals and other occasions.

Mainly there are four types of chocolates and each type has a number of varieties. They are moulded, enrobed, sugar panned and chocolate panned.

In moulded chocolates, variety is developed by giving different flavours like orange, coffee etc. or by stuffing the products with fruits, almonds, cashews etc.. In the enrobed type, variety is developed by giving different flavoured centres with chocolate around. Coconut, glucose, honey etc. are some of the flavours used.

Sugar panned types (there is outer coating of sugar products) are GEMS, PLAYTIME etc.. This single product accounts for around 20 per cent of the total market. In chocolate panned types, there are a number of brands such as Caramels, Nutties and Nut butter scotch.

Another type of chocolate popular with consumers is the Éclairs. This is packed like traditional toffees. hence

most of the leading confectionery manufacturers also produce Eclairs - e.g. Nutrine, Ravalgon, Parry's etc..

The milk-loving Indian population gives scope for chocolate beverages. This fact is evident by the size of the market - an estimated 30,000 tonnes per year. Of these 65 per cent is in the south and 15 per cent in the west. The balance of 20 per cent is shared somewhat equally between the North and the East. Of the Southern market, more than 50 per cent is from Tamil Nadu, Andhra Pradesh taking second place with 20 per cent, Karnataka and Kerala account for 15 per cent each. Of the western contribution 75 per cent is from Maharashtra and 20 per cent from Gujarat. Madhya Pradesh accounts for less than 5 per cent. The brand leader in Chocolate beverages is 'Bournvita' followed by 'Boost', 'Maltova'. 'Nutramul' and 'Winner'.

The market leader, Cadbury, has a wide range of chocolates in moulded, enrobed, chocolate panned and sugar panned categories. CAMPCO launched 'playtime' in

sugar panned category positioned against 'GEMS' of Cadbury.

All other competitors including AMUL are offering products in moulded and enrobed categories only. AMUL introduced enrobed products like 'AMUL trix' and 'Badambar'. One point to be noted is that one of Cadbury's highest selling products is the sugar-panned 'GEMS'. Consumers and dealers rated GEMS as the most bought/and sold product. As chocolate purchasing is mostly impulse purchase, wide range of products is one of the pre-requisites for success in this market. Wide range of products also give more mileage for each advertising. One of the factors noticed in CAMPCO's product strategy is the penchant for imitation i.e., all products of CAMPCO except 'White chocolate' are almost duplicates of Cadbury products positioned exactly against them. At the same time small competitors like Nestle, Atari, Parle and Amul also tried to evolve some product identity. Product range of major chocolate manufacturers is given in Appendix -V.

CAMPCO milk chocolate is positioned against

Cadbury's 'Dairy Milk', 'Treat' against '5-star', 'Turbo' against 'Double decker', 'Play time' against 'Gems', 'Winner' against 'Bournvita' etc. Wide range also commands more shelf space at the retailer level attracting consumer attention.

Even size and price of products are also positioned exactly along Cadbury Line. Various companies also market classic selections to develop exclusivity for gifting etc.

FUTURE TREND

It is very much evident that the chocolate market is growing at a fast pace over the last few years. The entry of CAMPCO has contributed much to this sudden spurt, Cadbury has for the first time felt the heat of competition. It is now in its fifty years of domination, that seems vulnerable. Sensing this, they have reacted strongly to keep their market. Reduction in prices, repacking of existing brands, promotion of a range of new products and diversification programme, all point towards an atmosphere in the market leader's belly.

CAMPCO and the re-energised AMUL, NESTLE, DR.WRITERS, PARLE AND ATARI are not the only names threatening Cadbury's market hegemony. New international brands of competitors, are likely to join the brand soon.

The consumer preference is moving from the plain chocolates to chocolates with exotic fillings like almonds, raisins and cashew. Presentation items of chocolates is a fast growing new market. There is the vast, untapped rural market which still chews its toffees and 'mithais'.

The previous pages in this chapter highlighted the world and Indian Market scenario in cocoa. The production of chocolates and marketing of various cocoa products are also discussed. The future of any crop depends on the smooth and clear production and marketing flows. However, the cocoa as an inter crop faces a number of problems from the production and marketing front. The problems relating to production and marketing are explained in the next chapter.

PROBLEMS OF COCOA CULTIVATORS

P.K. Abdul Khader “A study on the prospects and problems of cocoa cultivators in Kerala with special reference to marketing” Thesis. Department of Commerce and Management Studies, University of Calicut, 2005

Chapter V

PROBLEMS OF COCOA CULTIVATORS

CHAPTER V

PROBLEMS

Farmers of Kerala showed much interest in the cultivation of cocoa upto 1980. The initial interest in the plantation of cocoa slowly decreased year after year due to many problems. The area under cocoa came down significantly. So far no substantial support has been received for the development of cocoa in the state, unlike other plantation crops. Hence, the growers are unable to maintain their garden properly.

Most of the cocoa growers are financially poor and have to produce cocoa from the small and scattered land holdings. They experience crop loss from pests and diseases. Marketing machinery is very poor in this sector. Further, enough processing and storage facilities are also not available. They face problems such as inadequate loan facilities, non-availability of technical advice, wide fluctuations in price, exploitation by middlemen and absence of properly organized cocoa collection and selling.

Cent per cent of the respondents opine that though there are so many problems which made hindrances in the development of cocoa sector, the marketing problems are the most important.

This chapter is devoted to assess the various problems faced by the cocoa cultivators in Kerala. Their important problems can be discussed under three main heads: (a) Pests and Diseases (b) Marketing and (c) Others.

Pests and Diseases

Various pests and diseases attack cocoa plants and the yield is adversely affected. The magnitude of crop loss occurring today is very high. Table 5.1 provides the details of the crop loss from pests and diseases. From the study it is proved that currently about 35 per cent crop is lost every year due to pests and diseases.

TABLE 5.1

Crop Loss from Pests and Diseases

Crop loss	Loss in percentage
Due to pests	20
Due to diseases	15
Total	35

Source: Survey data.
Note: Crop loss from insect pest - 5 per cent.
Crop loss from mammalian pest - 15 per cent.

PESTS

The cocoa trees and cocoa pods are damaged by many pests of the cocoa growing regions. The pests are classified into two categories: (a) Insect pests and (b) Mammalian pests.

More than 60 insects are identified. A few of them can cause direct loss of the crop by feeding on young and growing cocoa pods and cocoa plants. An account of the damage caused by the insects on different plant-parts is given in table 5.2.

TABLE 5.2

Crop loss from Pests (Insects)

Sl. No.	Name of Pest	Percentage of Loss
1	Mealy bugs	40
2	Helopeltis	18
3	Stem borers	8
4	Aplids	14
5	Thrips	10
6	Others	10
	Total	100

Source: Survey data.

Insects suck sap from all parts of the plant and from tissues. The analysis of the table shows that mealy bugs cause severe damage to cocoa, which accounts to 40 per cent of the total loss. The other main insect groups which damage the cocoa crops are Aplids, Thrips, Helopeltis and stem borers.

Mealy bugs: The adult and young ones feed on the tender shoots, cushions, flowers and pods by sucking up the sap. Seedlings and young plants, affected by the mealy

bugs show retarded growth and excessive branching at undesired height. They also cause cushion abortion.

Helopeltis: The adults and nymphs damage cocoa and have a preference in feeding on the pods. The pests suck juices from pods, causing physical damage. Such feeding produces round lesions, which at first have brown water-soaked appearance, and after a few hours, they become harder and turn black. Secondary infections through the lesions can add to crop loss. They also feed on vegetative tissue, causing tip die-back.

Stem borers: Caterpillars of this polyphagous pest, commonly known as red borer of coffee, bore into the branches and trunks of cocoa trees. The aerial portion above the point of entry of the pest dries up. The tree may be destroyed if the attack is not detected in time.

Aphids: Adults and young ones of this black aphid feed on the tender leaves, succulent stem and flowers. Heavy infestation brings about premature shedding of flowers, stunting of stem-tip and nipping of the flaccid leaves along with the shoots.

Thrips: These red banded thrips are found in Kerala. The tender leaves, surfaces of cherelles and immature pods all show their feeding marks. The leaves exhibit a burnt brittle nature after the damage by thrips.

Mammalian pests like rats, squirrels and palm civets inflict direct loss of the crop by feedings on pods. They cause serious damage to the crop. Table 5.3 shows the crop loss from mammalian pests and birds.

TABLE 5.3

Crops Loss from Mammalian Pests and Birds

Sl. No.		Percentage of Loss
1.	Squirrels	35
2.	Rats	25
3.	Tody cat (Palm sivet)	13
4.	Birds	16
5.	Others	11
	Total	100

Source: Survey data.

Analysis relating to the crop loss from mammalian pests shows that rats and squirrels are the major rodent pests of cocoa, and they account for about 60 per cent of

the loss. The most important mammalian pests are mentioned below.

Rats: They gnow the pods near the stalk portion. Rats make round or oval holes and damage both ripe and unripe pods at night. Rats feed both on immature and mature pods, and while feeding on the mature pods, they feed only on the mucilage, but on immature pods the beans are also eaten.

Squirrels: They usually choose ripe pods. A large hole is made in the pod husk and the beans are extracted out. They usually make oval holes either in the central or in the terminal portion of the pods. They damage ripe pods during the day. They are seen to be active in the early morning and late evening hours.

The palm civet: This animal is as big as a small dog and has a slightly pointed snout and a hairy tail. It bites and breaks the husk of cocoa pods. While feeding, the civets swallow the beans also and as such no trace of beans is visible directly under the tree.

The golden-backed wood-pecker is seen damaging ripe cocoa pods. They make small holes on the husk of ripe pods and lick the mucilage inside with their sharp, flexible tongue. The damage is generally noticed in summer season.

DISEASES

Major cocoa-growing regions of Kerala have reported the occurrence of many diseases which cause loss to cocoa crop. The loss of crop due to diseases is at a high rate. Table 5.4 provides information about the crop-loss of cocoa from diseases.

TABLE 5.4

Crop Loss from Diseases

Sl. No.	Name of Disease	Percentage of Loss
1.	Black-pod	40
2.	Canker	10
3.	Charcoal pod rot	15
4.	"Cherelle" wilt	10
5.	Vascular Streak Die-Back	15
6.	Others	10
	Total	100

Source: Survey Data.

The table shows that black-pod disease causes major loss to cocoa crops that accounts to 40 per cent of crop loss. The other important diseases noticed in Kerala are Canker, Charcoal pod rot, Cherelle wilt and Vascular Streak Die-Back.

Black-pod disease: It occurs in all the cocoa growing areas in South India during the South-West monsoon period with the maximum incidence in July-august. The infection occurs anywhere on the pod as chocolate brown lesions which later cover the entire pod surface. Pods of all ages are susceptible. Pods damaged by rodent/insects or injured while harvesting/pruning or carrying out agricultural operations are more prone to infection by the pathogen.

Canker: It appears either on the main trunk, jorquettes or fan branches. The earliest symptom is the appearance of a greyish brown water-soaked lesion on the outer bark. A reddish brown liquid oozes out from these lesions which later dries up to form rusty deposits. The tissues beneath such lesion show reddish discolouration.

Finally the portion above such infected areas show wilting, and ultimately death occurs. The infection may also spread from the infected pod to the peduncle and then to the cushion and bark.

Charcoal pod rot: This disease is known to occur throughout the year, but becomes severe during summer. Pods of all stages are susceptible. The disease is characterised by the formation of water-soaked brown lesion on the pod either at the tip or stalk end. Initially the lesion is chocolate brown, but then it turns black. In due course, the affected pods turn black and remain on the tree as mummified fruit. The internal tissues are rotten and the affected beans turn black.

Cherelle wilt: The shrivelling and mummifying of some young fruits is a familiar phenomenon in all cocoa gardens. In the early stages, the fruit lose their lusture and in four to seven days the fruits shrivel.

Vascular streak Die-back: The first indication of the disease is the characteristic yellowing of one or two leaves behind the tip. Such diseased leaves show small sharply

defined green spots scattered over a yellow background. Diseased leaves fall away within a few days after turning yellow. Leaves above and below the first diseased leaf soon begin to show the yellow green patches and they too fall off leaving a bare length of shoot.

B. MARKETING PROBLEMS

Marketing of cocoa beans by farmers is of great importance. Majority of the cultivators have neither the means nor the know-how for fermenting and drying beans. Immediately after harvesting the pods, the growers remove the beans and dispose them off in the market. The wet beans are procured by the traders and agencies, which are to be fermented within 24 hours and then dried.

At present there is no systematic method for the marketing of the crop. Marketing and pricing behaviour plays an important role in increasing the production of cocoa in the country to meet the requirements of industrial demand. Constraints in developing cocoa cultivation such as lack of efficient marketing network, primary processing centres and steep fluctuations in prices, still exist.

The relaxation of import duties on cocoa has adversely affected the domestic cocoa bean prices.

Procurement of cocoa beans has not yet been organized in a systematic manner except in a very few cocoa growing areas. As per the present practice in vogue, a major portion of the produce is bought by the itinerant merchants and the representatives of a few manufacturing units who visit the growing areas during the season for collection of the produce. Only a small quantity of the produce is disposed off by the farmers themselves.

Cadbury India Ltd. and CAMPCO have set up procurement centres in the important cocoa growing areas and procure the produce directly from the farmers by paying market prices. However, a major part of the produce is still sold through the middlemen. Many of the small growers do not get the price offered by these two organizations as the middlemen usually cut their margin of profit.

A stable and attractive market for cocoa will act as a stimulant for increasing the domestic production of cocoa.

This has not made significant dent in the field mainly due to the fact that the collection and processing arrangements in the various cocoa growing areas have not helped all the cocoa growers. Though the efforts of Cadbury and CAMPCO in opening their procurement centres in important growing areas have helped in the collection of wet beans, much more work is yet to be done. There were occasions during the peak season when the procurement centres could not buy the wet beans brought by the farmers due to over procurement by the particular centres.

From the survey it is found that 84 per cent of the respondents face difficulties due to the monopoly of buying agencies.

During the marketing season, all the small growers are in need of money. They do harvest the cocoa pods as and when the village merchants approach them and dispose off the entire lot without any grading or segregation of good as well as damaged pods. The result is that the wet beans procured by the centres are not upto the standard. The bad beans which have been damaged by the rats,

rodents and the squirrels as well as pest-infected beans are also mixed with good beans and sold to the procurement agents. It was also observed that the village merchants add starch, sugar and water to increase the weight of the beans while selling them to the buying agents. This type of malpractices reduce the average quality of the dry beans.

There is a perception amongst the farmers in India that arecanut yields declined by 10 per cent due to cocoa inter cropping. This perception is compounded by the increase in arecanut prices. There is a strong feeling among areca growers who take up cocoa as an inter crop, that if the price of wet cocoa beans is below Rs.17 per kg., it would not meet the cost of return of the capital in growing cocoa. This will result in the cutting down of the cocoa plants. Therefore, there is an urgent need to assist the farmers in increasing the cocoa yields, so that the overall remuneration to the farmers increases, especially when more than 90 per cent of the supply is from small and medium growers.

There are no desirable government policies on cocoa either at the Central or State levels. At least there are three ministers at the Centre dealing with Agriculture, Commerce and Food processing. No dependable statistics on cocoa are collected and maintained. Cocoa and its products are not considered for any financial or other incentives for their export. Effective development or extension activities are not undertaken by the government or industrial users.

In Kerala, in the early stages, the major promotional activity by the government related to the production and distribution of quality seedlings. Tamil Nadu and Kerala governments established nurseries for growing cocoa, and the seedlings were distributed to farmers. In 1972-73, import of seed was taken over by the Government of India. During 1974 seed materials from indigenous sources were used to raise plants.

A number of private cocoa nurseries also came up in Kerala by 1975. Seed gardens of about 3 hectares were established in Kerala and Karnataka during the Fifth Plan

under a scheme sponsored by the Government of India and implemented by the states.

The expansion of the area under cocoa come to a standstill by 1980. The Kerala government has discontinued the scheme of production and distribution of seedlings. So the farmers are forced to depend on private cocoa nurseries to get cocoa seedling at a higher price and have no guarantee about their quality.

The Kerala State Co-operative Marketing Federation was asked to undertake cocoa procurements in Kerala during the price crisis of cocoa in 1980-81. The operation of 'Marketfed' ended up in a heavy loss and it soon stopped buying cocoa from farmers. After that there has not been any government agency, except CAMPCO, directly involved in the production and marketing of cocoa in Kerala. It caused to lose the confidence of the farmers in cocoa cultivation.

Cent per cent of the respondents are of the opinion that so far, no financial assistance has been received from the Government.

The time available after harvesting and fermenting the beans is short, not more than a week. Immediately after harvesting the pods the farmers remove the beans and dispose them off in the market.

Seventy per cent of the respondents have stated that they are facing problems to sell their produce to the collecting centres as they are far away from their farm. The main procuring agencies are Cadbury India Ltd., CAMPCO, Nestle and Sathe Biscuits. Cadbury and CAMPCO, the dominant consumers, appointed agents in different parts of Kerala and Karnataka to procure beans. Majority of their collecting centres are in towns and cities. But main production areas are located in interior rural, especially hilly areas. So they have to travel a long distance to sell their produce. Intermediaries take advantage by sending their agents to collect the produce from the farm itself. Some cultivators also lend their cocoa gardens on lease. Hence small farmers have to sell their cocoa without any price bargaining.

Cocoa prices have been fluctuating considerably in the International and National markets. The period from 1975 to 1980 is seen to be marked by high prices. The fall in the price in May 1980 has been very steep, from Rs.10/- to Rs.1.20/- (wet bean). This has been a great set-back in the cocoa industry.

The liberalized industrial policy and relaxation of duties on imports made imported beans cheaper than the domestic produce and the prices fell sharply in the country. Cadbury and many others imported cocoa beans for processing. The steep fall in prices forced many growers to cut down their cocoa trees and to change their cultivation to other remunerative crops. Farmers are afraid of this type of price fluctuations and many of them do not properly maintain their garden which results in low production.

Ninety five per cent of the respondents is having the view that the reason for the lack of interest in cocoa production is wide fluctuation in price for the crop in the market.

Fermentation and drying of beans consists of primary processing which requires utmost care. Accurate and proper fermentation is necessary as there are no remedies to correct the lapses committed during fermentation. These lapses in general, relate to the required amount of heat, proper turning over of the beans and inadequate or excess fermentation.

Fermentation and drying should be done immediately after taking out the wet beans by breaking the fruits. The growers, predominantly small farmers, are not conversant with the techniques of primary processing. Most of them sell their wet beans to the collection centres established by manufacturing firms. The latter carry out fermentation and drying. As cocoa beans can be stored only after primary processing, small farmers are unable to store their cocoa till there is a price hike in the market.

Another problem of primary processing at the farm level has been the timing of harvesting. A sizeable portion of harvesting of pods is done during the rainy season, from June to August. Proper fermentation and subsequent

drying of the beans cannot be organized at the farm level during this period. So the farmers are forced to sell their wet beans immediately after harvesting without getting a chance for price bargaining.

TABLE 5.5

Type of Marketing of Cocoa beans by Growers

Type of bean	Number	Per cent	Quantity (in tonnes)	Per cent
Wet beans	1202	78.05	2008	55.78
Dry beans	48	3.11	238* (794 tonnes wet beans)	22.05
Wet and dry beans	290	18.84	Wet beans: 648 Dry beans : 45* (150 tonnes wet beans)	18 4.17
Total	1540	100.00	Wet beans 3600	100.00

Source : Survey Data.
*238 tonnes of dry beans = 794 tonnes of wet beans
45 tonnes of dry beans = 150 tonnes of wet beans.

The marketing of cocoa beans by growers in the form of wet beans and dry beans, observed among the sample cocoa growers surveyed has shown in table 5.5.

Analysis relating to the type of marketing of cocoa beans by growers identifies that 78.05 per cent of cocoa

growers are selling their produce in the form of wet beans due to lack of primary processing facilities. They have to sell their cocoa to the processing agencies without any price bargaining. Out of 1540 respondents, 1492 growers sell 2656 tonnes of wet beans which comes to 73.78 per cent of the total production. Only 26.22 per cent of the beans is dried by growers. 18.84 per cent of cocoa growers are selling their produce in the form of wet and dry beans. This shows the urgent need for starting processing industries in all cocoa growing areas.

The marketing of agricultural produce through co-operative societies has been considered by many thinkers on the subject as an alternative pattern to the traditional marketing system, since it is expected that it will remove all the inherent defects of traditional marketing and ensure fair price to the producers. The aim of every marketing co-operative society is as follows.

- To help the members to produce the best products and those that are most in demand.

- To grade the produce in such a way that the best price is obtained for all qualities, to the advantage of the grower.
- To sell the members' product directly in the best market at the best price.
- To provide fair trading practices and to use its influence against manipulation of prices.
- To give farmers a better understanding of all stages in the marketing process.
- Co-operative societies increase the bargaining power of the farmers and thus save them from exploitation by traders.

These societies collect, grade, standardize and make arrangements for the sale of produce of their members and also advance loans to the members.

Ninety eight per cent of the respondents have expressed the need of establishing an effective co-operative marketing system which can solve their marketing problems to a greater extent.

In Kerala many agricultural produces are procured and marketed by co-operative marketing societies. But cocoa marketing societies are not effectively organized like others. So cocoa cultivators cannot enjoy the benefits of co-operative marketing, which help to market members' produce, to their best advantage.

With a view to giving incentives to production of some selected commodities the government declares a support price from time to time. This helps farmers to a great extent when there is a price fall for their produce. Price support is also required from the government to the cocoa growers. But there is no proper support to cocoa growers for the protection of their crop. Lack of confidence in cocoa prices results in an indifferent attitude of farmers towards the crop, and this in turn has caused poor plant husbandry.

C. OTHER PROBLEMS

Besides pests, diseases and marketing problems, cocoa growers are facing several other problems for the development of cocoa cultivation in Kerala.

Constraints on increasing yield of cocoa are identified as farm size, the cultivational practices and the age and plant density.

Cocoa farms in the major producing countries in the world are very large. They have access to large funds, skilled manpower, primary processing facilities and organizing capabilities. The large size of the farms helps in the production of large quantities of cocoa beans. Economies of large scale production, marketing and management are also enjoyed by them unlike small farm owners.

The study shows that 91.82 per cent of the cocoa cultivators are small and medium growers, raising cocoa as a supplementary crop. So our growers cannot enjoy the advantage of large scale cultivation, processing and marketing. It is true that large farmers are likely to enjoy higher returns in the cultivation of cocoa in Kerala.

Size of land holdings of sample cocoa growers and their cocoa cultivating area is presented in the table 5.6.

TABLE 5.6

Size of Land Held by Sample Cocoa Growers and Cocoa Cultivating Area in Kerala

Size of land holds (in acres)	Number of growers	Per cent	Cocoa lands (in acres)	Per cent
0 - 2	902	58.57	1373	31.54
2 - 4	334	21.69	1026	23.55
4 - 6	178	11.56	898	20.60
6 - 8	66	4.29	469	10.77
8 - 10	34	2.20	288	6.61
Above 10	26	1.69	302	6.93
Total	1540	100.00	4356	100.00

Source: Survey Data.

The above table reveals that in Kerala 58.57 per cent of cocoa growers belong to small growers group (holding 0 to 2 acres of cocoa land), holding 31.54 per cent of total cocoa cultivating area, under study.

Growers holding 2 to 6 acres of land are treated as middle class growers. Out of 1540 sample cultivators, 33.25 per cent come under this category and they hold 44.15 per cent of total cocoa lands. Land holding size from 6 to 10 acres are considered as big growers and their percentage is 6.49, contributing 17.38 per cent of sample

cocoa lands. Very big growers holding more than 10 acres of cocoa land are very few, they form 1.69 per cent of the total growers, and their contribution is 6.93 per cent of the total land under study.

Cultivation practices vary according to climate, soil and labour availability. However, there are some basic practices and principles to be adopted for the successful cultivation of cocoa.

As cocoa is raised only as a supplementary crop, appropriate agricultural practices are not practical in Kerala. This may result in low production. Table 5.7 shows the cultivation of cocoa in Kerala, as a main crop and as a supplementary crop.

TABLE 5.7

Cocoa Cultivation as a Main crop and as a Supplementary crop

Status	Number	Per cent	Area (in acres)	Per cent
Cocoa as a main crop	32	2.08	318	7.30
Cocoa as a supplementary crop	1508	97.92	4038	92.70
Total	1540	100.00	4356	100.00

Source: Survey data.

The above table shows that in Kerala, majority of the growers are cultivating cocoa as a supplementary crop. Out of 1540 respondents, 1508 growers are cultivating cocoa as a supplementary crop which comes to 92.7 per cent of the total area under cocoa cultivation. Only 2.08 per cent of the growers are cultivating cocoa as a main crop. As cocoa is a supplementary crop, growers will give more attention to the main crop and cocoa may be neglected. This causes for the poor plant husbandry and low production.

In Kerala, apart from cocoa, crops like pepper, Cardamom etc. are also cultivated in arecanut and coconut gardens. Spacing of cocoa plants in arecanut and coconut gardens in Kerala are not based on scientific recommendations. The type of the inter crops and their spacing will have an effect on the cocoa yield.

The important inputs in cocoa cultivation are organic manures and chemical fertilizers. No clear guidelines on the manuring of cocoa are available. The difficulties arise because of the genetic differences of the varieties, soil

conditions and insect attacks. Nevertheless, manuring will increase the yields if the soil conditions are right.

In Kerala, farmers apply fertilizers and organic manures. In the course of the survey, it has been found that the respondents use organic manures and fertilizers in the ratio of 70:30. Growers are not following scientific recommendations or guidelines in the use of manures which affect the yield of cocoa.

Raising of farm output is possible through the use of high yielding varieties of seeds, chemical fertilizers, pesticides, implements and machinery, irrigation and agricultural credit. This is possible only through farmers' education and training.

But majority of our cocoa cultivators are not getting proper training or education about the modern methods of production as shown in table 5.8. They are not getting proper training regarding farm-level processing like cocoa fermentation, drying etc.

TABLE 5.8

Educational Status in the Area of Agricultural Operations

Status	Number	Proportion
Not received education or training	1001	65
Received education or training	539	35
Total	1540	

Source: Survey Data

This table shows that the proportion between number of house holds who have not received agricultural education or training, and who have received agricultural education or training is 65:35.

This indicates that nearly about two-third of the total cocoa growers are traditional cultivators without any proper education or training in the area of agricultural operations. There are no awareness programmes to teach growers about the production and protection technologies for raising successful cocoa crops.

The transformation of traditional agriculture into technologically progressive and modern agriculture leads to

a higher productivity. Table 5.9 shows the variety of cocoa cultivated by our growers.

TABLE 5.9

Variety of Cocoa Cultivated in Kerala

Variety	Number	Per cent	Area in Acres	Per cent
Forastero	1454	94.41	4038	92.70
Clonal Propagation of cocoa	86	5.59	318	7.30
Total	1540	100.00	4356	100.00

Source: Survey Data

The table describes concentration of cocoa growers in the cultivation of forastero variety of cocoa, out of 1540 respondents, 1454 growers cultivate forastero variety, which covers about 92.70 per cent of their total land under cocoa cultivation. This indicates that only 5.59 per cent of cocoa growers are following vegetative propagation. The present average productivity in forastero garden is little over 1kg. dry beans per tree per annum. There is ample scope for increasing this productivity level to 3kg. of dry beans per tree per year by using vegetative propagation techniques. Now sufficient contribution of the research is

available by way of evolution of good selection and hybrids. Productivity of Indian cocoa is very poor because of their backwardness in cultivating high yielding vegetatively propagated planting materials, in order to increase the productivity and improve the quality of cocoa beans.

Agriculture is a productive occupation, and one of the essentials of agricultural production is capital. This may be provided by the cultivator himself or he may borrow it from some one else and repay it from the output of the field in which it has been invested. Provision of adequate, timely and cheap finance is an important requirement for the development of cocoa cultivation and allied activities.

TABLE 5.10

Source of Capital for Cocoa Cultivation

Sources	Number	Per cent
Saving	277	18
Co-operative Banks	323	21
Commercial Banks	493	32
Savings and Commercial Banks	216	14
Savings and Co-operative Banks	231	15
Government agencies	Nil	Nil
Total	1540	100

Source: Survey Data

Table 5.10 presents details of respondents' source of capital for their cocoa cultivation. The cultivators in the study get credit mostly from co-operative societies and commercial banks. It is found that respondents do not get any financial assistance from the Government agencies. Their problem is lack of adequate cheap credits so as to reduce the cost of production. The credit from the Government agencies is more attractive than that of co-operative societies and commercial Banks, since the former charge lesser rate of interest than the latter. But they supply negligible portion of the total credit requirements of the cultivators.

The quality of cocoa beans is governed by the plant variety, harvesting method, techniques of fermentation and drying of the beans. Fermentation and drying of the beans is not done by the majority growers. In Kerala, a large number of growers still sell wet beans and pods to small merchants, who in turn sell them to procurement centres. The quality is adversely affected to an extent because of the delay in fermentation.

Among plantation crops, cocoa is regarded as one of the most sensitive ones to water stress. Water stress affects several physiological processes leading to reduction in crop yield. Water potential of leaf is a major qualitative characteristic used to assess water stress. In Kerala many cocoa growing areas are facing the problem of water scarcity which adversely affect cocoa production.

Several obstacles exist in developing cocoa in the state. This developed a sense of insecurity among the planting communities, which detrimentally affected its expansion and induced the growers to convert the existing cocoa cultivating land for the cultivation of other crops. Table 5.11 provides the details of the conversion of cocoa cultivating land for other crops.

TABLE 5.11

Conversion of Cocoa Cultivating Land for Other Crops

	Number	Per cent
Converted the land for other crops	1058	68.70
Not converted the land for other crops	482	31.30
TOTAL	1540	100.00

Source: Survey data

The production of cocoa in Kerala has been restrained by several factors as discussed in this chapter. As per the sample studied, about 68 per cent of the respondents has converted cocoa land for the cultivation of other crops such as banana, pepper, pineapple, coffee, vanila and medicinal plants for getting better income. This attitude of farmers caused the reduction of area under cocoa.

The discussion in the previous pages reveals that the cocoa planters are facing a number of problems in the production and marketing fields besides the general problems common to all types of planters. Though the supply is inadequate to meet the existing demand, the

growers are affected by the malpractices prevailing in the marketing front. Hence proper care must be exercised to remove the hurdles faced by the growers so as to ensure a steady supply of cocoa. In the next chapter an attempt is made to summarise the findings of the study and to give suitable suggestions based on the findings.

SUMMARY, FINDINGS AND SUGGESTIONS

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Chapter VI

SUMMARY, FINDINGS AND SUGGESTIONS

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SUMMARY, FINDINGS AND SUGGESTIONS

This chapter brings together a summary of the major findings and conclusions of the analysis presented in the preceding chapters. A few suggestions that emerge from the study to solve some of the problems faced by cocoa growers are also made in this chapter.

Kerala is endowed with climatically suitable areas for the cultivation of cocoa and the extensive plantation crops like coconut and arecanut, can provide the required shade for the plant as it is grown as an inter crop.

The study analysed the growth of area of cocoa cultivation and production of cocoa over the years. In India, cocoa appears to be introduced as a commercial crop during 1960's. Because of favourable situation in price, there was a quantum jump in area which reached to 29000 hectares in 1980-81. This trend in area expansion did not continue further because of the subsequent fall in price,

attack of pests and diseases and poor marketing system. Thereafter the area under cocoa started declining year after year and by 2002-03, the area reached the level of 17800 hectares.

During the past 2 years, the prices started rising and interest in cocoa cultivation began reviving. The demand for cocoa-based products in the country has been growing at a rapid rate. Apart from this, more multinational companies are likely to enter the market for manufacturing cocoa-based products. This will provide further impetus to the demand.

In the recent past the use of cocoa was restricted more or less to the production of chocolates and other confectioneries. Cocoa is now finding wide spread application in Pharmaceuticals and cosmetics.

The cocoa industry in the country has expanded to a considerable extent in the recent years. While Cadbury India Ltd. alone was a monopolistic Institution available in the beginning, now a number of other companies such as Campco, Nestle, Lotus, Morde and over 15 other similar

confectionery manufacturing units are in the field. This industry has a capacity to process 30,000 tonnes of cocoa beans. But the current domestic availability of cocoa is about 10200 tonnes. It is facing a situation where there is demand but the supply is inadequate.

Cocoa beans price fluctuated widely earlier due to the non competitive monopolistic manipulation of one or two companies in the field. The situation has changed now and the price of dried cocoa beans ranges between Rs. 90 and Rs.100/- per kilogram.

The contribution of Kerala estimates nearly about 64 per cent of total production of cocoa in India. The scope for the cultivation of cocoa in the state is vast, as it does not require any additional land area. Development of this sector will provide more employment directly and indirectly, generate more income to the farmers and foreign exchange to the country.

No previous study has been conducted on problems of the cocoa cultivators and the marketing aspects in a detailed manner. The present study attempts to analyse

cocoa production, problems and prospects of cocoa cultivators and the present working of marketing system in Kerala.

The specific objectives set for the study are –

1. To examine the pattern of cocoa production, the factors which influence the production and to explore the reasons for the shortage of cocoa production.

2. To examine the existing marketing structure so as to find out defects in marketing, if any

3. To ascertain the assistance, if any, from the Government for the development of this sector.

4. To suggest appropriate measures for the improvement of this sector.

The study has been designed as a descriptive one based on survey method. Both primary and secondary data have been used for this purpose. The secondary data have been collected from various reports, books, journals, records, files of various offices and from unpublished sources.

For primary data collection, sample locations were selected to identify sample cocoa cultivators. A structured interview schedule was prepared and personal interview method was followed to collect the required information. The collected data was classified and tabulated for statistical analysis. For the analysis of data, mathematical and statistical tools have been applied. On the basis of the analysis, various aspects relating to production and marketing of cocoa and cultivators' problems and future prospects are assessed.

The whole study is presented in six chapters.

Chapter I is the introduction part stating the significance, objectives, methodology, hypothesis, sample design, statistical tools used, limitations of the study and a brief review of literature.

Chapter II gives a brief description about a few important plantation crops in Kerala.

Chapter III provides a profile of cocoa industry.

Chapter IV analyses the structure of cocoa market.

Chapter V examines the problems of cocoa cultivators in production and marketing of cocoa.

Chapter VI, the last chapter, summarises the whole study, lists the findings and offers a few suggestions.

Findings

- It is estimated that there are about 17000 cocoa growers in Kerala. The present area under the crop, (2002-03) is estimated to be 8700 hectares producing about 6500 tonnes of processed beans. Kerala accounts for about 64 per cent of the total production of the country.

- The farmers are not showing much interest on this crop for various reasons such as incidents of rodent/pest-attack, diseases, lack of skilled labourers for fermentation operation, lack of efficient marketing system, lack of price stability and presence of other profitable crops.

- The study has examined the profile of important plantation crops in Kerala. The plantation crops provide the silver lining to our agriculture with high level

productivity and employment. As per the samples studied, 97 per cent of cocoa growers are cultivating cocoa as mixed garden. Even though cocoa comes under the definition of plantation crops, pure plantation of cocoa as such is practically very few in Kerala

- The study shows that 90 per cent of cocoa cultivators are small and medium farmers, raising cocoa as a supplementary crop. So they cannot enjoy the advantages of large scale cultivation, processing and marketing.

- Raising of farm output is possible through the use of high yielding varieties of cocoa seeds, chemical fertilizers, pesticides, machinery, irrigation and credit. But 65 per cent of cocoa cultivators are not getting proper training or education related to agriculture.

- It is estimated that currently 35 per cent of cocoa crop is lost every year due to pests/rodents and diseases. Prominent diseases are Vascular Streak Die-back (VSD) and Black-pod. There is a progressive ongoing

reduction in the number of plants, which is estimated to be about 4 per cent per annum, on account of diseases and natural calamities. The ongoing crop loss on account of age related declining yield is estimated to be nearly about 3 per cent.

- The present average productivity level of existing garden is little over 1 kg. of dry beans per tree per annum and there is ample scope for increasing this productivity level to at least 3kg. of dry beans per tree per year.

- Lack of communication is a serious problem in cocoa development programme. The success of any programme depends on effective communication. In the case of cocoa, it should be jointly done by the industry and the State Government.

- Cocoa comes up very well as an inter crop of coconut and arecanut and it shows that if properly managed with fertilizers and irrigation, the yield of the main crop also tends to increase. The large return of organic residues by cocoa and the substantial build up of the

organic matter content of the soil, are the reasons for the benefit to coconut and arecanut.

- Realistic estimates of area and production statistics of cocoa are not available with Central and State Government Departments.

- Cocoa development activities are now done by Directorate of Cashewnut and Cocoa Development. Formerly it was taken up by Directorate of Cocoa, Arecanut and Spices Development. The developmental activities by these agencies are not satisfactory. Production oriented programmes with a project approach and integrated measures were highly lacking.

- Due to the Governments' liberalized economic policies and increased marketing campaign, cocoa market has started growing. But the production of cocoa beans in the country is not keeping pace with the increased demand and it is found that there is a wide demand-supply gap. As domestic production of

cocoa beans is not sufficient to meet the increased demand, the industry has to resort to significant imports.

- As there is no systematic and proper marketing system, exploitation by intermediaries exist.

Marketing and pricing policy plays an important role in increasing the production of cocoa. Though Kerala is the largest producer of cocoa, there exists no major cocoa products producing industry in the state. More primary processing units should be started in all cocoa growing areas.

- Procurement of cocoa beans has not yet been organised in a systematic manner except in a very few growing areas. Major portion of the produce is bought by a few manufacturing firms who visit the growing area. 70 per cent of the respondents has stated that they are facing problems to sell their produce, as many cocoa collecting centres are far away from their farm.

- Majority of the cocoa cultivators have neither the means nor the know-how for fermentation and drying of cocoa beans. This has repercussions on the marketing of cocoa, as the time available after harvesting and fermenting the beans is short, not more than one week. Accurate and proper fermentation is necessary as there are no remedies to correct the defects committed during fermentation. So farmers are forced to sell their wet beans without price bargaining.

- In Kerala many agricultural produces are marketed by co-operative marketing societies. But cocoa marketing societies are not effectively organised. So the cocoa farmers cannot enjoy the benefits. All the respondents have expressed the need of establishing an effective co-operative marketing system, which can solve their marketing problems to a greater extent.

- No worthy efforts are undertaken by the Central Government or State government for the development of this sector.

Results of hypothesis testing

On the basis of the above findings, the hypotheses set for the study have been tested and the results are as follows:-

The first hypothesis that the development of cocoa industry depends on the existence of an efficient marketing network is found true and hence accepted.

The second hypothesis that the domestic production of cocoa beans is not sufficient to meet the increased demand and the demand-supply gap is widening every year is found true and hence accepted.

The third hypothesis is that majority of cocoa farmers are small and medium scale cultivators. They have to sell their cocoa to the processing agencies in the form of wet beans without any price bargaining, due to lack of farm

level processing facilities; this is also found true and hence accepted.

SUGGESTIONS

- The climate and soil conditions in Kerala are the best suited for successful cultivation of cocoa. The growers will come forward to bring more area under cocoa cultivation, if they are ensured fair and stable price and a well organised market.

- The Government of India and State Government have to give importance to raise crop-status among farmers. The processing industries, which are the first users of cocoa beans, have to join hands with all concerned, to offer better and more remunerative price packages to the farmers. Their association in these efforts, have to be right from the stage of area expansion to a proper marketing.

- Intensive advertising-both in newspapers and electronic media-should be undertaken by the Government agencies to help the growers intending to plant cocoa.

Seedlings and fertilizers are to be supplied by government agencies in different parts of the state. Its field staff should visit the new plantations to give advice to the farmers. This may persuade the growers to look for cocoa for planting in their coconut and Arecanut gardens to protect their income.

- There is vast scope for increasing cocoa area under the coconut and arecanut gardens available in Kerala. Now there are about 900000 hectares of coconut gardens and 90000 hectares of arecanut gardens. The return per acre for cocoa and coconut and cocoa and arecanut will increase, if the gardens are properly managed with fertilizers and irrigation. In order to educate the farmers on various aspects of cocoa cultivation and to create a general awareness among the farming community, on the potential existing in different parts of the state, for growing cocoa mostly as an inter crop in the coconut/arecanut gardens, productions of video films and extension literature may also be taken up.

- A state level scheme should be launched aiming at educating the farmers on the scientific methods of cultivation including pruning and thinning of trees, controlling pests and diseases and fermenting and drying of the beans, through a field demonstration and training programme.

  Industry-based seminars should be conducted at Krishibhavan level. This seminar should have some experts, so that they can give details regarding cocoa cultivation and marketing. The technical know-how of the cultivation may be prepared with cost effective analysis.

- The productivity of the existing gardens are not highly encouraging; as such, productivity level is only just 30 per cent of the potential, exploitable by way of using high yielding clones. The genetic inferiority of the existing plantations is one of the factors for low productivity. The research on cocoa was taken up by the CPCRI and KAU, and specific management recommendations were made to increase production and

productivity of cocoa. Important varieties have also been released by CPCRI and KAU having high yielding capacity of more than 3 kg. dry beans per tree. Farmers and Agricultural departments should come forward to propagate to plant such high yielding variety of cocoa.

- A systematic and proper marketing system should be introduced so as to avoid any intermediaries, who may come in the way in the future years.

- Necessary steps may be taken to start cocoa processing units in the state sector so as to avoid any market glut. This will help to make farmers more confident about their produce.

- At present, the entire cocoa market is monopolised by big firms in private sector. Though the contribution of Kerala estimates about 64 per cent of total cocoa production in India, we could not start any cocoa product producing and processing industry in Kerala.

Efforts should be made to start our own cocoa processing and cocoa-products producing industry in

Kerala, to formulate a better policy for cocoa collection and marketing.

- There is better possibility for starting co-operative marketing and processing units. Once our Dairy farmers faced the same marketing problems that cocoa growers are facing today. Dairy farmers found it difficult to sell their milk at a reasonable price. Their problem was solved by starting Dairy co-operatives throughout Kerala. Milk plants were established, so that the entire chain of operation form milk collection, transport, processing and their marketing got integrated.

The success of milk co-operatives for the development of dairy farmers should become a guideline for the development of cocoa sector. Cultivators can start cocoa co-operatives at the apex level. Cocoa growers can sell their produce through their primary cocoa co-operative societies throughout Kerala. They can act as collecting centres. As the members of primary societies are cocoa cultivators, they will show more interest for the success of

their societies. It should be linked with processing and marketing societies, as cocoa has to undergo one or more stages of processing, before they reach the consumers.

- Import of cocoa beans may be allowed only in cases of sheer necessity and the quantity should be restricted. The internal price may be maintained to an attractive level to encourage the growers to pay better attention to the cocoa crop.

- The crop insurance and subsidy schemes have been launched in several agricultural produces. These schemes should be extended to cocoa land also.

- Adequate cheap credit facility is required to cocoa growers. If the credit supplied is inadequate, it will not only fail to meet the needs of production but will also be directed for other purposes.

- Formerly, the cocoa development activities were undertaken by the Directorate of Arecanut and Spices Development. And now they are taken up by the Directorate of Cashewnut Development. As cocoa is a

supplementary crop, if the developmental activities are taken up by the agencies that deal with such main crops, then they will concentrate on the main crops and the cocoa development will be sidelined. Hence a separate Board has to be set up for the development of cocoa.

- Government of India and respective State Governments will need to play an active and aggressive role in the development of cocoa. In this connection the support of the Government to the development of Rubber in the country should become a guideline for cocoa development. Government should actively take measures for improving the infrastructure in the field of production of cocoa, marketing and processing, provision of credit and transport facilities to growers, setting up growers' co-operatives and establishing specific government agencies. Export promotion, installation of processing plants, research and extension activities with popularisation of cocoa cultivation and

control of plant diseases are to get proper attention of various State agencies.

- The crop being comparatively new, providing training to extension personnel and farmers should be a continuous process. The officers training ie., trainers training should be organised by the CPCRI and KAU and the farmers training by the development departments. In the trainers training programmes the field officers of the processing industries should also be included.

- Central Food Technological Research Institute Mysore, has developed technology packages for production of cocoa mass, cocoa butter and cocoa powder. It has also developed a technology for cocoa processing. The project cost includes land and Building of about Rs.1,50,000/- and equipment cost around Rs.50000/- totalling about Rs. 2 lakhs, to process one tonne of fresh cocoa beans to obtain 300 kg. of dried beans. The equipment includes mechanical dryers, trolleys and wooden trays as well as packing materials like gunny

bags. Cocoa growers can use this technology for their primary processing and get a fair price for their produce.

CONCLUSION

From the study it can be concluded that there is vast scope for the development of cocoa in Kerala. The existence of production and marketing problems of cocoa cultivators are also significant.

The Government and industry have to commit themselves to the significant investment required to step up availability of cocoa in the country. At this point of time, in the history of cocoa, there is a need to take a serious look at the whole situation and come out with pragmatic solutions. If it is left unattended, this industry, which gives employment to thousands of people directly and indirectly, will be left in a miserable condition.

SCOPE FOR FURTHER RESEARCH

The Present study highlights the pattern of cocoa production, structure of cocoa market, cultivators' problems and the bright future for cocoa in Kerala. Such a

study has not been made so far. There is ample scope for further research. The study may be undertaken in the area of institutional aspects of both processing industries and marketing of cocoa.

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APPENDICES

APPENDIX I

State Wise Area and Production of Cocoa for the 10 years period

P – Production in MT.

A- Area in Ha.

State	1993-94		1994-95		1995-96		1996-97		1997-98	
	A	P	A	P	A	P	A	P	A	P
Kerala	8200	5270	6900	4300	7900	4455	8364	3537	8525	3794
Karnataka	2800	1400	2800	1400	2800	1400	2773	1397	2800	1300
Andhra Pradesh	835	30	979	30	1031	384	1208	720	670	123
Tamil Nadu	48	42	48	42	49	43	49	43	43	37
Total	11883	6742	10727	5772	11780	6282	12394	5697	12038	5281

State	1998-99		1999-2000		2000-01		2001-02		2002-03	
	A	P	A	P	A	P	A	P	A	P
Kerala	8909	3686	8949	4000	8500	4000	8680	4100	8700	6500
Tamil Nadu	43	37	92	40	100	40	350	180	400	200
Karnataka	2780	1325	4400	1550	4400	1700	4400	1700	6000	2500
Andra Praesh	670	150	2744	771	2740	800	2700	800	2700	1000
Total	12402	5198	16185	6361	15740	6540	16130	6780	17800	10200

Source: Compiled from the records of DCCD, Cochin.

APPENDIX II

DISTRICT-WISE PRODUCTION OF COCOA IN KERALA (PRODUCTION IN TONNES)

Sl. No.	District	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	2000-01	2001-02	2002-03
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	12
1	Thiruvananthapuram	116	102	182	70	76	60	55	51	48	50
2	Kollam	159	44	17	26	37	30	28	22	11	10
3	Pathanamthitta	435	604	517	574	524	383	350	341	334	550
4	Alappuzha	345	443	419	256	263	193	150	138	112	121
5	Kottayam	1411	977	1020	1182	756	671	680	772	761	1350
6	Idukki	1655	1492	1178	685	964	1445	1550	1612	1689	2529
7	Ernakulam	711	228	598	264	646	372	405	562	667	1200
8	Thrissur	57	44	189	86	43	99	84	72	52	66
9	Palakkadu	29	4	4	8	9	9	14	17	21	33
10	Malappuram	31	4	3	21	11	4	18	24	39	87
11	Kozhikode	118	152	137	183	288	268	242	238	227	290
12	Wayanad	79	72	56	60	69	48	42	41	43	49
13	Kannur	92	99	65	105	79	76	68	61	67	70
14	Kasargod	24	23	14	17	29	28	24	23	25	22
	State	5262	4288	4319	3537	3794	3686	3710	3924	4096	6455

Source: Department of Economics and Statistics, Kerala, Agricultural Statistics, DES and Statistics for Planning and DCCD, Cochin.

APPENDIX III

DISTRICT-WISE AREA UNDER COCOA IN KERALA (AREA IN Ha.)

Sl. No.	District	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	2000-01	2001-02	2002-03
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	12
1	Thiruvananthapuram	241	167	238	147	161	134	132	133	134	132
2	Kollam	223	50	33	59	54	48	36	31	28	28
3	Pathanamthitta	780	940	728	971	958	764	768	772	778	810
4	Alappuzha	191	401	433	309	313	235	202	190	182	181
5	Kottayam	2327	2981	1993	2278	2212	2492	2308	2010	1720	1744
6	Idukki	1804	1894	2027	2128	2271	2820	3080	3212	3363	3431
7	Ernakulam	1429	488	1125	1147	1368	1225	1280	1300	1335	1328
8	Thrissur	211	90	360	204	164	184	120	132	139	132
9	Palakkadu	62	11	18	30	21	32	30	31	33	44
10	Malappuram	92	14	19	40	63	45	48	50	52	63
11	Kozhikode	376	402	472	512	454	386	410	432	458	494
12	Wayanad	189	157	130	170	123	126	132	137	141	134
13	Kannur	179	241	220	279	239	284	232	218	206	177
14	Kasargod	136	71	66	90	124	134	126	111	109	97
	State	8240	8907	7862	8364	8525	8909	8094	8759	8676	8795

Source: Agricultural Statistics, DES and Statistics for Planning, and DCCD, Cochin.

APPENDIX IV

Important processing units which purchase wet or dry cocoa beans

1. Cadbury India Ltd.
2. Lotus
3. The Central Arecanut and Cocoa Marketing and Processing Co-operative Ltd.
4. Nestle India Ltd.
5. Keira District Co-operative Milk Producers Union Ltd., Anand.
6. Sathe Biscuits and Chocolate Co. Poona.
7. Dr. Writers Chocolate and Canning Co. Bombay.
8. Cocoa Products and Beverages Ltd., Madras.
9. Waik Field Products Co. (India) Poona.
10. Harts Chocolate, Madras.
11. Amul.
12. F.D. Metha and Company, Bombay.
13. Morde.

Source: Records, Campco Factory, Puthur.

APPENDIX V

PRODUCT RANGE

Cadbury's

Diary Milk Chocolate
Crackles
Bournville Dark
Fruit and Nut
Nut Milk
Orange
Roast Almond
Wild life bar
Old Jamaica
5-Star
Double decker
Krisp
Melto
Relish Honey
Mr. Lollipop
Gems
Caramels
Candynuts
Nut Butter
Nutties
Tiffins
Eclaires
Temptations
Bournvita
Milk treat
Perk
5 star
Almond Magic
Rasin Magic

CAMPCO

Creamy Milk Chocolate
Creamy White Chocolate
Turbo

Treat
Funbite
Playtime
Eclares
Toffee
Winner
KRUST
Megabite
Melto chocolate eclairs
Melto
4ever
Campco Bar

AMUL

Amul Milk Chocolate
Amul crisp
Amul Coffee
Amul Fruit and Nut
Amul Bitter
Amul Orange
Amul Trix
Amul Assorted Tin
Amul Badambar

NESTLE

KITKAT
MUNCH

Dr. Writers

Milk Chocolate
Chocrack
Fonda-in 6 flavours

Others

Parry's Milk Chocolate

Sathe's Milk Chocolate

Aurofood's Wonder Bar

Parle's Fudgy, Melody and Chocolate

Western Company's- Chockles and Chocstix

Nutrine's Eclairs

Parry's Eclairs

Ravalgon- Eclairs.

Source: Compiled from the records of CAMPO, Cadbury India Ltd; Nestle India Ltd., and Amul.

APPENDIX VI

Average wholesale price of wet cocoa beans in Kerala Rs./Kg

Year	Wet Beans
1993-94	12.22
1994-95	13.91
1995-96	17.00
1996-97	15.00
1997-98	16.00
1998-99	17.00
1999-00	16.50
2000-01	15.00
2001-02	27.00
2002-03	29.50

Source: District Agricultural Office (Marketing), Kozhikode, Department of Agriculture, Govt. of Kerala

APPENDIX VII

Dear Sir/Madam,

This survey is conducted as a part of my research work for Ph.D in Commerce. This is purely for academic purpose. All the information provided by you will be taken only for the purpose of my research work and will be kept confidential. Kindly co-operate with me in answering these questions.

Thanking you,

Yours faithfully,

P.K. ABDUL KHADER

QUESTIONNAIRE

A study on the prospects and problems of Cocoa cultivators in Kerala with special reference to marketing

1. General particulars

   a) District b) Panchayath
   c) Ward No. d) House No.

2. How many family members are engaged in Cocoa cultivation : Male Female Total

3. Has any member of the household received education or training related to Agriculture : Yes/ No

   If yes, Give details

4. Land holding size (in acres) : Dry Wet Total

5. Cocoa cultivating area (in acres) :

6. Did you convert cocoa lands for other purpose : Yes/No
   If yes, :
   a) Area (in acres)
   b) Year
   c) Purpose
   d) Reason

7. (a) Whether mixed garden or plantation :
   a) Area under mixed garden (in acres)
   b) Area under plantation (in acres)

(b) Whether cocoa is cultivated as a main crop or as a supplementary crop: a) Area under main crop :
b) Area under supplementary crop :

8. Area under cultivation in the past three years: Acres

1997
1998
1999

9. Amount of cocoa obtained from last crop (in Kilograms) : Wet beans b) Dry beans

10. Average Annual Yield of Pods per tree :

11. Do you hire labourers other than family members: Yes/No

If yes, given details : Full time Male Female Total

Part time Male Female Total

12. Do you experience any difficulty in getting labourers : Yes/No

If yes, what are the reasons : 1.
2.
3.

13. Variety of cocoa cultivated : a) Forastero b) Criollo
c) Clonal propagation of cocoa

14. Farming methods used : 1-Traditional method
2- Modern/Scientific method
3- Mixed method

15. Cost of cultivation/Acre :

16. Manure used : a) Farm yard manure
b) Chemical fertilizers
c) Both

If both, in what proportion :

17. Irrigation facilities
1. Well
2. Tank
3. Channels
4. Others

18.	Source of Capital	:	Source 1. Saving 2. Co-op.Bank 3. Commercial Bank 4. Money lenders 5. Friends 6. Others
19.	Do you receive financial assistance from the Government	:	Yes/No
	If yes, Specify the percentage of assistance to total cost/acre	:	
20.	Do you notice any significant damage to cocoa crop	:	Yes/No
	If yes	:	
	Extent of damage of crop	:	
	Damage due to:		Loss %
			a) Heavy rain fall b) Drought c) Attack of pest d) Attack of diseases e) Any other
21.	Type of marketing of cocoa beans	:	a) Wet beans b) Dry beans c) Both
	If both, in what proportion	:	
22.	If marketing wet beans, state the Reasons	:	a) Difficulties in Fermentation Process b) Lack of artificial drying facilities c) Urgent need for money
23.	If you are marketing dry beans specify the method of fermentation used	:	a) Heaps b) Trays d) Boxes
24.	Method of drying cocoa beans	:	a) Sun drying b) Artificial drying
25.	Whether you are selling cocoa beans directly to the processing units or through middle men	:	a) Directly b) Middle men
26.	What is your terms of sales	:	a) Cash b) Credit c) Both

27. Do you have any marketing problem at present : Yes/No

If yes, Specify :

a) Insufficient cocoa beans collecting centres
b) Delay in getting payment
c) Price fluctuations
d) Monopoly of buying agencies
e) Lack of fermentation and drying facilities
f) Absence of Co-operative sector
g) Exploitation by middle men

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