COCONUT BASED FOOD AND OIL MILLING INDUSTRIES IN KOZHIKODE AND KANNUR DISTRICTS

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THESIS

Submitted in partial fulfilment of the
requirement for the degree of

Master of Science in Agriculture

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Vellanikkara - Trichur
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1991

DECLARATION

I hereby declare that this thesis entitled "Coconut based food and oil milling industries in Kozhikode and Kannur districts" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.

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CERTIFICATE

Certified that this thesis entitled "Coconut based food and oil milling industries in Kozhikode and Kannur districts" is a record of research work done independently by Kum. T. Bala Sudhahari, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to her.

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ACKNOWLEDGEMENTS

I am grateful to :

Dr.K.Mukundan, Professor of Agricultural Economics and Chairman of the Advisory Committe,

Dr.V.Radhakrishnan, Professor and Head, Department of Agricultural Economics,

Shri.P.V.Prabhakaran, Professor and Head, Department of Agricultural Statistics

and Dr.E.K.Thomas, Associate Professor, Department of Agricultural Economics for their valuable guidance.

I am also grateful to Shri.P.K.Thampan, Chief Coconut Development Officer (Retd.) for his valuable suggestions. I am thankful to Shri.K.S.Sebastin, Coconut Development Board for his assistance in the analysis. I am also thankful to Smt.Indira Devi and Smt.Jessy Thomas, Department of Agricultural Economics and other friends of mine for their sincere help.

The award of research fellowship by the Kerala Agricultural University is also duly acknowledged.

T. Bala Sudhahari

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Introduction

INTRODUCTION

Coconut palm is a multiproduct crop. Though basically an oil seed crop, it yields various food products and also non-food products of commercial importance. As an oil seed crop, the contribution of coconut palm is six to seven percent of the total production of vegetable oils in India. The major food products derived from the crop are edible copra, coconut milk in its natural state as well as processed forms, desiccated coconut, toddy and toddy products, coconut water based products etc. For direct food use in households as well as for social and religious ceremonies fresh coconut is in demand in most of the states in the country. It is estimated that around 55 percent (Coconut Development Board) of the total output of coconuts were utilised for such purposes during 1986. The coconut palm is also an important source of raw materials for a number of traditional processing activities. The conversion of coconut into copra particularly milling copra, oil milling, coir manufacture and the production of shell based products are the important commercial activities developed around coconut. The coconut based processing activities covering both the food and non-food sectors sustain the livelihood of over 10 million people in India (Thampan, 1989). Though the major coconut products are not exported from India, the country however, earns

foreign exchange from the export of coir products amounting to around Rs.400 million (Thampan, 1989).

The distribution of coconut is concentrated mainly along the coastal belt of India. According to the 1989-'90 data, coconut occupies an area of 15.0951 lakh hectares with an annual production of 928.34 crore nuts (Coconut Development Board). Among the coconut growing states, Kerala is the most important one with an area of 8.759 lakh hectares and production of 439.40 crore nuts (Coconut Development Board). Consequent on its extensive spread and the involvement of about 2.5 million families (Thampan, 1989) in its culture and related processing activities, the economic prosperity of Kerala is closely linked with the fortunes of the crop. The contribution of coconut to the annual income of Kerala is around 15 percent and to the agricultural income around 35 percent (Thampan, 1989). Coconut and its products constitute the major article of inter-state trading from Kerala. Coir and coir products also enter in such trading involving substantial annual turnover.

In Kerala, the major processing activities centered around coconut are copra making, oil milling and production of coir and coir products. These are all traditional activities in the state providing employment opportunities to a sizeable section of the rural population. Of late, processing technologies have been developed for the production of non-traditional food articles such as preserved coconut milk,

bottled coconut water as a beverage, desiccated coconut and partially defatted coconut meal or flour. Processing industries utilising the new technologies have been started in some parts of the state. The activities promoted so far on commercial scale cover the production of partially defatted coconut meal or flour and desiccated coconut.

The Processing of coconut in general is given in Appendix-I.

The Problem

The production of coconut oil in the country has stagnated since 1975-76. This is essentially the reflection of the downward trend in the production of coconut in Kerala State till 1986. In Kerala, there are 79 expeller units with 137 expellers and 1009 rotary units with 2901 rotaries (Thampan, 1989). Presently there are two solvent extraction plants at Kozhikode and Irinjalakuda. All the copra produced in the state are however not crushed locally. In 1989-'90 about 55 percent of the total milling copra in the state was crushed locally yielding about 1,26,000 tonnes of coconut oil (Thampan, 1989). The balance (45 percent) of the copra output moved out of the state for crushing in other states. This is mainly because the milling industry in the state is traditional with a very slow pace of modernisation. In Kerala, where about 76 percent of the milling units are located, there is a disproportionate concentration of the technologically inferior rotary mills accounting for 77 percent of the total rotaries

in the country. Consequently, the milling sector in the state commands only 54 percent of the total installed capacity in the country (Coconut Development Board). In Kerala, most of the expeller units are of recent origin and are not effectively working due to various reasons. Similarly, more than 30 percent of the rotary units are now idle and in the case of others, the full installed capacity is not utilised. The expeller units alone have a total crushing capacity of about 138,000 tonnes of copra if worked in three shifts for 250 days in a year. However, only 200,000 tonnes of copra are crushed within the state with an annual output of about 126,000 tonnes of oil (Coconut Development Board). Most of the small rotary units have only limited capacity and the production is usually adjusted to equate the demand from the consumers and the retailers of the locality.

Another dimension of the problem is related to the demand supply gap of coconut oil. The demand for vegetable oil in the country is growing at the estimated rate of 4.7 percent per annum. The demand is estimated at 350,000 tonnes of coconut oil as against the availability of 200,000 to 220,000 tonnes in 1986-'87 (Thampan, 1989). The demand supply gap in coconut oil is, therefore, of the order of 130,000 tonnes or a net equivalent of 1300 million nuts. The projected demand for the coconut products in the country by the end of 2000 AD is equivalent to 12,146 million nuts (Thampan, 1989).

In addition, not much diversification has taken place in the coconut processing sector in India. The situation is not different in Kerala State also where coconut is the most important commercial crop. Technical innovations have already taken place in some other countries for the diversified uses of coconut products including coconut water, currently a waste product, which have helped in augmenting the income of coconut growers.

Objectives

The study was organised with the objective of assessing the performance of coconut processing sector in Kozhikode and Kannur districts of Kerala. The specific objectives were :

(1) to study the economic performance of coconut based food and oil milling industries and

(2) to identify the constraints that affect the proper functioning of coconut based food processing and oil milling industry in Kozhikode and Kannur districts.

Scope of the study

In the light of the problems explained, the study on the coconut based food processing and oil milling industries would bring to limelight the institutional and structural support required for modernising the coconut based processing sector in the state.

Limitation

Since the number of units for the study on coconut based food industries was very small, functional analysis could not be done. Aggregate analysis on the coconut oil mills could not be done owing to wide disparity in the capacity between the mills of various categories. Data corresponding to different years and that on the borrowed capital could not be collected for want of time and other practical difficulties. Stratification based on the capacity also could not be done due to practical difficulties.

Organisation of thesis

The write up of the study is organised in the following manner :

Chapter I : Highlights the importance of coconut industry in Nation's and Kerala's economy, problem setting, the objectives, scope and limitation of the study.

Chapter II : Review of literature are presented.

Chapter III : Deals with the methodology and tools of analysis.

Chapter IV : Results and discussion and their implications are presented.

Chapter V : Summary of results and conclusions are made.

Review of Literature

REVIEW OF LITERATURE

To develop clarity and comprehension in any study, a review of the earlier studies on the subject is essential, which would help the researcher to have better and precise understanding of the perspectives of the research problem. The present study is first of its kind made in Kannur and Kozhikode districts. Studies on other similar topics are available but only in limited number . A brief review of the earlier studies is presented in this chapter. For better exposition the chapter is classified into the following four sections :

1. Studies on agro based processing industries.
2. Studies on coconut based food industries.
3. Studies on coconut oil milling.
4. Concepts used in the study.

Agro based processing industries

According to Jaiswal (1965), properly planned Agro-industries could open up a new field of employment and bring prosperity in the rural areas.

Uthamalingam (1979) calculated the average investment in the sago industries of Salem district of Tamil Nadu as 1.48 lakhs rupees in small factories and 2.18 lakhs rupees in big factories. The average casual labour requirement per day

in small sago factories was eight man-days of men labour, 40 women labour and six juvenile labour, whereas big sago factories utilised 16 man-days of men labour, 58 women labour and five juvenile labourers. He also found that the market for sago and starch is oligopolistic.

Sah and Srivastava (1984) computed income ratios such as return on sales, return on equity, return on assets, current ratio, debt equity ratio etc. for rice bran oil industry. Return on sales was 3.26 rupees in the third year which could be improved by reducing costs and increasing sales. Return on equity was 22.71 percent, indicating return for the own funds in the business. Current ratio was very high than expected with 1.4:4 which showed higher liquidity than liabilities.

Seetharaman (1985) found that value adding tasks like marketing and processing have not been tried for many commodities. Farmers starting cooperative processing ventures could not only increase their income, but more importantly, strengthen farm production. The four stages of growth discussed in his study were 1) Stabilisation of the Agro processing industry, 2) Development of infrastructure and subsidiary occupation, 3) Expansion of processing capacity and by products utilisation and 4) Exploring and developing new ventures.

Grant et al. (1987) has found that crushing margins in the soyabean processing sector increase as risk increases. Thus, soyabean processors with better risk management strategies may have a competitive advantage.

While assessing the economic feasibility of setting up a vegetable processing plant in Uttah, Synder (1987) has collected data on current vegetable production and the associated average yields, costs and returns, potential markets, transport costs and capital costs. Linear programming was used to select the optimal combination of crops from both the producers' and processors' point of view. The major problems identified were a) limited and variable growing conditions may present supply problems, b) compensation will be necessary for growers unable to make deliveries due to over capacity, 3) commodities which are profitable may not be the most profitable to process and 4) regional markets are limited.

Vale and Aanesland (1987) observed that in Norway it is not economically profitable to process potatoes into potato starch and glucose. Even if there were no labour charges there would be no value in the industry.

Dawar (1988) has found that quality of sugarcane ie: its sugar content, size of mill, efficiency of input use and historical profit level influence profitability in the sugar industry in Punjab and Haryana.

Singh and Vyasules (1989) have observed that the growth that has taken place in the food processing industry in Punjab was above the average in both output and employment.

Coconut based food industries

Sadath and Gopalan (1979) reported that the average weight of ball copra obtained from 1000 coconuts after storing them for ten to twelve months was 130 kg. The gross returns realised for 130 kg of copra was Rs.753.11 or Rs.579.48 per quintal of copra marketed and the net returns worked out to Rs.710.13 for 130 kg of copra or Rs.546.25 per quintal of copra.

According to the project for the use of coconut water as a soft drink prepared by the Regional Research Laboratory (RRL), Thiruvananthapuram in 1986 the cost in production of soft drink from coconut water was indicated at Rs.2/- per bottle. The requirement of coconut water for a daily output of 1,250 bottles was given as 250 litres from 2000 nuts. The established cost of building, plant and equipment as given in the project was around Rs.8 lakhs. Besides, a working capital of Rs.1.5 lakhs was shown as essential to run the factory. The transport and handling charges from the copra processing units to the factory also formed an important item of expenditure.

According to Arumughan et al. (1987) coconut processing is cumbersome, labour intensive and inefficient with inherent

wastage and under utilisation. Because of the poor yield of milk at household extraction, the residue may contain nearly 50 percent oil which is wasted. It is estimated that about 25,000 tonnes of coconut oil may be wasted on this account alone. Processed coconut cream, if made available could, to some extent, avoid wastage and also ease the household drudgery.

According to Satyavati Krishnankutty (1987) a process has been developed for the production of partially defatted edible coconut gratings which can be used in many food preparations. Also the oil extracted in this process is of very good quality with very low free fatty acid content and a good shelf life.

Janardhanan (1987) reported that processing fresh coconuts to make instant spray dried coconut milk powder, a product yet to be introduced in India, is a very promising proposition. With the availability of spray dried coconut milk powder, a variety of consumer food products could be produced for the growing domestic markets.

According to Mall (1987), only about 50 percent of the installed capacity is being utilised by the desiccated coconut industry in Karnataka. The major problems encountered by the desiccated coconut powder manufacturers are the high cost of raw material and the unhealthy competition in the market.

Power shortage and price fluctuations are other factors which hamper the growth of this industry.

Thampan (1988) noted that for ensuring stability in the coconut based economy it is essential to apply technological innovations in the field of product diversification and by-product utilisation. According to him, by diversifying the use of coconut and it's products the present dependence on a single commodity, ie, coconut oil could be avoided and the coconut based economy freed from the fluctuations often experienced in the prices of coconut oil. He has identified various areas of diversification, viz. desiccated coconut, coconut cream, edible copra, soft drink, shell based products, vineager etc.

Coconut oil milling

The erstwhile Directorate of Coconut Development organised a survey in 1976 to study the expeller units in Kerala. The survey revealed that oil produced in the expeller units could not wholly be sold in retail or wholesale in the locality, but should find outlets in the assembling centres through upcountry buyers. Price paid for expeller cake by solvent extraction units was 20 to 25 percent less than price quoted for rotary cakes.

A study conducted by the Coconut Development Board in 1976 also revealed that the average extraction from expeller mills was sixty five percent oil which was about 2.5 percent more than from rotary mills. But full benefit of the better extraction efficiency was not available to the units because of the higher driage and mechanical loss in expeller milling which was around 4 percent of the weight of copra crushed compared to the average figure of 2.5 percent in rotary milling. Expeller cake also fetched a lower price than that of rotary cake because of the comparitively low oil content.

Thampan and Pankajakshan (1976) observed that big copra milling establishments found outlets for oil in major oil markets of the state. Important oil markets in Kerala, according to them were Cochin and Calicut. In the assembling markets oil was transacted mainly for upcountry markets through brokers or commission agents. Important outside markets were Madras, Bombay and Calcutta from where oil was ultimately traded through a large number of wholesale and retail outlets to remote villages.

Satyavati Krishnankutty et al. (1978) found that in spite of Government encouragement and incentives, the pace of change over from rotary to expeller was slow and rotary mills accounted for 70 percent of the crushing capacity in Kerala State.

Rama Rao et al. (1979) observed that the efficiency of oil extraction is low, especially in indigenous mills.

Paul (1982) examined the impact of coconut oil import on the oil milling industry in Kerala. He pointed out that the unexpected import of coconut oil in sizeable quantities caused a steep decrease in price of coconut oil in local markets that had given a severe jolt to the entire economy of Kerala. With the setting up of a solvent extraction unit at Irinjalakuda, there was a steady market for copra cake produced by oil mills which gave a fillip to oil milling industry in the state.

The market research studies conducted by the Coconut Development Board in 1985, revealed that the yield of coconut oil depended on the oil content of the copra used, the efficiency of the method and the machinery employed. The copra produced in Kerala from the West coast Tall variety was considered as the best milling copra available in the country and the copra from the coastal and backwater areas was preferred by the millers. It was also revealed in this study that all the rotary units covered in Kerala State were small scale units generally having three to four rotaries only and the unit cost of crushing varied from Rs.15/- per quintal of copra in Kannur, Pathanamthitta and Kasaragod to Rs.25/- in Malappuram. This included the labour and electricity charges

and cost of gum. In the expeller units the average cost of crushing copra was found to vary from Rs.7/- to Rs.15/- per quintal.

A study conducted by the National Co-operative Development Corporation (NCDC) in 1986, revealed that the capacity utilisation of the local milling sector was of the order of only 30 percent due to lack of local absorption capacity for oil and oil cake, high transport and handling cost, storage of working capital and violent fluctuation in oil prices. The study also reported that the following factors were responsible for capacity under utilisation :

a) High demands of working capital in view of the high cost of input and inability of the small investor units to muster these high levels of working capital;

b) Speculative nature of the coconut oil trade; and

c) Cornering of copra stocks through procurement followed by crushing and marketing of the products by a few selected vested trade and processor interests located in upcountry markets.

Narasimhappa (1987) reported that in the recent years, the demand for coconut oil has declined both in edible and inedible sectors. The continued high price margin, eratic price behaviour and short supplies coupled with certain policy

matters of the Government have been instrumental for the erosion of demand of coconut oil. As a consequence of this, coconut oil is slowly getting replaced by other oils in both edible and inedible sectors.

Bhat (1987) found out that a new technique using super-critical carbondioxide extraction (SCE) can be developed to extract copra cake to obtain coconut oil of improved quality compared to the conventional method.

According to Varghese (1987), copra made from unripe nuts is likely to be rubbery and difficult to dry. Rubbery copra during storage undergoes rapid deterioration and can spoil the good quality copra, if any, stored along with it. It is found to be having less oil content and the oil extracted from such copra will contain high amount of unsatured fatty acids.

Renuka Nair (1987) observed that the various items of cost incurred by the miller were crushing costs, taxes paid, container costs, brokerage, handling and loading charges and transportation costs.

Jos (1987) observed that the level of coconut oil price has not been stable; even though the fluctuations were mild in some years, the prices moved up and down frequently and violently. Sharp fluctuations in prices of coconut oil had

become a global phenomenon and these fluctuations in price could not be solely attributed to any shrinkage in production of coconut.

Paul (1987) has listed out the major problems of coconut oil milling industry in Kerala viz., (1) Import of copra/oil, (2) Inadequate supply of raw material, (3) Taxation policy of State Government, (4) Indifferent attitude of the Government towards this industry and (5) Lack of forward trading in coconut oil.

Mussadi (1987) reported that the copra crushing industry in the Eastern region was saddled with heavy under utilisation of capacity on account of inadequate availability of copra at economic prices. Another problem related to this industry in this region, more particularly in West Bengal, was the sales tax which is as high as 8 percent while the C.S.T. is 4 percent.

Jolly et al. (1988) had examined the factors such as economics of scale, storage, cost of finance, future market risk, market concentration and their contribution to the differences arising in the crushing margins of oil seeds.

Thampan (1989) observed that the production of milling copra was concentrated in Kerala and oil milling was not confined to Kerala alone, but has taken deep roots in other states as well. The milling establishments in other states

depended mainly on the copra produced in Kerala State.

Chandra Reddy et al. (1989) found that cost and returns were high in expeller mills but net profit margin was large in rotaries. According to him employment generation was more in expeller mills while rotaries were operated with family labour.

Concepts used in the study

To develop clarity and comprehension in any study it is necessary to examine the various concepts used in the study. Hence the various concepts used in the present study are defined and specified as follows :

Industry

All firms selling a similar product within some geographic area, constitute an industry according to the U.S. Department of Agriculture (1973).

According to Caves (1977) the sellers participating in a given market are called collectively the industry providing that product.

An industry, Brain (1988) says, "is strictly a group of sellers of close substitute outputs, who supply to a common group of buyers".

Agro industry

According to Iqbal (1977), agro industries are those which are engaged in (a) manufacture of farm inputs such as agricultural machinery and implements, pesticides and manures and fertilizers required by agricultural sector; and (b) in extraction of raw material from agriculture and utilise agricultural produce as their basic raw material such as oil crushing, sugar and pulses and canning and preservation of fruits and vegetables.

It is an agro industry, by the definition of Rizivi (1977), who includes in agro-industries all those manufacturing units which directly depend upon agricultural sector for their raw material supplies irrespective of their capital investment, employment, size, location and registration.

According to Uthamalingam (1979), a small industry could be defined as either small plant or firm or an industry in which the average size of plant was small compared to that of other industries, the size being measured by the average number of workers per economic unit.

While enumerating the important agrobased industries, Garg and Gupta (1983) included oil ghanis, rice milling, Khandasari and gur making, manufacture of essential oils, fruit preservation and dehydration of vegetables, sericulture,

wool knitting, soap industry, milk procuring and processing, poultry, fishery and egg collection, handloom, khadi and blanket production, repairing and manufacturing units of agricultural implements and machineries and bins making, cold storage and potato processing industry, production inputs supply centres and finally custom service centres.

Production

Smith (1934) defined production as creation of utilities in commodities and services in order to satisfy human wants.

Chopra (1978) stated that production is a physical process in which quantities of raw materials and labour were transformed into quantities of output.

Seth (1985) stated that production is the result of blending of the various factors of production - land, labour, capital and organisation.

Johl and Kapur (1989) tried to explain that products are the result of use of resources or services of resources.

The word 'production' in economics is not merely confined to effecting physical transformation in the matter, but also covers the rendering of services such as transporting, financing, wholesaling and retailing.

In the present study, production of coconut based products is defined as the process of converting human labour, machine labour and raw material, viz. copra and coconuts into oil, desiccated coconut and byproducts.

Investment

Keynes (1936) has clearly defined the concepts of income, saving and investment in his famous book, "The General Theory of Employment, Interest and Money". His definition of income as excess value of output sold during the period over the prime cost led to the definition of current investment, which implied the current addition to the value of the capital equipment which aids in production.

Similarly, Chakravarthy (1973) stated that investment is an addition to capital assets, ie., expenditure of funds in the production of capital goods. Thus the capital investment included the expenditure made on machinery, building and other construction works which are related to increase in production capacity of industries in general.

Similarly, Rajvar Singh and Satish (1979) included in fixed cost the rent, depreciation and interest on building and equipments and the salaries of the staff.

Similarly, Osburn and Schneaberger (1984) stated that ownership or investment capital refers to durable resources like machine and building in which money invested is tied for several years.

In general, economists classified capital investments into fixed capital and working capital. The fixed capital are the durable production goods, which are used in production again and again till they wear out, such as machinery, tools, railways, tractors, factories etc. The working capital are the single use producer goods like raw material, goods in process and fuel. They are used up in a single act of production.

In the present study capital investment includes investment on land, buildings and plant and machinery including furniture.

Depreciation

Saxena et al. (1981) calculated the depreciation on building by straight line method by dividing the value of building by estimated life period; the estimated life assumed for pucca building and kutcha building were 40 and 20 years respectively.

Gittinger (1982) defined depreciation as the anticipated reduction in the value of an asset over time that is brought about through physical use or obsolescence.

Osburn and Schneaberger (1984) stated that depreciation is a procedure for allocating the used up value of durable assets over the period they are owned by business or until they are salvaged. For the calculation of depreciation they suggested three methods which are commonly accepted. They are straight line, diminishing balance and sum of the year digits.

According to Johl and Kapur (1989), depreciation is a slow using up of a long lived asset. In other words, it is a decline in the value of given asset as a result of the use, wear and tear, accidental damage and time obsolescence.

For the present study, the depreciation on buildings and machineries have been calculated by using diminishing balance method. The rate at which depreciation is calculated is 5 percent for pucca buildings and 10 percent for machineries.

Costs

According to Kahlon and Sadhu (1966) fixed costs include depreciation on the value of capital assets and interest on the value of fixed capital . In addition, the rent paid or payable is also taken into account.

According to Tandon and Dhondyal (1971), variable costs are otherwise known as prime costs and these costs are related to the variable resources and change with the level of output.

Samuelson (1973) divided the costs into fixed costs and variable costs. Fixed costs represent the total expenses that go on even when a zero output is produced. It is often called overhead cost and usually includes contractual commitment for rent, maintenance, depreciation, overhead salaries, wages etc. It is such cost because it is quite unaffected by any variation in the level of output, in the time period of its life. According to him variable cost represents all items of total cost except fixed cost.

Deivasigamani (1977) included under variable costs, the cost of cocoons, cost of fuel, labour charges, electricity charges, cocoon sorting and steering charges, levy paid on cocoons, miscellaneous charges and interest on working capital.

Srinivasan (1981) included under fixed cost the interest and depreciation on the machineries and buildings and under variable cost the cost of cocoons, fuel, labour, electricity, levy paid, water charges, transport, marketing charges and interest on working capital.

According to Johl and Kapur (1989), fixed costs can be cash or non-cash costs but incurred even when production is not undertaken.

For the present study the total cost is divided into fixed and variable costs. Fixed costs included depreciation on building and machineries, furniture and establishment utilities; wages on permanent labour including family labour; rent paid including the imputed rental value of own land and the interest on fixed capital. Variable cost consisted of cost of raw material; electricity and telephone charges; fuel and other utilities; wages on temporary labour; purchase tax and sales tax; maintenance charge, interest on working capital and cost of packing, labelling and transportation.

Returns

Gross Return

Deivasigamani (1977) worked out the gross income by taking the total value of all the crops, livestock and silk cocoons produced on the farm including the value of those produce retained for farm and home consumption. He worked out the net income by substracting the total cost from gross income.

Uthamalingam (1979) in his study included under gross income the value of main product and by product, the net income was the residue obtained after deducting the total cost of production from the gross income.

Manoharan (1980) while evaluating the economics of sericulture included under the gross annual income, the total sale value of silk cocoons produced, the sale proceeds of mulberry cuttings and the mulberry leaves sold, if any; the net income in his study was the gross income minus total cost incurred in cocoon production.

Johl and Kapur (1989) defined gross return as the total production times the price. Return to fixed farm resources was equal to gross return minus variable cost. Net return was equal to gross return minus all costs (fixed and variable, cash and kind).

In the present study, gross return included the return realised from the sale of coconut oil and cake, in case of oil mills and desiccated coconut, coconut peelings and shell in case of food industries.

Net Return

Singh (1973) calculated the net income by deducting the total cost from the gross income.

Shukla and Misra (1974) defined the net income as the gross income minus total cost.

According to Singh et al. (1977), the net income is the return that pertains to all factors of production over and above all charges for such factors in the cost analysis.

In the present study net return is worked out by subtracting the total cost from gross return.

Employment

Chatterji (1966) described percentage distribution of population by sex, activity status and occupation of the members as employment pattern.

Dandekar and Rath (1973) viewed employment from the perspectives of income in that an adequate level of employment must be defined in terms of its capacity to provide a minimum living to the population.

Rao (1973) has also taken time criterion for defining employment and suggested a blanket assumption of full employment norm of 48 hours a week which implied work of 8 hours a day for six days a week.

Lal also suggested that employment should be measured on the basis of income thus abandoning the time criterion. Perhaps the real concern was not with employment per se but the income level, this employment made possible.

In the present study employment was measured in manday units of eight hours work done by an adult man.

Wages

According to Dewett and Varma (1984), any type of reward for human exertion whether paid by hour, day, month or year basis and paid in cash, kind or both is called wages.

In the present study wages include all payments made to workers in cash as remuneration for work done during the year. It includes basic wages, dearness allowance, overtime payments, leave allowance, wages paid for holidays and bonus.

Methodology

METHODOLOGY

This study on "Coconut based food and oil milling industries in Kozhikode and Kannur districts" is based on primary data collected from a sample of coconut oil milling units and from all the four desiccated coconut units in the two districts.

Sampling procedure

For the study on coconut based food industries, since desiccated coconut industry was the only coconut based food industry in the area, all the four desiccated coconut units viz. two at Kozhikode district and two at Kannur district were covered.

For the study on coconut oil milling units, the method of multistage random sampling was used. Accordingly two taluks were selected randomly from each district. The four taluks so selected were Kannur and Tellicherry in Kannur district and Kozhikode and Vadakara in Kozhikode district. From each selected taluk, two local bodies were selected at random. The local bodies so selected in Kannur district were Kannapuram and Kannur in Kannur taluk and Tellicherry and Kuthuparambu in Tellicherry taluk. Similarly the local bodies

selected in Kozhikode district include Kozhikode and Kakkodi in Kozhikode taluk and Chorode and Vadakara in Vadakara taluk. Finally the list of coconut oil mills in the selected local bodies were prepared and from the list 30 units in Kozhikode and 40 in Kannur were identified in proportion to the number of oil mills. Total number of samples thus selected was 70.

Collection of data

Primary data were collected from the selected units by personal interview method using a well structured schedule to elicit data from the respondents. Detailed information on location of the units, assets, type of machinery used, mode of procurement and price of raw materials, various cost components, products and by products generated, details of employment, sales of products and by products, taxation and problems faced by the industries were collected.

Similarly, using a separate well structured schedule, the interview was conducted in the four desiccated coconut units also.

Specimen of the two schedules used in the study are given in the Appendices II and III.

Period of study

The study was conducted during the months of May and June 1991. The data and information collected were related to the financial year 1990-'91.

Tools of analysis

Analysis on capital investment and on cost and returns of the coconut based food and oil milling industries was done through tabular method and by percentage analysis. In addition, functional analysis was carried out to determine the factors influencing the return from the industries and also to determine the employment potential in these industries. Other tools of financial analysis used for examining the feasibility of the enterprise were input output ratio, capital output ratio and break-even analysis. An analysis of the different constraints faced by the millers was also done by tabular method.

Capital investment

The three components taken under the capital investment were land, building and plant and machinaries (including furniture). The actual market value of these items was taken while computing the capital investment.

Cost structure

The costs incurred in the industries were grouped into fixed cost and variable cost. The fixed cost included depreciation on building, machinaries and furniture; wages on permanant labour including family labour; rentpaid/imputed rental value of the unit and interest on fixed capital. Since all the buildings were found to be pucca, depreciation was worked out at the rate of five percent per annum. For the machinaries and furniture the rates at which depreciation was worked out were 10 percent and one percent respectively per annum. Diminishing balance method was used to work out the depreciation. Rental value for the own units were imputed based on the rental rate prevailing in the area. Interest on fixed capital was worked out at the rate of 13 percent (ie) the interest rate for fixed deposit in the State Bank of India. While computing the fixed cost the rent paid was taken for the rented units and for the own units the imputed rental value of the unit along with the depreciation on building and machineries was taken.

Variable cost consisted of the cost of raw material, viz. copra in oilmills and raw coconuts in desiccated coconut units; Electricity and telephone charges, fuel and other utilities, wages on temporary labour; purchase tax and sales tax; cost of packing, labelling and transportation;

maintenance cost and interest on working capital. Since the working capital is spread over the whole year, the interest on working capital was worked at the rate of 3 percent (ie) half of the interest rate for the savings bank account in the State Bank of India.

Efficiency measures

Gross return included the return realised from the sale of coconut oil and the oilcake produced in case of oil mills. In the desiccated coconut units, it was worked out by the income realised from the sales of desiccated coconut and the by products, viz. shells and coconut parings. The net return was calculated by subtracting the total cost from gross return.

Cost of production for one quintal of oil and per kilogram of desiccated coconut was found out by adding all the cost items and then dividing it by the total quantity of coconut oil or desiccated coconut produced respectively. Similarly, return per quintal of oil and per kilogram of desiccated coconut was found out by dividing the gross return by the total quantity of coconut oil or desiccated coconut produced respectively.

Input output ratio was worked out to find out the input required to produce one unit of output. Similarly capital output ratio enables to find out the level of capital

required to generate one unit of output. In this analysis the terms like input, output and capital were defined as given below :

Input : denoted the total cost of production which included both fixed and variable costs.

Output : referred to the gross return from the production process.

Capital : referred to the investment made on capital goods namely land, building, plant and machinaries including furniture.

Break-even analysis

Break-even analysis was done to find out the minimum level of production necessary to keep the firm in business. Break-even point is one which equates total cost and total return; break-even quantity is the output corresponding to break-even point. A firm has to produce more than the break-even quantity to keep itself in production. In this study, break-even quantity was worked out and illustrated graphically. Total production was taken in X-axis and total cost and return in Y-axis.

Break-even quantity was calculated using the formula,

$$\text{Break-even quantity} = \frac{\text{Fixed cost}}{\text{(Price - Unit variable cost)}}$$

Functional analysis

A. Production function :

An attempt was made to study the relationship between the gross return and a set of variables contributing to it. Separate functions were fitted with the same dependent and independent variables for rotary and expeller units, as explained below:

(1) Linear function

$$Y = a+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+e$$

(2) Cobb Douglas function

$$Y = ax_1^{b_1}x_2^{b_2}x_3^{b_3}x_4^{b_4}x_5^{b_5}x_6^{b_6}e$$

where,

Y = Gross return in rupees

X_1 = Copra crushed in quintal

X_2 = Fixed cost in rupees

X_3 = Employment in mandays

X_4 = Operational expenditure in rupees

X_5 = Percentage of oil extraction

X_6 = Dummy (Ownership of units ie. Rented/not)

e = error

b_1, b_2, b_3, b_4, b_5 and b_6 represent the respective elasticities and 'a' is the intercept. Stepwise regression analysis was also attempted to reduce the incidence of multicollinearity and to determine the best subset of variables.

Specification of variables

Gross return (Y) : This referred to the income realised from the sale of coconut oil and the oil cake produced in the oil mills.

Copra crushed (X_1) : Dried copra is the raw material used in the oil mills and was measured in quintals.

Fixed cost (X_2) : Fixed cost included depreciation on building, machineries and furniture, rent paid including imputed rental value of own unit and interest on fixed capital.

Employment (X_3) : Employment was measured in manday units of eight hours work by an adult man.

Operational expenditure (X_4) : This included expenditure on electricity and telephone charges, fuel and other utilities; purchase and sales

tax; packing, labelling and transportation cost, maintenance cost and interest on working capital.

Percentage of oil extraction (X_5) : This denoted the ratio of oil produced to the copra crushed in physical units expressed in percentage.

Dummy (Ownership of the units) (X_6) : Values of 'one' or 'two' were given to the rented and owned units respectively.

B. Employment function

To study the employment potential of coconut oil mills, employment function was fitted. Separate functions were fitted with the same dependent and independent variables for the rotary and expeller units. Stepwise regression analysis was carried out, to reduce the incidence of multicollinearity among the independent variables and to arrive at the best subset of variables. In the present study the models tried were,

1. Linear model

$$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + e$$

2. Cobb-Douglas model

$$Y = a x_1^{b_1} x_2^{b_2} x_3^{b_3} x_4^{b_4} e$$

Where,

Y = Employment in mandays

X_1 = Copra crushed in quintals

X_2 = Fixed cost in rupees

X_3 = Operational expenditure in rupees

X_4 = Dummy (Ownership of unit ie. rented/not)

e = error

The variables Y, X_1, X_2, X_3 and X_4 are explained as follows :

Employment (Y) : Employment was expressed in terms of manday units of eight hours work done by an adult man.

Copra crushed (X_1) : Dry copra is the raw material used in oil mills and was measured in quintals.

Fixed cost (X_2) : Fixed cost included depreciation on building, machinery and furniture, rent paid including imputed rental value of own unit and interest on fixed capital.

Operational expenditure (X_3) : This included expenditure on electricity and telephone charges, fuel and other utilities; purchase and sales tax, maintenance cost, interest on working capital and packing, labelling and transportation cost.

Dummy (Ownership of the unit) (X_4) : Values of 'one' and 'two' were given to the rented and own units respectively.

The analysis on the constraints faced by the coconut based food and oil milling industries and the trade practice involved were done through tabular method of analysis.

Results and Discussion

RESULTS AND DISCUSSION

The present study was conducted with the major objectives of examining the economic performance of coconut based food and oil milling industries and to identify the constraints that affect the proper functioning of these industries in Kozhikode and Kannur districts. Kozhikode is a flourishing centre of trade, both national and international. In both the districts, besides coconut and it's products, other major items of trade are pepper, arecanut etc. There are two desiccated coconut units and eightynine coconut oil mills in Kozhikode district. Similarly there are two desiccated coconut units and 154 coconut oil mills in Kannur district.

For the study on coconut based food industries all the four existing desiccated coconut units in the area were contacted and the data collected by personal interview method. For the oil milling industries, the method of multistage random sampling was used. The data collected were analysed using the tools discussed in Chapter III and the findings of the study are presented in this chapter. Accordingly the results are grouped into two sections. First section deals with the study on coconut based food industry viz. desiccated coconut units and the second section comprises the study on the coconut oil milling industry.

4.1 Coconut based food industry

The dried out shreded coconut meat in which the water content has been reduced from 50 percent to less than 2 percent is called desiccated coconut. It is made out of fully matured nuts which have been stored for about a month before dehusking. The dehusked nuts are carefully chipped by a special type of small axe and the shells removed. The brown testa is pared off in a thick rind from the surface. The pared kernels are placed in tanks and sliced into two to release coconut water. The sliced kernel pieces are then passed into other tanks through a two stage washing. The kernel pieces should be kept immersed in water in order to prevent discolouration but not long enough to develop surface sliminess. The kernel pieces after thorough washing are sterilised by passing through large tanks containing boiling water. After sterilisation, the kernel pieces are transferred to the disintegrator, which shreds the kernel pieces into a fine wet meal. The product that comes out of the disintegrator will have about double the weight of the final product. This has to be subsequently desiccated or dried to a final moisture content of two to 2.5 percent. The dried product is allowed to cool on galvanised tables, sifted into coarse, medium and fine grades. Good desiccated coconut should be crisp; snow white in colour with a sweet, pleasant and fresh taste of nut.

In the present study, different analysis were conducted on the capacity utilisation, capital investment, cost structure, efficiency measures, break-even volume and the problems faced by the desiccated coconut manufacturing units.

4.1.1 Capacity utilisation

Capacity utilisation in the four desiccated coconut units varied between 1440 thousand nuts and 2004 thousand nuts per annum. The percentage of capacity utilisation to the annual installed capacity also ranged between 50 and 70. The capacity utilisation in the desiccated coconut units are presented in Table 4.1.

Table 4.1 Capacity utilisation in the desiccated coconut units

Unit	Annual installed capacity (in terms of raw material '000 nuts)	Capacity utilisation (in terms of '000 nuts)	Percentage of capacity utilisation to annual installed capacity
1	2880	1728	60
2	2880	1440	50
3	2880	1712	59
4	2880	2004	70
Average	2880	1721	59.75

The annual installed capacity was found to be the same in all the four units. It was also reported that 90-100 kg of desiccated coconut could be obtained from thousand nuts. Coconuts from Anakompoyil, Thiruvampady and Kuttiyadi in Calicut and from Kanya Kumari district of Tamil Nadu were reported to give better yield of desiccated coconut.

4.1.2 Capital investment

Table 4.2 presents the data on the capital investment in desiccated coconut units.

Table 4.2 Capital investment in desiccated coconut units (Average/unit)

S.No.	Particulars	Amount (Rs.)
1.	Land	80000 (4.30)
2.	Building	450000 (24.21)
3.	Plant & Machineries (including furniture)	1329000 (71.49)
	Total	1,85,9000 (100)

(Figures in paranthesis show percentage to total)

It can be seen that as much as 71 percent of the capital investment was in the form of plant and machineries. The machineries used included crusher, dryer, motor and sieve which were all imported, thus involving a high cost.

4.1.3 Cost structure

Corresponding to the length of planning periods, there are two major categories of costs namely (i) Fixed costs or sunk costs or supplementary costs, and (ii) Variable costs or prime costs.

4.1.3.A Fixed cost

Details on the fixed cost incurred in the desiccated coconut units are presented in Table 4.3.

It is clear from the table that wages on permanent labour including family labour accounted for the largest share (51.10%) of the fixed cost. This is because manufacture of desiccated coconut involves highly labour intensive operations such as cracking the shells, paring, sieving, packing and labelling. The next largest item of cost was the interest on fixed capital (28.76%) which was followed by depreciation on machinery. The other items of cost included under fixed cost were depreciation on furniture and other establishment utilities(4.88%), Rent paid/Imputed rental val of land (5.85%) and depreciation on building (2.12%).

Table 4.3 Fixed cost in desiccated coconut units

(Average per unit)

Sl.No.	Components	Amount (Rs.)
1.	Depreciation on building	2284 (2.12)
2.	Depreciation on machinery	7847 (7.29)
3.	Wages on permanent labour	55010 (51.10)
4.	Depreciation on furniture and other establishment utilities	5250 (4.88)
5.	Interest on fixed capital	30960 (28.76)
6.	Rent paid/Imputed rental value of the unit	6300 (5.85)
	Total	107651 (100)

Figures in paranthesis show percentage to total.

4.1.3.B Variable cost

The variable cost incurred by the desiccated coconut units is furnished in Table 4.4.

In the desiccated coconut units, the percentage contribution by the raw material cost to the total variable cost was the largest, which accounted for 78.21 percent of the total variable cost which was followed by the cost on package, labelling and transportation which contributed to 12.32 percent of the total variable cost. On an average, raw material needed to produce 100 kg of desiccated coconut was 1000 nuts and hence this high cost on raw material. However, it was also reported that during the months of January to May 110 kg of desiccated coconut could be obtained from 1000 nuts, on an average. The contribution by the other components viz. cost on electricity, fuel and other utilities, sales tax on the product, maintenance cost and interest on working capital were comparatively low.

4.1.4 Efficiency analysis

Total production in the desiccated coconut units in an year averaged 143318 kg. The gross return was Rs. 5196343 which included the return from the sales of both desiccated coconut

Table 4.4 Variable cost in desiccated coconut units

(Average per unit)

Sl.No.	Particulars	Amount (Rs.)
1.	Raw material cost	2350111
		(78.21)
2.	Electricity, fuel and other utilities	131920
		(4.39)
3.	Sales tax on the product	45029
		(1.50)
4.	Packing, labelling and transportation cost	370200
		(12.32)
5.	Maintenance cost	20000
		(0.67)
6.	Interest on working capital	87517
		(2.91)
	Total	3004777
		(100)

Figures in paranthesis indicate percentage to total.

Table 4.5 Efficiency measures per desiccated coconut unit

Sl.No.	Particulars	
1.	Capital investment (Rs.)	1859000
2.	Total cost (Rs.)	3112428
3.	Total output (Kg)	143318
4.	Gross return	
	a. By sale of desiccated coconut (Rs.)	4442858
	b. By sale of coconut shell and coconut peelings (Rs.)	753485
	c. Gross return (Rs.)	5196343
5.	Net Return (Rs.)	2083915
6.	Cost per kg of desiccated coconut (Rs.)	21.72
7.	Return per kg of desiccated coconut(Rs.)	36.26
8.	Input-Output ratio	0.60
9.	Capital-Output ratio	0.36

and the byproducts such as shell and coconut parings. The net return worked out to Rs. 2083915. Cent percent of the production is sold outside the state. This is done through brokers and commission agents. It is sent mainly to Bombay, Calcutta, Assam, Bihar, Uttar Pradesh, Madhya Pradesh and Gujarat under various brands. They are marketed in packs of 1 kg or in boxes of 15 kg and 20 kg. The coconut parings are sold to the oil millers and shell to the nearby shell powder making units.

Efficiency refers to the ratio of output to input. Under the efficiency analysis, input-output ratio, capital-output ratio and cost and return per kilogram which help to judge the efficiency of capital utilisation in the desiccated coconut units are discussed.

The gross return per kg of desiccated coconut produced was higher than the cost incurred on the production of 1 kg of desiccated coconut by Rs. 14.54. Hence it is found to be a profitable industry.

The input-output ratio gives an idea about the cost of input for producing one unit of output. In the desiccated coconut units as could be seen from the Table 4.5, the input-output ratio was found to be 0.60 which implies that the cost of inputs for producing one rupee worth of output is Rs.0.60. Thus the desiccated coconut processing units proved to be profitable.

The concept of capital-output ratio expresses the relationship between the value of capital investment and the value of output. Capital relates to the investment made on various capital goods and the output refers to the gross return. Capital output ratio found in this case was 0.36 which means that the capital needed to produce one rupee worth of desiccated coconut was Rs. 0.36. Thus these units were found to be low in capital intensity.

4.1.5 Break-even analysis

Break-even analysis was made to determine the minimum level of production required to keep the units in the production process. The break-even quantity of production was worked out by using the formula,

$$\text{Break-even quantity} = \frac{\text{Fixed cost}}{\left(\text{Per unit price} - \text{Unit variable cost}\right)}$$

It is clearly discernible from Fig. 1 that there should be a minimum level of production of 5373.42 kg desiccated coconut to keep the unit in business. At this level of production the total cost and total return were equal to Rs. 220310.02 as could be seen from Table 4.6. Here total return referred to the value of the product at that level. The production of desiccated coconut was 143318 kg which was

far higher than the break-even volume of 5373.42 kg. The margin of safety was also very high.

Table 4.6 Break-even analysis in desiccated coconut units (Average/unit)

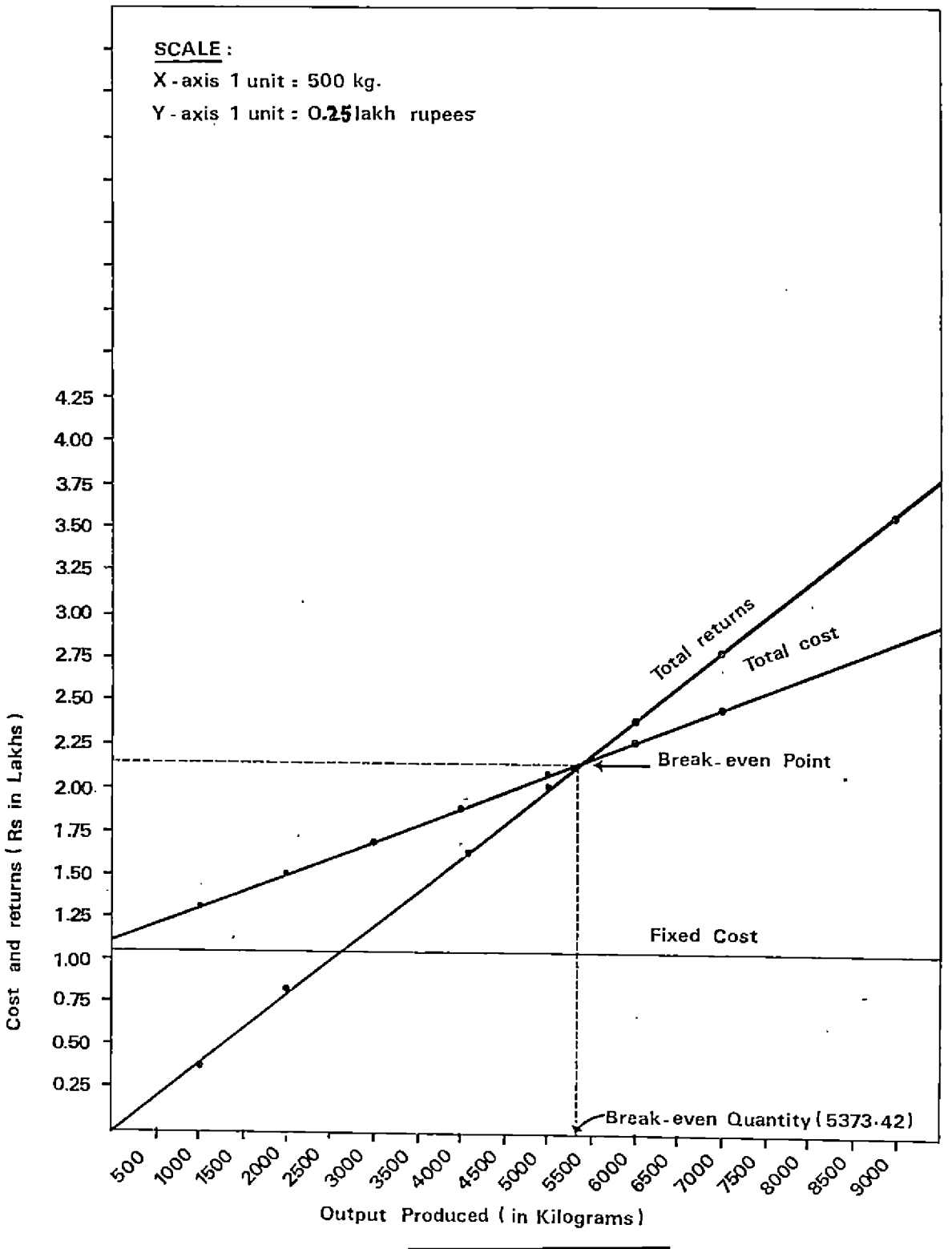
(Amount in Rupees)

Sl. No.	Production (kg)	Fixed cost	Variable cost	Total cost	Total return
1	1000	107651	20966	128617	41000
2	2000	,,	41932	149583	82000
3	3000	,,	62898	170549	123000
4	4000	,,	83864	191515	164000
5	5000	,,	104830	212481	205000
6	5373.42	,,	112659.02	220310.02	220310.02
7	6000	,,	125796	233447	246000
8	7000	,,	146762	254413	287000
9	8000	,,	167728	275379	328000
10	9000	,,	188694	296345	369000
11	10000	,,	209660	317311	410000

(Average production of desiccated coconut - 143318 kg)

Fig : 1

BREAK-EVEN ANALYSIS IN DESICCATED COCONUT UNITS



4.1.6 Major constraints faced by the desiccated coconut units.

The main problem faced by the desiccated coconut units is taxation. Whereas the Governments of Tamil Nadu and Pondicherry do not levy any tax for coconut and desiccated coconut powder, taxation is reported to be a menace in Kerala. Earlier, the tax levied was purchase tax for coconut. But when representation was given, tax on purchase was abolished and levied on sales. Hence the sales price is higher for this product in Kerala when compared to that in Tamil Nadu and Karnataka. So the desiccated coconut manufacturers in Kerala find it very difficult to find market, and there is lack of demand for their product.

Similarly all the four entrepreneurs also reported the problem of power cut in the whole Malabar area.

Another problem expressed by them was the shortage of raw materials during off season when the quantity of coconut also will be low. Then, they have to buy it from other states, mainly from Kanyakumari district of Tamil Nadu. In that case also, they are forced to pay tax on the purchase of coconuts.

These may be the reasons for the under utilisation of capacity in Kozhikode and Kannur districts.

The coconut oil mills selected for the study are located in Kozhikode and Vadakara taluks of Kozhikode district and Kannur and Tellicherry taluks of Kannur district. In total, seventy units were contacted of which 13 expeller units and 17 rotary units were from Kozhikode district and 20 expeller units and 20 rotary units from Kannur district.

In the present study an attempt has been made to examine the capacity utilisation, capital investment, cost structure, efficiency measures, break-even volume, relationship between the output and various inputs, employment potential, problems faced by the coconut oil millers and the trade practises involved in the coconut oil milling industries.

4.2.1 Capacity utilisation

The annual installed capacity of the selected units varied from 5000 quintals per annum in the rotary units of Kozhikode and Kannur to 15000 quintals per annum in the expeller units of Kozhikode. The capacity utilised was low in the rotary units compared to the expeller units and between the two districts a better utilisation was there in Kozhikode as shown in Table 4.7. As such, the expeller units of Kozhikode had the highest utilisation of about 82 percent. The reasons may be attributed to marketing aspects of the oil. In Kozhikode most of the millers exported their products to

Table 4.7 Capacity utilisation and percentage of oil extraction in coconut oil mills

(Average per unit)

Unit	Annual installed capacity	Capacity utilisation	Percentage of oil extraction
	(in terms of copra expressed in quintal)		
Expeller			
Kozhikode	15000	12296 (81.97)	65
Kannur	5000	1868 (37.36)	65
Rotary			
Kozhikode	5000	2542 (50.84)	62
Kannur	5000	1700 (34.00)	62

(Figures in paranthesis show percentage to the annual installed capacity).

other states and hence they did not face the problem of marketing. This was possible since Kozhikode has remained an important trade centre for a long time. But in Kannur due to lack of infrastructure almost all of them adhered to local sales within the state and hence the demand for oil was less comparatively. Hence they limited their production to the local demand for oil.

4.2.2 Capital investment

The capital investment pattern in the coconut oil mills of Kozhikode and Kannur districts could be read from Table 4.8. Of the three components of capital viz. land, building and plant and machinary, plant and machinary accounted for the largest share in both the expeller and rotary units of both the districts. It ranged between 55.80 percent in the rotary units of Kannur and 81.89 percent in the expeller units of Kozhikode. It could however be seen that in both the districts, the percentage contribution of plant and machinery to the capital was more in the expeller units when compared to the rotary units owing to the higher cost of investment on expeller.

4.2.3 Cost Structure

4.2.3.A Fixed cost

The fixed cost of oil mills in the two selected districts is furnished in Table 4.9. The fixed cost included

Table 4.8 Capital investment in coconut oil mills

(Average per unit)

(Amount in Rupees)

Sl. No.	Particulars	Kozhikode		Kannur	
		Expeller	Rotary	Expeller	Rotary
1.	Land	4550 (1.00)	3300 (1.65)	4500 (2.66)	3500 (3.87)
2.	Building	78000 (17.11)	78300 (38.98)	37000 (21.84)	36500 (40.33)
3.	Plant and machinary (including furniture)	373300 (81.89)	119250 (59.37)	127900 (75.50)	50500 (55.80)
	Total	455850 (100)	200850 (100)	169400 (100)	90500 (100)

(Figures in paranthesis show percentage to the total)

depreciation on building; depreciation on machinery; wages on permanent labour (including family labour); depreciation on furniture and other establishment utilities; interest on fixed capital; rent paid and inputed rental value of the unit. The fixed cost varied from Rs. 40826 in the expeller units of Kannur to Rs. 2,48,127 in those of Kozhikode district. Wages on permanent labour constituted the largest share in the fixed cost, which ranged between 43.68 per cent in the rotary units of Kannur district and 75.65 per cent in the rotary units of Kozhikode. Next to this, the percentage share was more for interest on fixed capital which was the highest of 29.03 percent in the rotary units of Kannur district and the lowest in the rotary units of Kozhikode with a contribution of 12.33 percent.

4.2.3.B Variable cost

It is candid from Table 4.10 that the variable cost ranged from Rs. 29.29 lakhs in the expeller units of Kannur to Rs. 172.81 lakhs in the expeller units of Kozhikode district. Raw material cost formed the major variable cost item, which alone contributed more than 90 percent of the variable cost in both the districts. The other cost items included in the variable cost were cost on electricity, telephone charges, gum, filter cloth and other utilities; wages on temporary labour; Sales tax; packing, labelling, transportation cost; maintenance cost and interest on working capital.

Table 4.9 Fixed cost in coconut oil mills

(Average/milling unit)

Sl. No.	Particulars	Kozhikode		Kannur	
		Expeller (Rs.)	Rotary (Rs.)	Expeller (Rs.)	Rotary (Rs.)
1.	Depreciation on building	3842 (1.55)	1611 (0.71)	848 (2.07)	1007 (2.14)
2.	Depreciation on machinery	14180 (5.71)	7756 (3.44)	2726 (6.67)	3460 (7.36)
3.	Wages on permanent labour	151043 (60.87)	170648 (75.65)	20260 (49.63)	20532 (43.68)
4.	Depreciation on futniture and other establishment utilities	8923 (3.60)	9316 (4.13)	3695 (9.05)	5684 (12.09)
5.	Rent paid/Inputed rental value of unit	12347 (4.98)	8432 (3.74)	1801 (4.41)	2681 (5.70)
6.	Interest on fixed capital	57792 (23.29)	27818 (12.33)	11496 (28.17)	13645 (29.03)
	Total	248127 (100)	225581 (100)	40826 (100)	47009 (100)

(Figures in paranthesis show percentage to the total)

Table 4.10 Variable cost in coconut oil mills

(Average/Milling unit)

Sl. No.	Particulars	Kozhikode		Kannur	
		Expeller (Rs.)	Rotary (Rs.)	Expeller (Rs.)	Rotary (Rs.)
1	Raw material cost	16090400 (93.11)	6685385 (95.22)	2815180 (96.12)	2948437 (95.92)
2	Electricity, telephone charge, gum, filter cloth and other utilities	77463 (0.45)	46995 (0.67)	8934 (0.32)	12631 (0.41)
3	Wages on temporary labour	693 (0,004)	--	2352 (0.08)	2500 (0.08)
4	Sales tax on oil	47003 (0.276)	33551 (0.48)	11216 (0.38)	13240 (0.42)
5	Package, labelling & transportation cost	515403 (2.98)	21167 (0.30)	727 (0.02)	2206 (0.07)
6	Maintenance cost	69723 (0.40)	11283 (0.16)	4136 (0.14)	4900 (0.16)
7	Interest on working capital	479958 (2.78)	222623 (3.17)	86009 (2.94)	90257 (2.94)
	Total	17280643 (100)	7021004 (100)	2928554 (100)	3074171 (100)

(Figures in paranthesis show percentage to total)

4.2.4 Efficiency analysis

The efficiency measures are worked out and presented in Table 4.11. Total production of oil per milling unit for an year ranged from 1064 quintals in the rotary units of Kannur to 7990 quintals in the expeller units of Kozhikode. The gross return was higher for the expeller units compared to the rotary units. In Kozhikode it was Rs. 24985192 in the expeller units whereas it was only Rs. 8368720 in the rotary units. Similarly in the Kannur district, it was Rs. 3842420 and Rs. 3433298 respectively in the expeller and rotary units. The net return was also higher in the expeller units compared to the rotary units in both the districts. However the net return from the expeller unit of Kozhikode district which was around Rs. 74.56 lakhs was much higher than the amount of Rs. 8.73 lakhs in the expeller units of Kannur district. This is on account of the higher level of installed capacity as well as capacity utilisation in Kozhikode district. Similarly the net return from the rotary units of Kozhikode district was much higher than that in Kannur district. The main reason for this is that most of the units in Kozhikode were more efficiently utilised when compared to those in Kannur and hence not only were the total cost higher, but the gross returns were also higher which resulted in high net return.

The cost per quintal of oil produced was much higher in the rotary units when compared to that in the expeller units.

It was Rs. 2446 for the expellers of Kannur whereas it was Rs. 2933 for the rotary units. Similarly when the cost was only Rs. 2,194 in the expellers of Kozhikode district for one quintal of oil produced, it was as high as Rs. 2820 in the rotary units of Kozhikode.

On account of this higher cost of production in rotary units the profit from these units were less compared to expeller units.

The input output ratio was low in expeller units than in rotary units. The cost of inputs to produce one rupee worth of output was Rs. 0.70 and Rs. 0.78 respectively for the expeller units of Kozhikode and Kannur showing that the method of copra crushing was more profitable in the expeller units when compared to the rotary units. In rotary units, the input output ratio was 0.87 and 0.91 respectively in Kozhikode and Kannur districts, which implies that oil extraction in the rotary units was relatively costly when compared to the expeller units. Though the expeller units needed huge investment, because of higher productivity, the unit cost of production tended to become less as compared to the rotary units.

Capital-output ratio was less in the expeller units of Kozhikode; to produce one rupee worth of output, the capital

Table 4.11 Efficiency measures per coconut oil mill.

Sl. No.	Particulars	Kozhikode		Kannur	
		Expeller	Rotary	Expeller	Rotary
1	Capital investment (Rs.)	455850	200850	169400	90500
2	Total cost (Rs.)	17528770	7246585	2969380	3121180
3	Total output (Q.)	7990	2570	1214	1064
4	Gross Return				
	a) By the sale of oil (Rs.)	23270000	7712470	3644000	3192000
	b) By the sale of oil cake (Rs.)	1715192	656250	198420	241298
	c) Gross return (Rs.)	24985192	8368720	3842420	3433298
5	Net Return (Rs.)	7456422	1122135	873040	312118
6	Cost per quintal of oil (Rs.)	2194	2820	2446	2933
7	Return per quintal of oil (Rs.)	3127	3256	3165	3227
8	Net return per quintal of oil (Rs.)	933	436	719	294
9	Input outout ratio	0.70	0.87	0.78	0.91
10	Capital output ratio	0.018	0.024	0.044	0.026

needed was 0.018 rupees. On the other hand, 0.024 rupees was required to produce one rupee worth of output in the rotary units of Kozhikode. Similarly to produce one rupee worth of output in the expeller units of Kannur, the capital needed was 0.044 rupees while it was 0.026 rupees in the rotary units of Kannur. This implies that oil extraction in the expeller units was relatively low in capital intensity. The capital output ratio in the coconut oil mills is generally low when compared to the desiccated coconut units, since the initial capital investment is also comparitively low.

4.2.5 Break-even analysis

It is clearly discernible from the graph (Fig. 2) that there should be a minimum level of 296.45 quintal of coconut oil production in the expeller units of Kozhikode district, to keep them in business. At breakeven point, the total cost equalled the total return. The total return referred to the price of oil at that quantity. In this case the total cost and total return were Rs. 889344.09 at the breakeven point as illustrated in Fig. 2 and Table 4.12. The actual level of production of 7990 quintal of oil was much higher than the breakeven volume of 296.45 quintal.

In the expeller units of Kannur district the total cost and total return were equal to Rs. 208295.70. The minimum

Table 4.12 Break-even analysis in expeller units of Kozhikode district.

(Amount in Rupees)

Production (Q.)	Fixed cost	Variable cost	Total cost	Total return
100	248127	216300	464427	300000
200	"	432600	680727	600000
296.45	"	641217.09	889344.09	889344.09
300	"	648900	897027	900000
400	"	865200	1113327	1200000
500	"	1081500	1329627	1500000

(Average production - 7990 Q.)

Table 4.13 Break-even analysis in expeller units of Kannur District.

(Amount in Rupees)

Production (Q.)	Fixed cost	Variable cost	Total cost	Total return
50	40826	120600	161426	150000
69.44	"	167469.74	208295.74	208295.70
100	"	241200	282026	300000
200	"	482400	523226	600000
300	"	723600	764426	900000
400	"	964800	1005626	1200000
500	"	1206000	1246826	1500000

(Average production - 1214 Q.)

Table 4.14 Break-even analysis in rotary units of Kozhikode District.

(Amount in Rupees)

Production (Q.)	Fixed cost	Variable cost	Total cost	Total return
100	225581	273200	498781	300000
200	"	546400	771981	600000
300	"	819600	1045181	900000
400	"	1092800	1318381	1200000
500	"	1366000	1591581	1500000
600	"	1639200	1864781	1800000
700	"	1912400	2137981	2100000
800	"	2185600	2411181	2400000
841.72	"	2299579.3	2525160.3	2525160.3
900	"	2458800	2684381	2700000
1000	"	2732000	2957581	3000000

(Average production - 2570 Q.)

Table 4.15 Break-even analysis in rotary units of Kannur District.

(Amount in Rupees)

Production (Q.)	Fixed cost	Variable cost	Total cost	Total return
100	47009	288990	335909	300000
200	"	577800	624809	600000
300	"	866700	913709	900000
400	"	1155600	1202609	1200000
423.50	"	1223504.50	1270513.50	1270513.50
500	"	1444500	1491509	1500000
600	"	1733400	1780409	1800000
700	"	2022300	2069309	2100000
800	"	2311200	2358209	2400000

(Average production - 1064 Q.)

level of production required to keep the firm in business was Rs. 69.44 quintals as shown in Fig. 3 and Table 4.13, whereas the actual level of production was 1214 quintals of oil.

In case of the expeller units, those in Kozhikode had to produce nearly five times as much of those in Kannur so as to keep them in business. This is because of the high investment made in the units of this district.

Similarly the breakeven analysis for the rotary units of Kozhikode revealed that a minimum level of production of 841.72 quintals of oil was required to keep the firm in business. But the actual level of production was much higher than this to the extent of 2570 quintals. The total cost and total return were equal to Rs. 2525160.30. This is explained in Fig. 4 and Table 4.14.

Also the breakeven quantity was found to be 423.50 quintals of oil in the rotary units of Kannur wherein the actual production of oil was 1064 quintals. The total cost and total return were equal to Rs. 1270513.50. This is candid from Fig. 5 and Table 4.15.

In case of the rotary units also it could be seen that the minimum level of oil to be extracted to keep the firm in business was high in Kozhikode district when compared to those in Kannur district, due to high investments in the former case.

Fig: 2

BREAK-EVEN ANALYSIS IN EXPELLER UNITS OF KOZHIKODE DISTRICT

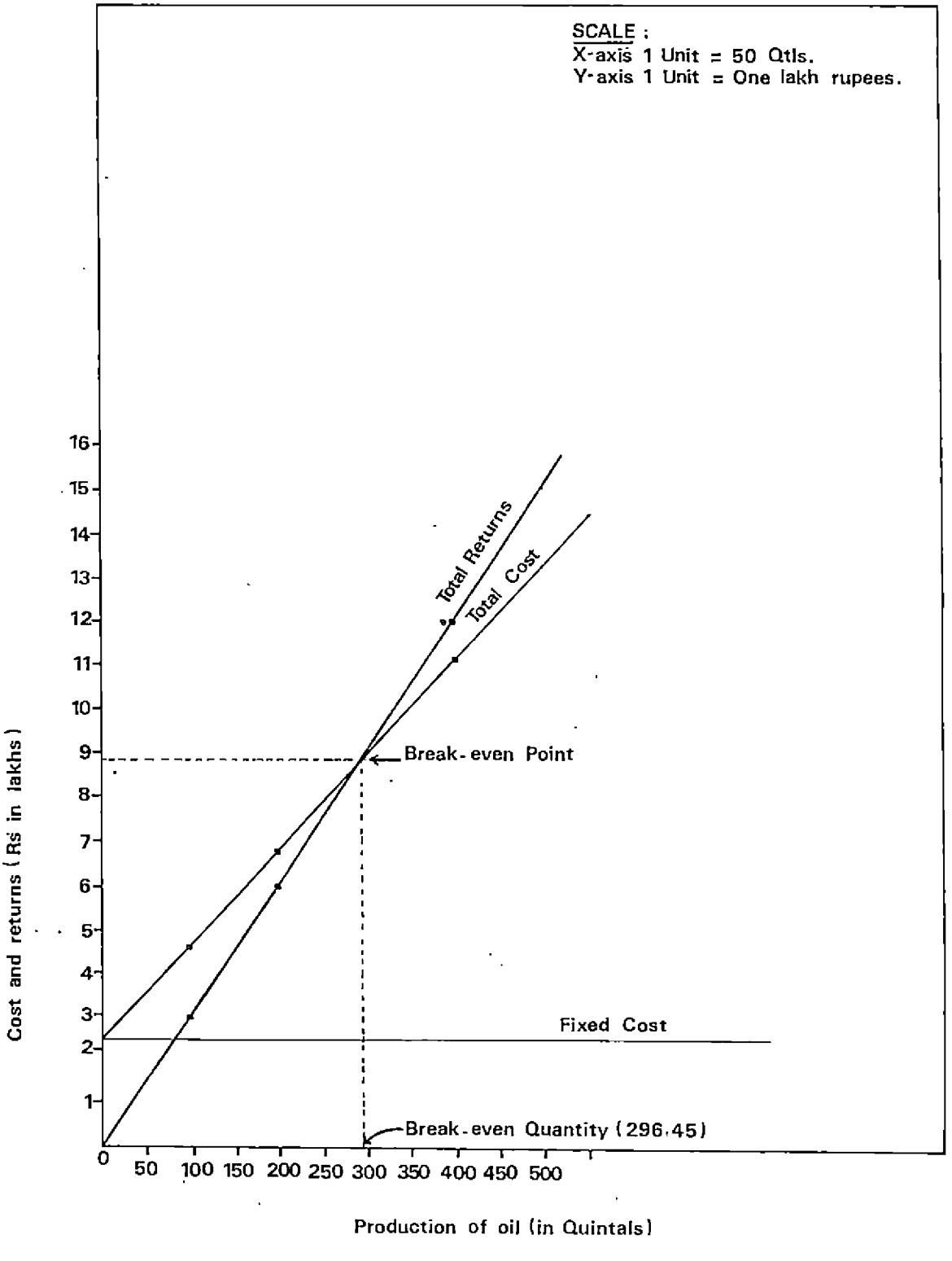


Fig : 3

BREAK-EVEN ANALYSIS IN EXPELLER UNITS OF KANNUR DISTRICT

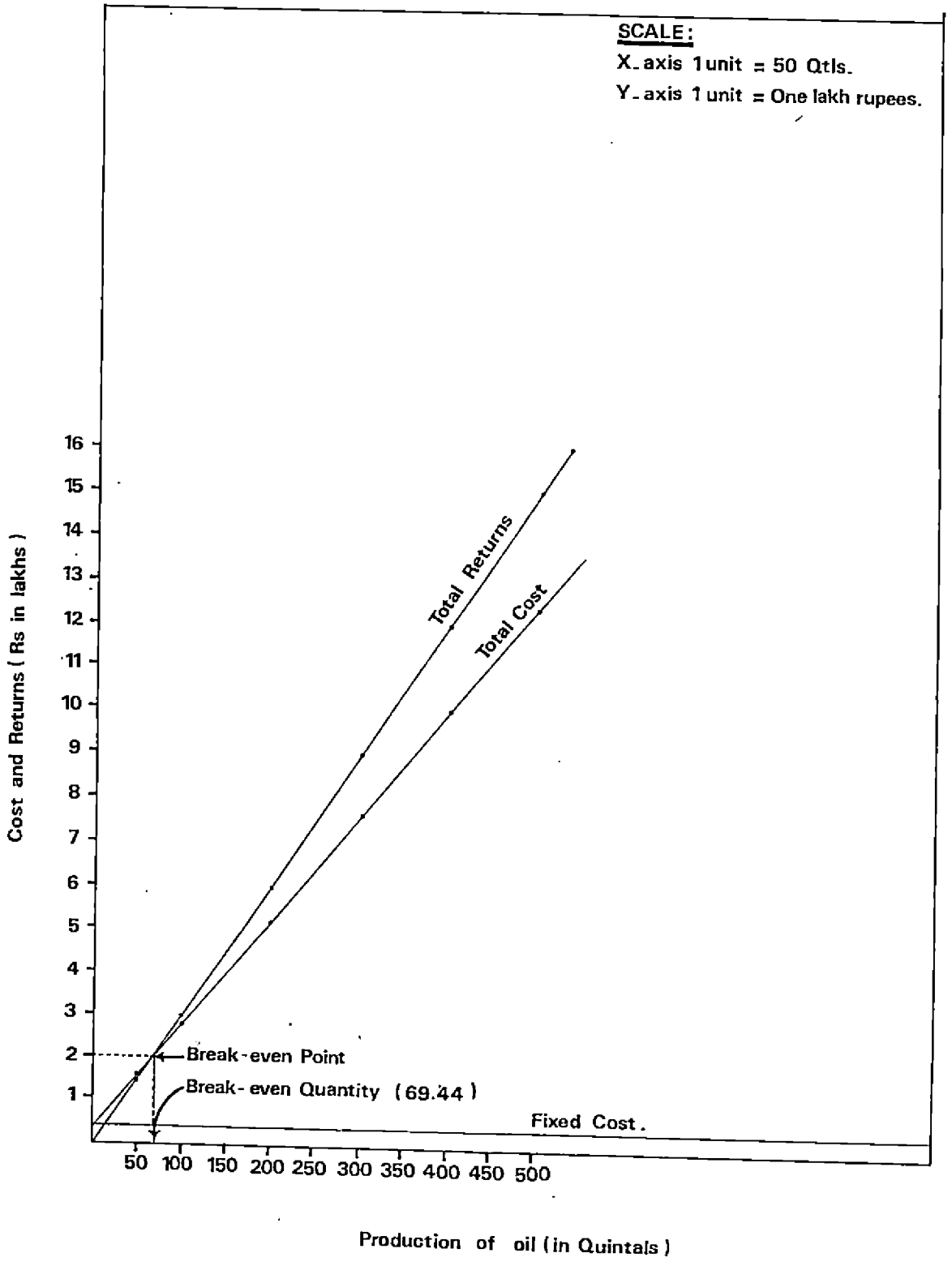


Fig:4

BREAK-EVEN ANALYSIS IN ROTARY UNITS OF KOZHIKODE DISTRICT

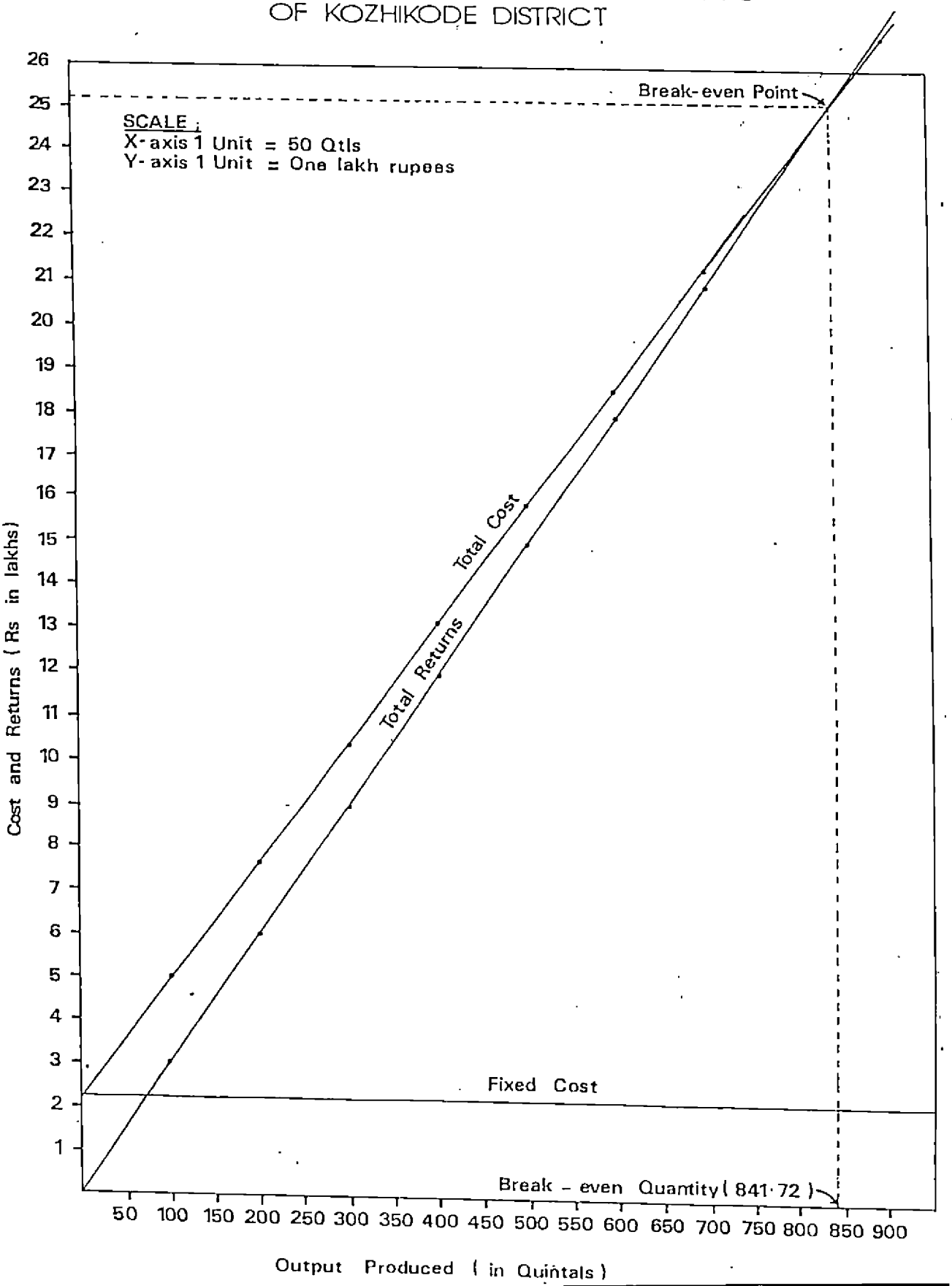
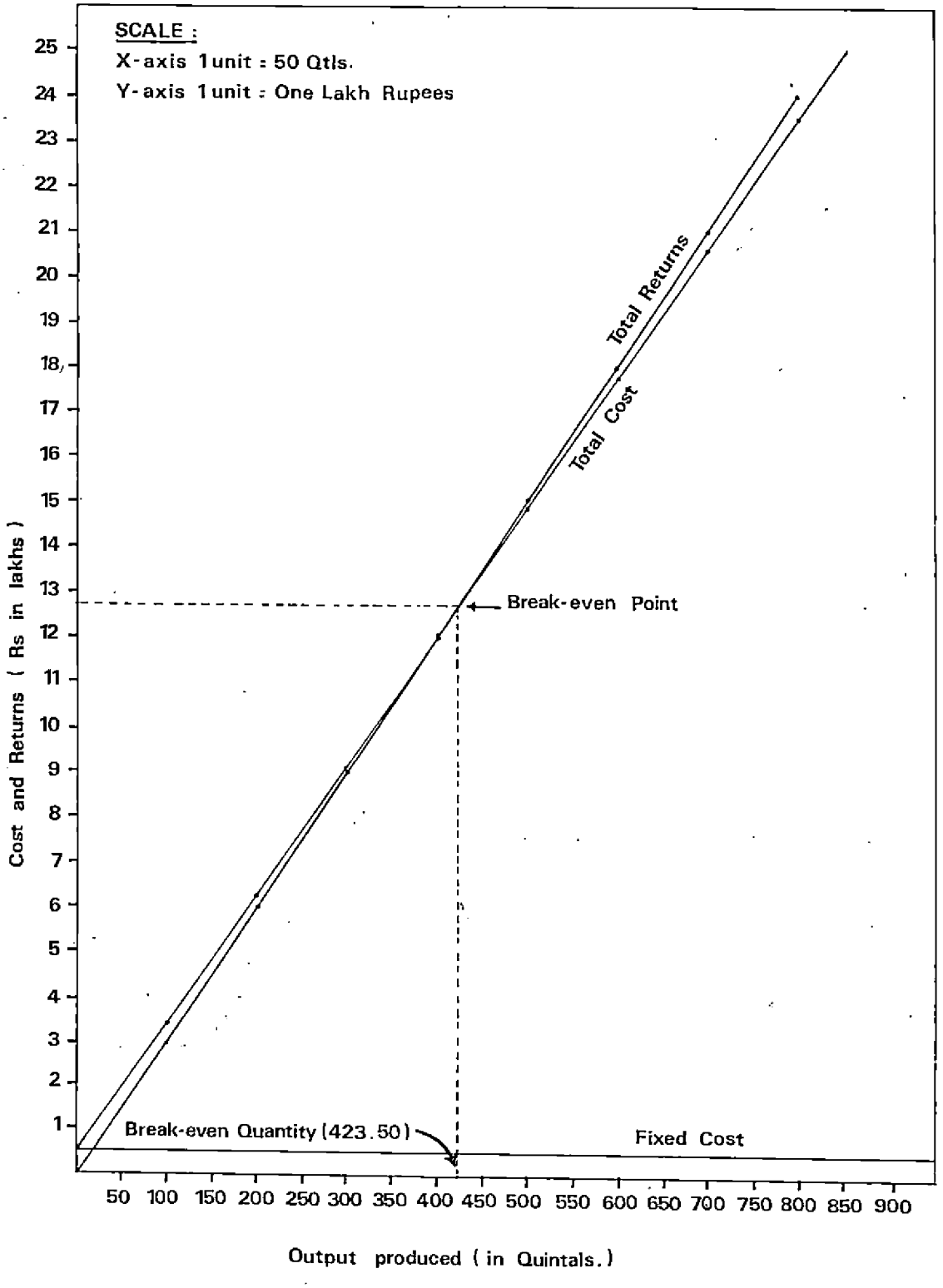


Fig: 5

BREAK-EVEN ANALYSIS IN ROTARY UNITS OF KANNUR DIST.



Similarly, the break-even quantity was found to be higher for the expeller units when compared to the rotary units. This also was because of the capital intensity in the expeller units. However comparison of break-even volume with that of the total quantity produced indicated that the performance of all the units were far above the break-even volume. The margin of safety was very high in all the units.

4.2.6 Functional analysis

4.2.6.A Production function

The resource use efficiency of the various inputs on gross return was measured by fitting both linear and Cobb-Douglas production functions. Separate functions were fitted with the same dependent and independent variables for the rotary and expeller units of Kozhikode and Kannur districts. The goodness of the fit was examined by calculating the values of coefficient of multiple determination. The results are furnished in Table 4.16. The coefficient of multiple determination was relatively higher in the linear function and hence the linear model was selected for further analysis.

The percentage of variations explained by the different independent variables in the dependent variable ranged between 72 to 99.72 in the linear model, whereas it ranged between 2.72 to 84.52 in the Cobb-Douglas model.

Table 4.16 Coefficient of multiple determination (R^2) of the Linear and Cobb-Douglas models.

Category	Coefficient of multiple determination in percentage	
	Linear model	Cobb-Douglas model
Expeller		
Kozhikode	99.20**	56.61
Kannur	85.00**	2.72
Rotary		
Kozhikode	99.72**	84.52**
Kannur	72.00**	9.73

** Significant at 0.01 level of probability.

The estimated partial regression coefficients of the linear model along with their standard error are presented in Table 4.17.

From the results given in Table 4.17, it could be inferred that the important variables in both expeller and rotary units of Kozhikode district were raw material and fixed cost, where the latter exerted a negative effect. Besides, the percentage of oil extraction also had a significant positive influence in case of the rotary units. In Kannur district, the single variable that had significant contribution on income was the quantity of copra used in both the expeller and rotary units. The remaining variables did not exert any significant influence on gross return. The non significance of these inputs can be due to the presence of multicollinearity among the various input factors.

As a method of reducing multicollinearity and in order to obtain the best subset of variables, stepwise regression analysis was done. The result of the analysis is furnished in Table 4.18.

From the Tables 4.16 and 4.18 it is clear that the value of coefficient of determination obtained from the stepwise regression always was a little lower than that of

Table 4.17 The partial regression coefficient (b_i) of the various inputs on gross return.

Input	Kozhikode		Kannur	
	Expeller	Rotary	Expeller	Rotary
Copra crushed (X_1)	2581.076** (78.039)	1972.88** (19.08)	2033.166** (316.42)	2155.135** (594.09)
Fixed cost (X_2)	-294.192** (59.43)	-26.644** (6.17)	68.963 (220.83)	- 33.279 (49.01)
Employment (X_3)	34.70 (101.31)	92.400 (79.06)	1214.709 (1839.58)	- 331.478 (1553.07)
Operational expenditure (X_4)	-0.636 (0.536)	-0.098 (0.088)	-30.977 (37.97)	4.084 (41.74)
Percentage of oil extraction (X_5)	-52395 (124158)	90167** (31268)	22936.25 (60776.12)	641326.42 (833978)
Ownership of the unit (X_6)	1234803 (1661916)	-81652 (70268)	-776082 (188848)	-1254508 (1291207)

Figures in paranthesis show standard error of partial regression coefficients.

**Significant at 0.01 level of probability.

Table 4.18 Results of stepwise regression analysis

Type of Unit	Regression equation	R^2
Expeller		
Kozhikode	$\hat{Y} = -4160584.40 + \underset{(68.15)}{2582.74^{**}X_1} \underset{(42.42)}{-358.86^{**}X_2}$	99
Kannur	$\hat{Y} = -145596 + \underset{(240.39)}{2157.22^{**}X_1}$	82
Rotary		
Kozhikode	$\hat{Y} = -22475.068 + \underset{(20.44)}{1965.70^{**}X_1} \underset{(4.42)}{-20.23^{**}X_2} \underset{(38.58)}{+68.56X_3} \underset{(3.28)}{+16.81^{**}X_5}$	99
Kannur	$\hat{Y} = 637363 + \underset{(310.72)}{1931^{**}X_1}$	69

Figures in paranthesis show standard error of partial regression coefficients.

**Significant at 0.01 level of probability

the multiple regression analysis, the difference being meagre. In the expeller units of Kozhikode, the value was 99.2 percent in the former whereas it was only 99 percent in the latter. Thus the small difference of 0.2 percent accounted for the influence of the inputs viz. employment, operational expenditure, percentage of oil extraction and ownership of the unit that occurred in the multiple regression model and not in the other.

The stepwise regression analysis for the expeller units of Kannur explained a percentage variation of 82 whereas that explained by the multiple regression analysis was 85, the difference being contributed by all the other inputs except copra crushed which alone was exhibited in the stepwise regression model.

Similarly in the rotary units of Kozhikode also 99.72 percent of variations in the dependent variables was explained by the independent variables in the multiple regression analysis, whereas it was 99 percent as explained by stepwise regression analysis. Thus the percentage contribution by the eliminated variable in the stepwise regression analysis viz. ownership of the mill was negligible.

Also, the variations in the dependent variables in the rotary units of Kannur district as explained by the multiple regression analysis and stepwise regression analysis were 72 per cent and 69 per cent respectively which means that only 3 per cent contribution was made by all other inputs except raw material.

Thus the contribution made by the different variables that were exhibited in the multiple regression model but eliminated during the stepwise regression analysis was negligible and hence can be ignored.

The results of stepwise regression analysis showed that the extent of copra crushed and the fixed cost were the two major determinants of gross return in both the expeller and rotary units of Kozhikode. In addition, the percentage of oil extraction also had a significant positive influence in case of the rotary units.

In the expeller units of Kozhikode district, an increase in crushing of copra by one quintal caused an increase in gross return by ₹ 2532.74. Also an increase in fixed cost by one rupee caused a decline in gross return by ₹ 358.86. This is because the investment on capital goods was huge and hence any further increase would decrease the gross return. Improving the capacity utilisation by more use of raw material will be helpful to increase the gross return.

Similarly in the rotary units of Kozhikode the effect of raw material and percentage of oil extraction were found to be positive whereas that of fixed cost was significant, but negative. It implied that use of higher quantities of raw material would increase the gross return. Also, higher the percentage of oil extraction, higher the gross return. However, as in the expeller units, here also the oil millers in this category made large investment on capital goods above the optimum requirement level.

Fixed cost included the depreciation on building and machineries, rent paid, imputed rental value of own land and interest on fixed capital. Most of the units in Kozhikode were comparatively new and hence a higher depreciation. More over the buildings in Kozhikode district was rented than own. The rent paid was more than the depreciation on own buildings. These factors lead to the higher value of fixed cost which in turn reflected in the negative effect. Hence any further addition to this would have an adverse effect on gross return.

In Kannur, the single variable that influenced the income was the quantity of copra used in both the rotary and expeller units. In the expeller units, an increase in copra crushing by one quintal gave rise to an average increase of 2157 units in gross return. It implied that higher quantities of raw material are to be used for increasing the revenue of these units.

Similarly in the rotary units, an increase in raw material by one unit could bring about an increase in gross return by 1931 units. Hence, improving the capacity utilisation which is very low as discussed in early part of this chapter, will be helpful to increase the revenue.

4.2.6.B Employment Function

The problem of unemployment and underemployment is serious in our economy. Hence an attempt was made to assess the employment potential of this industry. Linear and Cobb-Douglas models were tried with the variables as specified earlier. Separate functions were fitted with the same dependent and independent variables for rotary and expeller units of Kozhikode and Kannur districts. The value of coefficient of multiple determination (R^2) were calculated for testing the adequacy of the fit and are presented in Table 4.19.

The value of coefficient of multiple determination (R^2) was not significant in both the linear and Cobb-Douglas models of the expeller units. This may be due to the smallness of the size of samples in both the districts. However the R^2 value obtained in the linear model for the rotary units were 99.30 percent and 68.24 percent whereas it was 6.76 percent and 57.08 percent in the Cobb-Douglas model.

Table 4.19 Coefficient of multiple determination (R^2) obtained from the Linear and Cobb-Douglas models.

Category	Coefficient of multiple determination (in percentage)	
	Linear	Cobb-Douglas
Expeller		
a. Kozhikode	31.11	48.37
b. Kannur	29.14	2.32
Rotary		
a. Kozhikode	99.30**	57.08*
b. Kannur	68.24**	6.76

* indicates significance at 0.05 level

** indicates significance at 0.01 level

Also in the Cobb-Douglas model the value was significant only for Kozhikode district. The linear functions were found to give better fit and their results are explained in what follows.

The results of multiple regression analysis through the linear model are furnished in Table 4.20.

From the results given in Table 4.20, it is clear that none of the variables exerted significant effect on employment in the expeller units of both Kozhikode and Kannur districts. However, in the rotary units of Kozhikode district raw material, fixed cost and operational expenditure showed significant influence whereas in Kannur, raw material alone had a significant positive influence on employment. The remaining variables did not exhibit any significant influence on employment. This can be due to the presence of multicollinearity between the various inputs.

Hence stepwise regression analysis was used to reduce multicollinearity and to obtain the best subset of variables. The result of stepwise regression analysis is furnished in Table 4.21.

Table 4.20 Results of multiple regression analysis

Inputs		Kozhikode		Kannur	
		Expeller	Rotary	Expeller	Rotary
Copra crushed	(X_1)	0.001	0.265**	0.063	0.284**
		(0.281)	(0.081)	(0.043)	(0.068)
Fixed cost	(X_2)	0.078	0.138**	-0.014	0.004
		(0.230)	(0.017)	(0.032)	(0.080)
Operational expenditure	(X_3)	0.001	0.0011**	-120.5	0.008
		(0.002)	(0.0001)	(82.395)	(0.007)
Ownership of of unit	(X_4)	2822.675	640.668	- 20.052	-28.609
		(5799.037)	(425.015)	(172.716)	(304.38)

** shows significance at 0.01 level of probability

(Figures in paranthesis indicate standard error of the multiple regression coefficients)

Table 4.21 Results of stepwise regression analysis

Category	Regression Equation	R^2 (in percentage)
Expeller		
Kozhikode	$Y = 5579.5826 + 0.0020^{**} X_2$ (0.001)	29.81
Kannur	$Y = 647.9930 + 0.00713^{*} X_1$ (0.0371)	27.80
Rotary		
Kozhikode	$Y = -142.43 + 0.3203^{**} X_1 + 0.1234^{**} X_2 + 0.001^{*} X_3$ (0.0746) (0.0147) (0.008)	99.28^{**}
Kannur	$Y = 510.2160 + 0.3248^{**} X_1$ (0.0591)	63.62^{**}

* significant at 0.05 level

** significant at 0.01 level

(Figures in paranthesis show standard error of partial regression coefficients)

The stepwise regression analysis gave the same result as before. The important variables in the case of expeller units were fixed cost in Kozhikode and raw material in Kannur. The non significance of the variables proves true, as the expeller units are more mechanised and human labour requirement is only limited.

Rotary units are more labour intensive and the main determinants of labour use in Kozhikode district were raw material consumption, investment on fixed cost and operational expenses in Kozhikode district. However, since the earlier results have shown that any additional investment on fixed cost had a negative effect on gross income, the prospects of increasing investment on that item cannot be considered. As the capacity utilisation of rotary units in Kozhikode is low, higher capacity utilisation by greater use of raw material can be suggested both in view of the profitability of the business and social objective.

This argument holds true for the rotary units of Kannur district also.

4.2.7 Constraints faced by coconut oil mills

The major problems faced by the oil millers of Kozhikode and Kannur district are presented in Table 4.22. The details are as follows :

i. Shortage of raw materials

About 13 millers of Kozhikode and twenty one millers of Kannur faced the problem of shortage of raw materials. Since the sales tax for copra ~~export~~ was low, most of the copra traders were interested in ~~exporting~~ sending copra to other states which eventually led to the shortage in Kerala. In addition KERAFED, NAFED and other Quasi Government agencies were to buy copra in the market. The copra procured by these agencies was sold to the units outside the state, further contributing to the shortage.

ii. Power problems

Twenty nine millers in Kozhikode and 33 of them in Kannur reported the malady of power cut. The whole of Malabar area is subject to this. This led to further problems like

a) Break down of machinery - i.e. during daytime the motor doesn't work, but gets heated up unnecessarily and hence leads to breakdown of machinery.

b) Wastage of power.

iii. Labour problem

Labour problem has not become a major problem so far. It was only 3.91 percent of the total problems in Kozhikode and 1.95 percent in Kannur district. Labour Unions have started coming up in the area recently. However they do not pose much problems.

iv. Breakdown of plant and machinery

About 7 millers of Kozhikode and 11 millers of Kannur reported this problem. The problem was however more in the rotary units wherein the pestle had to be replaced quite often.

v. Shortage of finance and lack of credit facilities

The millers of Kozhikode were not much affected by shortage of finance. Only two millers reported of this which accounted for 1.56 percent whereas 18 from Kannur reported it (8.78%). This was mainly because most of them in Kannur district were small millers who took up crushing just enough to meet the local demand for the product, whereas most of them in Kozhikode district were exporters of oil to other states with good turn over. Similarly, 16 millers of Kannur reported the problem of lack of credit facilities. They reported to having been experiencing difficulties in availing loan

facilities, due to lack of proper securities as envisaged by the commercial banks.

vi. Lack of demand for the product and competition from other units

This constituted 9.38 percent of total problems in Kozhikode and 5.37 percent in Kannur district. A large number of small oil mills have sprung up in the two districts and so there is lot of competition among the units, which has finally led to lack of demand for the product in the area.

vii. Market fluctuations

This accounted for 2.34 percent of all the problems in Kozhikode district and 4.39 percent of the problems in Kannur district. The purchase price of copra is fixed based on the Cochin market rate for coconut oil. However coconut oil is a highly fluctuating market mainly because the main users are upcountry markets. Coconut oil price depends mainly on the policy of Government. Thus any fluctuation in the oil price would reflect on the copra price also. Thus sometimes the oil millers would have bought copra at higher price, but suddenly the oil price might come down. There would often be absence of parity between copra and oil. Thus the industry becomes a gamble for the miller; for when the disparity is in favour of

the miller it is a gain and when unfavourable it is a loss for him.

viii. Taxation

Taxation forms the major problem in the coconut oil mills. All the millers viz.30 in Kozhikode and 40 in Kannur reported of this problem. Taxation in the oil milling industry is very much complicated. They were subject to tax harassment. Tax assessment is based on power consumption. It is computed @ 12 units per quintal crushed. But some of them reported that the power consumption for crushing one quintal of copra was even more. In that case the tax levied on them was high.

The different types of tax paid by the oil millers during the period of study were purchase tax on copra and sales tax on oil. The purchase tax on copra varied between 2-3 percent ie. if sales tax was levied for coconut oil, purchase tax would be 2 percent. If sales tax or central sales tax was not collected for coconut oil, it would be 3 percent. Sales tax was 5 percent if sold within Kerala and 1 percent if sold outside Kerala. Thus the sales tax was found to be more for local sales. Yet another problem posed on the people of Tellicherry area was, that the copra from the area was taken by the oil millers of Mahe, the nearest Union Territory.

Table 4.22 Major constraints faced by the coconut oil mills.

Items	Kozhikode	Kannur
Shortage of materials	13 (10.16)	21 (10.24)
Power problem	29 (22.66)	33 (16.10)
Labour problem	5 (3.91)	4 (1.95)
Breakdown of plant and machinery	7 (5.47)	11 (5.37)
Shortage of finance	2 (1.56)	18 (8.78)
Lack of demand for the product	12 (9.38)	11 (5.37)
Taxation	30 (23.43)	40 (19.52)
Working capital	3 (2.34)	12 (5.85)
Competition from other units	19 (14.84)	14 (6.83)
Lack of transport facilities	..	16 (7.80)
Lack of credit facilities	1 (0.78)	16 (7.80)
Bureaucratic delay	..	..
Collection of dues	4 (3.13)	..
Market fluctuations	3 (2.34)	9 (4.39)

Figures in paranthesis show the percentage to column total

They have tax exemption for 10 years and so they sell oil at a lower price. Oil from Mahe is sold at Tellicherry where they find a good market, due to their lower price level whereas the oil millers in the study area face a major set back.

The other less important problems faced by the oil millers included problems on working capital, lack of transport facilities and collection of dues as shown in Table 4.22.

4.3.8 Trade practises involved in the coconut oil mills

There are three types of sales: local sales, sales within the state and sales outside the state. Details on the sales practices of coconut oil in the two districts could be learnt from Table 4.23.

i. Local sales

Here the retailers and domestic consumers get it directly from the oil millers. 55.03 percent of the oil produced in Kannur district was sold locally. However the contribution of local sales in Kozhikode was less to an extent of 12.13 percent only. It was found that, in the study area, especially in Kannur district, the farmers

delivered their copra to the millers at their mills and purchased oil from the mills.

ii. Sales within the state

This is done through brokers. The buyers come and collect oil from the mills. 41.63 percent of the oil produced in Kannur district was sold within the state, apart from local sales. However it was less in Kozhikode district, where the sales within the state accounted for 10.25 percent of the total sales.

iii. Sales outside the state

In this type, oil was exported to upcountry markets in Bombay, Gujarat, Orissa and other North and North eastern states. Bombay and Gujarat formed the main upcountry markets. The export was done through brokers and commission agents. The upcountry buyers themselves make arrangements for the transportation of oil. In Kozhikode about 10 units took up export of 262293 quintal of oil to other states. This accounted for 77.62 percent of the total sales. However the export of oil from Kannur was very little which accounted for only 3.34 percent of the total sales.

Table 4.23 Trade practices in the coconut oil mills

Particulars	Kozhikode	Kannur
Local sales		
Number of Unit	16	32
Actuals (in Q.)	40990 (12.13)	47636 (55.03)
Sales within the State		
Number of Units	10	10
Actuals (in Q.)	34637 (10.25)	36037 (41.63)
Sales outside the State		
Number of Units	10	1
Actuals (in Q.)	262293 (77.62)	2891 (3.34)
Total quantity of oil sold	337920	86564

Figures in paranthesis show percentage to the total

Summary

SUMMARY AND CONCLUSION

Though India enjoys the distinction of having the largest cultivated area under oil seeds in the world and the third largest country producing coconut, there is a persisting demand supply gap in edible oils and particularly in coconut oil. The deficit in the supply position of coconut oil in the year 1986-87 was estimated at 130,000 tonnes. As the demand for vegetable oils in the country has been found growing at the estimated rate of 4.7 percent the demand supply gap in coconut oil is likely to widen further unless the output of coconut oil is increased from the level of 200,000 to 220,000 tonnes. There was, however, a stagnation in the production of coconut oil in the country till 1987 mainly because of the declining trend in the production of coconut in Kerala State.

Hence a study was organised with the objective of assessing the performance of coconut processing sector in Kozhikode and Kannur districts of Kerala. The specific objectives of the study were, (i) to study the economic performance of coconut based food and oil milling industries and (ii) to identify the constraints that affect the proper functioning of coconut based food processing and oil milling industry in Kozhikode and Kannur districts.

To gain better perspectives of the economics of coconut based food processing sector, all the four desiccated coconut units - two in Kozhikode district and two in Kannur district were visited and studied. To study the performance of coconut oil mills, a sample of 70 units were selected by multistage random sampling in the two districts, in which two taluks from each district formed the first stage, two local bodies from each taluk formed the second stage and the oil mills formed the third stage. Separate questionnaires were designed, pretested and administered personally to elicit the necessary information needed for the study purpose.

The findings of the study are summarised hereunder with conclusions drawn.

Desiccated coconut industry

Capacity utilisation

The annual installed capacity was found to be 2880 thousand nuts which was the same in all the four units. However, the capacity utilisation in the four desiccated coconut units varied from 1440 thousand nuts per annum to 2004 thousand nuts, such that the percentage of capacity utilisation to the annual installed capacity also ranged between 50 and 70.

Capital investment

Of the three components of Land, Building, Plant and machineries (including furniture) in the initial capital investment, the percentage contribution of plant and machineries occupied the largest share. The machineries used in the desiccated coconut units were all imported thus involving a high investment.

Cost structure

A. Fixed cost

Wages on permanent labour accounted for the largest share (51.10%) of the fixed cost in the desiccated coconut units. This was followed by the interest on fixed capital (28.76%) which was followed by depreciation on machinery (7.29%). The other items of cost included under fixed cost were depreciation on furniture and other establishment utilities (4.88%), rent paid/imputed rental value of land (5.85% and depreciation on building (2.12%).

B. Variable cost

The percentage contribution by the raw material cost was maximum, which formed 78.21 percent of the variable cost, followed by the cost on package, labelling and transportation (12.32%). The contribution by the other components, viz.,

cost on electricity, fuel and other utilities, sales tax, maintenance cost and interest on working capital were comparatively low.

Efficiency measures

Total production in the desiccated coconut units in an year averaged to 143318 kg. The gross return was Rs. 5196343 which included the return from the sales of both desiccated coconut and the byproducts such as shell and coconut parings. The net return worked out to Rs. 2083915. Cent percent of the production is exported to upcountry markets. The coconut parings are sold to the oil millers and shell to the nearby shell powder making units.

The gross return per kg of desiccated coconut produced was higher than the cost incurred on the production of 1 kg of desiccated coconut by Rs. 14.54. Hence it was found to be a profitable industry.

The input output ratio was found to be Rs. 0.60 which implies that the cost of inputs for producing one rupee worth of output was Rs. 0.60. Thus the industry proved to be profitable. The capital output ratio was 0.36 which means that the capital needed to produce one rupee worth of desiccated coconut was Rs. 0.36. Thus these units were found to be low in capital intensity.

Break-even analysis

It was found that there should be a minimum level of production of 5373.42 kg desiccated coconut to keep the unit in business. At this level of production the total cost and total return were equal to Rs. 220310.02. The actual production of desiccated coconut was 143318 kg which was far higher than the break-even colume. The margin of safety was very high.

Major constraints

The main problem faced by desiccated coconut units was taxation. Whereas the Governments of Tamil Nadu and Pondicherry do not levy any tax for coconut and desiccated coconut powder, sales tax on the product has become a menace in Kerala. Because of this the sales price of desiccated coconut was high and hence, marketing faced stiff compensation from other sources of supply. The other problems faced by the units were power cut and shortage of raw materials during off season.

Coconut Oil Milling

In the present study an attempt has been made to examine the capacity utilisation, capital investment, cost structure, efficiency measures, break-even volume, relationship between output and various inputs, employment potential, problems faced by the coconut oil millers and the trade practices involved in the coconut oil milling industries.

Capacity utilisation

The annual installed capacity of the selected units varied from 5000 quintals per annum in the rotary units of Kozhikode and Kannur to 15000 quintals per annum in the expeller units of Kozhikode. The capacity utilised was low in the rotary units compared to the expeller units and between the two districts a better utilisation was there in Kozhikode. The expeller units of Kozhikode had the highest utilisation of about 82 percent. The reasons may be attributed to the marketing aspects of the oil. In Kozhikode, most of the millers exported their products to the other states and hence they did not face the problem of marketing. But in Kannur almost all of them adhered to local sales within the state and hence the demand for oil was less comparitively. Hence they limited their production to the local demand for oil.

Capital investment

Of the three components of capital viz. land, building, plant and machinery, plant and machinery occupied the largest share in both the expeller and rotary units of both the districts. It ranged from 55.80 percent in the rotary units of Kannur to 81.89 percent in the expeller units of Kozhikode. It could however be seen that in both the districts, the percentage contribution of plant and machinery to the capital was more in the expeller units when compared to the rotary units owing to the higher cost of investment on expeller.

Cost structure

A. Fixed cost : The fixed cost in oil mills varied from Rs. 40,826 in the expeller units of Kannur to Rs. 248127 in those of Kozhikode district. Wages on permanent labour occupied the largest share, which ranged between 43.68 per-cent in the rotary units of Kannur district and 75.65 per-cent in the rotary units of Kozhikode. Next to this the percentage share was more for interest on fixed capital which was the highest at 29.03 per-cent in the rotary units of Kannur district and lowest in the rotary units of Kozhikode.

B. Variable cost : The variable cost ranged from Rs. 29.29 lakhs in the expeller units of Kannur to Rs. 172.81 lakhs in the expeller units of Kozhikode. Raw material cost formed the major variable cost item which alone contributed more than 90 percent of the variable cost in both the districts. The other cost items included in the variable cost were cost on electricity, telephone charges, cost of gum, filter cloth and other utilities; wages on temporary labour; sales tax; packing, labelling, transportation cost; maintenance cost and interest on working capital.

Efficiency measures

The gross return was higher for the expeller units compared to the rotary units. In Kozhikode it was Rs.24985192 in the expeller units whereas it was only Rs. 8368720 in the rotary units. Similarly in the Kannur district it was Rs. 3842426 and Rs. 3433298 respectively in the expeller and rotary units. The net return was also higher in the expeller

units compared to the rotary units in both the districts.

The cost per quintal of oil produced was much higher in the rotary units and hence the profit from these units was less compared to expeller units.

The input output ratio was low in expeller units than in rotary units. The cost of inputs to produce one rupee worth of output were Rs. 0.70 and 0.78 respectively for the expeller units of Kozhikode and Kannur. In rotary units of Kozhikode and Kannur districts, the input output ratio was 0.87 and 0.91 respectively. This implies that the method of copra crushing was more profitable in the expeller units when compared to the rotary units. The capital output ratio was also less for expeller units when compared to rotaries. This implies that oil extraction in the expeller units was relatively low in capital intensity. The capital output ratio in the coconut oil mills is generally low compared to the desiccated coconut units, since the initial capital investment is also comparitively low.

Break-even analysis

The minimum level of production required to keep the oil mills in the production process was 296.45 quintals of oil in the expeller units and 841.72 quintals in the rotary units of Kozhikode. Similarly it was found to be 69.44 quintals in the expeller units and 423.50 quintals in the

rotary units of Kannur. Comparison of Break-even volume with that of the total quantity produced indicated that the performance of all the firms were far above the break-even volume. The margin of safety is almost very high in almost all the firms.

Functional analysis

a) Production function

The resource use efficiency of the various inputs on gross return was measured by fitting both linear and Cobb-Doghlas production functions. The linear model was found to give a better fit and hence was selected for the study.

The important variables obtained from the multiple regression analysis in both expeller and rotary units of Kozhikode district were raw material and fixed cost, where the latter exerted a negative effect. Besides, the percentage of oil extraction also had a significant positive influence in the rotary units. In Kannur district, the single variable that had significant contribution on income was the quantity of copra used in both the expeller and rotary units. The remaining variables did not exert any significant influence on gross return. The nonsignificance of these inputs can be due to the presence of multicollinearity among the inputs. Hence stepwise regression analysis was done to reduce multicollinearity and to obtain the best subset of variables.

The results showed that the extent of copra crushed and the depreciation on building and machineries were the two major determinants of gross return in both the expeller and rotary units of Kozhikode. In addition, the percentage of oil extraction also had a significant positive influence in case of the rotary units. It implied that use of higher quantities of raw material would increase the gross return. Also higher the percentage of oil extraction, higher the gross return. However, since the investment on fixed cost items was huge any further increase would decrease the gross return.

In Kannur, the single variable that influenced the income was the quantity of copra crushed in both the rotary and expeller units. Hence, improving the capacity utilisation will be helpful to increase the revenue.

Employment function

Both linear and Cob-Douglas models were fitted of which the former gave a better fit.

None of the variables was found to be significant for the expeller units of Kozhikode and Kannur districts. This is because the expeller units are more mechanised and hence human labour requirement was low. Rotary units are more labour intensive and the main determinants of labour use in Kozhikode district were raw material consumption, investment on fixed cost and operational expenses, and that in Kannur district was raw material.

Constraints in the coconut oil mills

The major problems faced by the oil millers of Kozhikode and Kannur were shortage of raw materials, power problems, labour problems, break-down of plant and machinery, shortage of finance, lack of demand for the product and competition from other units, lack of credit facilities and the market fluctuations, the most important one being the problem of taxation. The different types of tax paid by the oil millers during the period of study included, purchase tax on copra and sales tax on oil. The sales tax was more for local sales than for sales outside the state.

Trade practices involved

There are three types of sales - Local sales, sales within the state and sales outside the state. More than 50 percent of the oil produced in Kannur district was sold locally and 41.63 percent sold in other centres within the state. But, in Kozhikode more than 75 percent was ~~exported~~ sent to other states.

Conclusion

The following conclusions emerged from the study

1. Costs and returns relating to the existing coconut based food industries were highly favourable. Financial analysis such as Break-even analysis and efficiency analysis showed encouraging results.

2. Cost and returns relating to the coconut oil mills of Kozhikode and Kannur districts were also highly favourable.
3. Expeller units were low in capital intensity and more profitable when compared to the rotary units.
4. The cost of inputs for producing one rupee worth of oil was low in expeller units and hence they worked more profitably than rotary units.

From the foregoing it could be seen that inspite of the profitability of the coconut based food and oil milling industries, the capacity utilisation was low. More intensive use of the machinary by increased use of raw material could be suggested both in view of the profitability of the business and social objective. Some changes in the structure of taxation on copra, coconut oil, oil cake and desiccated coconut would be of considerable help in achieving this. Steps should also be taken to overcome the problem of powercut in the area. There are two ways of assisting the oil milling industry, one being that there should be proper arrangements for the purchase and stocking of copra during the periods of plentiful supply and the other, there should be encouragement to start other industries based on oil and cake such as the production of chemical derivatives of coconut oil, animal and poultry feeds etc.

Also suitable policies should be developed for the survival of the desiccated coconut industry. The Government

of Kerala should consider exempting the industry from sales tax as in the neighbouring states. The Government can also encourage the consumption of desiccated coconut in government, defence and public enterprises canteens.

Schemes for utilisation of major products and by-products of coconut by introducing new technologies should also be developed.

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Appendices

Appendix -I

Processing of coconut

For the country as a whole not more than 44 per cent of the total production of coconuts become available for processing. The bulk of the production, ie, 56 per cent is consumed as fresh nuts for household edible uses, religious and social purposes. On the other hand, in Kerala 60-65 per cent of the total production of coconuts become available for conversion into copra and subsequent processing (Thampan, 1989).

Edible copra

There are two types of edible copra. One is copra in the ball form known as ball copra and the other is edible quality cup copra. Both the types are used for various household sweet preparations and also as an ingredient in the processed betalnuts for chewing. In Kerala, the production and marketing of ball copra are popular activities only in selected centres in Kozhikode and Alapuzha districts.

In Kerala, ball-copra is produced by storing fully matured (12 months) unhusked nuts for a period of about eight to twelve months on a raised platform usually made of bamboos inside a shed. During this storage period, the water inside the nut gets absorbed into the kernel which eventually dries out, loosens itself from the shell and rattles, when shaken.

At this stage the nut is dehusked and the shell carefully broken to remove the copra from inside in the ball form.

Edible quality copra is produced in the form of cup also. For this purpose, fully matured nuts which are stored for long periods are utilised. The selected nuts are dehusked, cut into cups and dried in the open sun until good quality copra is obtained. In some places indirect drying is adopted for the manufacture of superior quality cup copra. At the different stages of copra making such as cutting, deshelling, drying and handling, maximum care and attention are bestowed in order to ensure the quality of the final produce. This type of copra also fetches better price than the ordinary cup copra.

The popular grades of edible cup copra in Kerala markets are "Rajapur", "Malathi" or "Madras Nottam", "Dilpasant" and "White". Among these grades, "Rajapur" is of superior quality which is prepared from fully dried ball copra after exposing the cups to sun for two to three days. The grade "Malathi" is made out of partially dried ball copra after sundrying the cut cups for seven days. The grade "Dilpasant" is prepared from nuts stored for shorter periods after drying the cups in the sun for more than one week. The last grade "White" is a selection from bulk copra arrived in markets for milling purposes. The

cups selected on the basis of colour, cleanliness and size are further subdivided into four subgrades of which the grade known by the name "Rai" is the most important. The "Rai" copra is small in size, clean and sweet.

Desiccated coconut

The dried out shredded coconut meat in which the water content has been reduced from about 50 per-cent to less than 2 per-cent is called desiccated coconut. The product enjoys demand throughout the world for edible uses in the households and in the confectionary and other food industries. It comes in many forms and shapes - chips, curls, gratings, slices, bits, etc., coarse, medium or fine sizes, plain or sweetened or spiced and dry, moist or wet.

The desiccated coconut industry is still in its infancy in India. The processing takes place in small scale units, the concentration of which is more in Karnataka followed by Tamil Nadu and Kerala. The different steps involved in the commercial production of desiccated coconut are removal of kernel and paring, washing, sterilising, disintegrating and desiccating, cooling and setting.

Coconut Flour

In Kerala, the Regional Research Laboratory, Thiruvananthapuram has perfected a technology for the partial

extraction of oil from desiccated coconut for use in such areas where the demand for desiccated coconut is low solely because of its high price. Besides superior quality coconut oil, the processing also yields partially defatted coconut flour. Coconut flour can also be made by powdering the pressed cake obtained after extracting oil from quick dried gratings of coconut meat.

Milling copra

The basic raw material for the production of coconut oil is milling copra. The production of milling copra is not widespread in the country. It is concentrated mainly in Kerala State from where more than 90 per cent of the total output of copra in the country emanates.

Oil milling

Copra crushing is a traditional industry in Kerala State. On a commercial scale, power driven chekkus or rotary mills and expellers are used for the crushing in the ascending order of efficiency and scale of production. In the modern industrial units, solvent extraction plants are linked with the expellers for the optimum recovery of residual oil from the copra cake.

Solvent extraction plants have been used to extract the residual oil present in the rotary and expeller crushed cakes. In this process, the cake is broken into bits and fed to flaking rolls. The resulting raw material is then treated with suitable solvents in a counter current extraction process. The solvent containing the dissolved oil is drawn off from the extracted residue and filtered. The oil is then seperated from the solvent by distillation. The common hydrocarbon solvents used in the solvent extraction plants in India are benzene and hexane.

Miscellaneous products

Coconut water is an excellent medium for the preparation of products of microbial fermentation for use as food. One such product is Nate-de-cocoa which is already in export market and finds good demand in the United States and other countries. The product is now produced on commercial scale in Philippines. Nata-de-cocoa is prepared either from coconut water or skim milk by mixing sugar acetic acid and a culture liquor made from pineapple in specific proportions and allowing the mixture to remain undisturbed for about 15-20 days. After this period, the white jelly like thick surface growth which is produced by the action of the organism Acetobactor xylinium is harvested, sliced, acid washed out, boiled in sugar syrup and preserved which makes a delicious desert.

Coconut water is also converted to vinegar, the quality of which is comparable to the vinegar obtained from other natural sources. Coconut milk is now available in preserved form either as condensed whole milk or as dehydrated milk powder. The skimmed coconut milk which is obtained after the separation of cream from coconut milk in a cream separator is processed into protein rich products such as skim milk powder, coconut syrup, coconut honey, etc.

In Kerala state, technologies for the preservation of coconut water as a bottled soft drink and of coconut milk as cream or dehydrated form have been developed by the Regional Research Laboratory, Trivandrum. The technologies are yet to be utilised for commercial application.

Appendix - II

Interview schedule for the Survey on Coconut based food Industries.

1. Name of the firm :

2. Product : By product :

3. Classification (SSU/MSU) :

4. Established in :

a) Location : Place : Village: Taluk:

5. Type of ownership:
a) Proprietorship (b) Partnership (c) Private Ltd. Co.
b) Public Ltd. Co.

6. Subsidiary occupations of the owner/partners

1.

2.

3.

7. Is any family member engaged in this business? If so number of family members:

Male Female

8. Mode of starting the unit
a) Independent ie. New Unit :

b) Acquired from others ie take over of existing unit :

9. If acquired, terms of acquisation

1. On lease/rental basis
2. Outright purchase
3. Others

10. Fixed cost

a) Land

i) Area :

ii) Whether owned/leased in :

iii) Rent paid for the leased in land :

b) Building

i) Owned/rented :

ii) Year and cost of construction :

iii) Rent paid :

iv) Maintenance cost :

c) Machinery

Sl. No.	Item	Year of purchase	Purchase price	Annual installed capacity (in terms of copra)	Capacity utilised in

11. If there is a change in the method of production when effected (Date)

12. Details of production

Type of machinery	One shift (8 hours)				
	Raw material used Qty.	Product Qty.	By product Qty.	Labour used No.	Salary/ Wages

13. Procurement of raw materials

Sl. No.	Raw material	Source	Qty.	Per Unit cost	Total cost

14. Terms of purchase: Cash/Credit
If credit period of credit .....

15. Terms of delivery .....

16. Cost of production of per kg of the product

Raw materials	: Rs.
Plant and machinery	:
Depreciation	:
Cost of labour	:
Rental value	:
Utilities (fuel water, oil etc.)	:
Interest on working capital	:
Interest on fixed capital	:
Transportation cost	:

17. (i) Procurement of coconut (specify whether husked or unhusked nuts are purchased : Also report the percentage of purchase from each source. Specify the current price/per 100 nuts also)

a) Direct purchase from cultivators:

b) From co-operative societies/ Farmer's Banks etc.

c) From nearby markets (Specify name and average distance of market)

d) From far away markets (specify name and average distance of market:

e) From own farm

ii) How you are fixing the price of coconut: Depending upon :

a) Price of copra :

b) Price of coconut oil:

c) Independently decided by the farmer/you :

18. Minimum stock required for continuous working during normal production period

Type of Machinery	Nos./ Specification	Raw materials		
		Qty.	Days	Value

19. Production schedule .....hours/day
.....days/week
.....weeks/year

20. What do you do during the off seasons:

a) Stop production

b) Have minimum production

c) Take up production of other products:

d) Normal production with the stock maintained. If stock is maintained for off season

i) Maximum quantity

ii) Maximum days

iii) Value

21) Details of employment

Type of Labour	Regular (Nos.)			Casual (Nos.)			Total	Wage Rate/day Regular			Casual			Total wages paid
	M	F	C	M	F	C		M	F	C	M	F	C	
Skilled														
Unskilled														
Management														
Clerical														
Technical														
General														
Others														
Total														

22. Do you give any other benefits to the labour : Yes/No
    If yes, specify

23. Is there any labour union in your unit : Yes/No

24. Investment data

Land	Building	Plant & Machinery	Furniture and fixtures	others	Total F.C.	Total W.C.	Total capital

25.

	In raw material			In finished good		
	Qty.	Max. days	Value	Qty.	Max. days	Value
Normal stock						

26. Sales Data

Year	Product/ Byproduct	Local market		Inside the state, but other than local market		Outside the state		Total sales	
	Qty.	Rs.	Qty.	Rs.	Qty.	Rs.	Qty.	Rs.	Qty.	Rs.
1986-87										
1987-88										
1988-89										
1989-90										
1990-91										

27. Terms of Sales : Cash/Credit
If credit, for how many days

28. Have you any permanent arrangement for sales of oil (give details)

1. Direct sales
   a) Sales within the state
   b) Sales outside the state
2. Through agents/Brockers
3. Any sales depot in upcountry centres

29. Taxation :

a) Purchase tax on copra

b) Sales tax on oil

c) Sales tax on oil cake

d) Octroi (if any)

30. How is the present tax system?
Favourable/Unfavourable
If unfavourable, reasons:

1.

2.

3.

31. Reasons for under utilisation :

a. Shortage of materials :

b. Power problems/cuts :

c. Labour problems :

d. Breakdown of plant & Machinery :

e. Shortage of finance :

f. Lack of demand for the product :

g. Any other problems (specify) :

32. State the problems that you are generally facing

a. Working capital :

b. Labour problem :

c. Competition from other units :

d. Bureaucratic delay :

e. Lack of transport facilities :

f. Lack of credit facilities :

g. Collection of dues :

h. Lack of demand for the product :

i. Power problems :

j. Other (specify) :

Appendix - III

Interview schedule for the Survey on Coconut oil milling units

1. Name of the firm :

2. Product : By product :

3. Classification (SSU/MSU) :

4. Established in :

4 a) Location : Place : Village : Taluk :

5. Type of ownership:
a) Proprietorship (b) Partnership (c) Private Ltd. Co.
d) Public Ltd. Co.

6. Subsidiary occupations of the owner/partners

1.

2.

3.

7. Is any family member engaged in this business ? If so number of family members :

	Male	Female

8. Mode of starting the unit
a) Independent ie. New Unit :

b) Acquired from others ie. take over of existing unit :

9. If acquired, terms of acquisation

1. On lease/rental basis

2. Outright purchase

3. Others

10. Fixed cost

a) Land

i) Area :

ii) Whether owned/leased in :

iii) Rent paid for the leased in land :

b) Building

i) Owned/rented :

ii) Year and cost of construction :

iii) Rent paid :

iv) Maintenance cost :

c) Machinery

Sl. No.	Item	Year of purchase	purchase price	Annual Installed capacity (in terms of copra)	Capacity utilised (in90-91)

11. If there is a change in the method of production, when effected (Date) :

a) Rotary to expeller :

b) Addition of expeller :

12. Details of production

Type of machinery	one shift (8 hours)				
	R.M.used (copra) Qty.	Oil produced Qty.	Cake produced Qty.	Labour used Nos.	Wages/ Salary
Rotary					
Expeller					
Total					

13. Procurement of Raw materials

Sl. No.	Raw material	Source	Qty.	Per unit cost	Total cost

14. Raw materials purchased (monthwise for three years)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1987-88												
1988-89												
1989-90												
1990-91												

15. Production details: Main product (monthwise for past three years)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1987-88												
1988-89												
1989-90												
1990-91												

16. By product

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1987-88												
1988-89												
1989-90												
1990-91												

17. Terms of purchase : Cash/Credit
If credit, period of credit:

18. Terms of delivery

19. Cost of production of per tonne of coconut oil

Raw materials
Plant & Machinery
Depreciation
Cost of labour
Rental value
Utilities
(fuel, water, oil etc.)
Interest on working capital
Interest on fixed capital
Transportation cost
Others

20. How you are fixing the price of Copra: Depending upon -
a. Market rate of the day for copra :
b. Based on price of coconut :
c. Price fluctuations expected :
d. Independently decided by you :
e. Independently decided by the farmer/processor:
f. Based on coconut oil :

21. Minimum stock required for continuous working during normal production period

Type of machinery	Nos. Specification	Raw materials		
		Qty.	Days	Value
Rotary				
Expeller				

22. Production schedule : . . . . . hours/day
. . . . . days/week
. . . . . weeks/year

23. What do you do during the off seasons

a) Stop production

b) Have minimum production

c) Take up production of other products

d) Normal production with the stock maintained. If stock is maintained for off season

1. Maximum quantity
2. Maximum days
3. Value

24. Details of employment

Type of Labour	Regular (Nos.)			Casual (Nos.)			Total	Wage Rate/day Regular			Wage Rate/day Casual			Total wages paid
	M	F	C	M	F	C		M	F	C	M	F	C	
Skilled														
Unskilled														
Management														
Clerical														
Technical														
General														
Others														
Total														

25. Do you give any other benefits to the labour. If yes, specify : Yes/No

26. Is there any labour union in your unit : Yes/No

27. Investment data

Land	Building	Plant & Machinery	Furniture & Fixtures	Others	Total F.C	Total W.C.	Total Capital

	In raw material (Copra)			In finished good (Oil)		
	Qty.	Max. days	Value	Qty.	Max. days	Value
Normal Stock						

29. Sales data

Year	Product	Local market		Inside the state, but other than local market		Outside the state		Total sales	
		Qty.	Rs.	Qty.	Rs.	Qty.	Rs.	Qty.	Rs.
1986-87	Oil Cake								
1987-88	Oil Cake								
1988-89	Oil Cake								
1989-90	Oil Cake								
1990-91	Oil Cake								

31. Have you any permanent arrangement for sales of Oil (give details)

1. Direct sales a) Sales within the state
   b) Sales outside the state
2. Through agents/Brokers
3. Any sales depot in upcountry centres

32. Taxation :

a) Purchase tax on copra
b) Sales tax on oil
c) Sales tax on oil cake
d) Octroi (if any)

33. How is the present tax system?
Favourable/Unfavourable
If unfavourable, reasons :

1.
2.
3.

34. Reasons for under utilisation :

a. Shortage of materials :
b. Power problems/cuts :
c. Labour problems :
d. Breakdown of Plant & Machinery:
e. Shortage of finance :
f. Lack of demand for the product:
g. Any other problems (specify):

35. State the problems that you are generally facing

a. Working capital :
b. Labour problem :
c. Competition from other units :
d. Bureaucratic delay :
e. Lack of transport facilities:
f. Lack of credit facilities :
g. Collection of dues :
h. Lack of demand for the product:
i. Power problems :
j. Other (Specify) :

Abstract

COCONUT BASED FOOD AND OIL MILLING INDUSTRIES IN KOZHIKODE AND KANNUR DISTRICTS

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ABSTRACT OF THE THESIS

Submitted in partial fulfilment of the
requirement for the degree of

Master of Science in Agriculture

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1991

ABSTRACT

A study was conducted to assess the performance of coconut processing sector in Kozhikode and Kannur districts of Kerala, during 1990-91. The specific objectives of the study are (i) to study the economic performance of coconut based food and oil milling industries and (ii) to identify the constraints that affect the proper functioning of these industries. All the four desiccated coconut units in the two districts were visited and studied. To study the performance of coconut oil mills, a sample of 70 units were selected by multistage random sampling in the two districts.

Desiccated Coconut Units

The annual installed capacity was equal in the four desiccated coconut units, while the capacity utilisation varied between 1440 thousand nuts to 2004 thousand nuts per annum.

In desiccated coconut units, plant and machineries occupied the largest share in capital investment. Wages on permanent labour accounted for the greatest share of the fixed cost. This was followed by interest on fixed capital and then by depreciation on machinery. The

percentage contribution of raw material cost to the variable cost was maximum, followed by cost on package, labelling and transportation.

Total production in the desiccated coconut units in an year averaged to 143318 kg. The gross return per kg of desiccated coconut produced was higher than the cost incurred on the production of 1 kg of desiccated coconut by Rs.14.54. The cost of inputs for producing one rupee worth of output was Rs.0.60. Thus the industry proved to be profitable. The desiccated coconut units were also found to be low in capital intensity. It was also found that the actual production of desiccated coconut was much higher than the break-even volume. Cent percent of the production is ~~exported~~ sent to upcountry markets.

Coconut Oil Milling

In the oil mills the percentage of capacity utilisation to the annual installed capacity was low in both the expeller and rotary units of Kannur when compared to the respective units in Kozhikode.

In case of the coconut oil mills also plant and machineries which ranged between 81.89 percent in the expeller units of Kozhikode and 55.80 percent in the

rotary units of Kannur occupied the largest share in the capital investment.

The fixed cost in the oil mills varied from Rs.40826 in the expeller units of Kannur to Rs.248127 in those of Kozhikode district. Wages on permanent labour occupied the major share which was followed by the interest on fixed capital. The variable cost ranged from Rs.29.28 lakhs in the expeller units of Kannur to Rs.172.81 lakhs in the expeller units of Kozhikode. Raw material cost formed the major variable cost item which alone contributed more than 90 percent of the variable cost in both the districts.

The gross and net returns were higher in the expeller units compared to the rotary units in both the districts. The cost per quintal of oil produced was much higher in the rotary units and hence the profit from these units were less compared to expeller units. The input output ratio and the capital output ratio were low in the expeller units than in rotary units. Hence the expeller units were low in capital intensity and also more profitable.

The minimum level of production required to keep the oil mills in the production process was 296.45 quintal of oil in the expeller units and 841.92 quintal in the rotary units of Kozhikode. Similarly it was found to be 69.44

quintals in the expeller units and 423.51 quintals in the rotary units of Kannur. Comparison of break-even volume with that of the total quantity produced indicated that the performance of all the firms were far above the break-even volume. The margin of safety was very high in all the firms.

The production function analysis showed that the extent of copra crushed and the investment on fixed cost were the two major determinants of gross return in both the expeller and rotary units of Kozhikode. Besides this, the percentage of oil extraction also had a significant positive influence in case of rotary units. In Kannur, the single variable that influenced the income was the quantity of copra crushed in both rotary and expeller units. Hence, improving the capacity utilisation will help to increase the revenue.

In case of the employment function analysis, none of the inputs was found to be significant for the expeller units of Kozhikode and Kannur districts. This is because the expeller units are more mechanised and hence human labour requirements is low. Rotary units are more labour intensive and the main determinants of labour use in Kozhikode district were raw material consumption, investment on fixed cost and operational expenses and that in Kannur district was raw material.

The major problems faced by the desiccated coconut units and the oil milling industries of Kozhikode and Kannur district were shortage of raw materials, power problems, labour problems, break-down of plant and machinery, shortage of finance, lack of demand for the product and competition from other units, lack of credit facilities and the market fluctuations, the most important being the problem on taxation.

Cent percent of the production of desiccated coconut powder was ~~exported~~ sent to Bombay, Calcutta, Assam, Bihar, U.P., M.P. and Gujarat under various brands, through brokers and commission agents. There were three types of sales of oil - local sales, sales within the state and sales outside the state. More than 50 percent of the oil produced in Kannur district was sold locally and 41.63 percent of it sold within the state. But, in Kozhikode more than 75 percent was ~~exported~~ sent to other states.