ECONOMICS OF PRODUCTION AND MARKETING OF GINGER IN KERALA WITH SPECIAL REFERENCE TO IDUKKI DISTRICT

By

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THESIS

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DECLARATION

I hereby declare that this thesis entitled "Economics of production and marketing of Ginger in Kerala with special reference to Idukki district" 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.

Vellanikkara
15-6-1994

JAYESH, K.S.

CERTIFICATE

Certified that this thesis entitled "Economics of production and marketing of Ginger in Kerala with special reference to Idukki district" is a record of research work done independently by Mr.Jayesh, K.S., under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.

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We, the undersigned members of the Advisory Committee of **Mr.Jayesh, K.S.** a candidate for the degree of Master of Science in Agriculture, agree that the thesis entitled " **Economics of production and marketing of Ginger in Kerala with special reference to Idukki district**" may be submitted by Mr.Jayesh, K.S. in partial fulfilment of the requirement of the degree.

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Introduction

INTRODUCTION

Ginger (*Zingiber officinale* Rose) is one of the major spices grown in the country. It belongs to the family Zingiberaceae. Ginger is considered as native of tropical South-East Asia. It was introduced in to Jamaica in West Indies, Africa as well as in warmer parts of other countries of the world and now is being cultivated in almost all tropical countries. It is a perennial herb generally raised as annual crop. The Ginger of commerce is processed underground rhizome of this plant. The word Ginger has been derived from the Sankrit 'Sringavered' through the Arabic 'Zanzabil' and Greek 'Zingiber'.

Ginger is extensively used as spice and condiment. It is also credited with many medicinal properties. It is curative and stimulant of gastro intestinal tract. Besides, it finds wide application in non-alcoholic beverages as well as in food industry as flavouring agent. Ginger is traded in different forms mostly as green (fresh) and dried. Now-a-days, other ginger products like ginger oil, ginger oleoresin, ginger powder and crystallised ginger are also gaining prominance in ginger market.

World Production and Trade

Ginger is cultivated in a number of tropical and

sub tropical countries. India is one of the major ginger producing countries in the world and ranks first in world production. Other important producers are China, Thailand, Philippines, Bangladesh etc. Out of these countries, China is renowned for preserved ginger and others for their dried products. Major ginger producing countries and their annual average production are given in Table 1.1.

Ginger is grown mainly for export by some of the producing countries. Besides India, other major exporting countries are China, Indonesia, Thailand, Fiji, Malaysia and Singapore. It may be interesting to note that Singapore is exporting sizeable quantity of ginger though the local production is negligible. Jamaica and Sierra Leone are well known for their quality ginger but their exports are small compared to others.

Among the importing countries, Japan, USA, UK, Singapore and Saudi Arabia are important. The annual average export and import of ginger by major countries are given in Table 1.2.

Indian situation and International Trade

As stated above, India is the largest producer of ginger in the world. It is grown in a number of states from extreme South to the foot hills of Himalayam. The

Table 1.1. Major ginger producing countries and their annual average production

Country	Average production (M.T.)	Rank
Bangladesh	37,900	4
China	NA	
Dominican Republic	1,200	7
Fiji	700	9
India	1,46,000	1
Indonesia	8,800	5
Korea Republic	3,200	6
Thailand	84,000	2
Jamaica	800	8
Malaysia	1,200	7
Philippines	41,600	3
World production (excluding China)	3,25,400	

Source: Spices Statistics 1991, Published by Spices Board

Table 1.2. The annual average export and import of ginger by major countries

Exporting countries	Average export *(M.T)	Importing countries	Average import *(M.T)
Jamaica	150	Australia	125
St. Vincent	670	Canada	1,580
Fiji	2,600	Hongkong	1,250
India	6,513	Malaysia	4,450
Malaysia	2,300	Singapore	3,050
Singapore	13,500	U.K.	4,600
Indonesia	25,000	France	1,175
Taiwan	7,300	F.R.G.	1,200
Thailand	4,100	Netherlands	1,300
China	19,000	Sweden	225
		USSR	200
		Saudi Arabia	4,700
		Japan	4,500
		U.S.A.	5,175
		Belgium - Lux	150

Source: Spices Statistics 1991, published by spices Board

most important ginger growing state in the country is Kerala (15410 ha) followed by Orissa (7600 ha), Meghalaya (6300 ha) and West Bengal (4690 ha). The remaining areas are scattered over Arunachal Pradesh, Bihar, Gujarath, Haryana, Himachal Pradesh, Karnataka and North Eastern States. Kerala accounts for as much as thirty five per cent of production of ginger in the country.

Ginger is a traditional item of export from India. Indian ginger known as Cochin ginger in trade parlance, is popular among importing countries. Bulk of export from the country is in the dry form, though a small quantity of green ginger is also exported. India exports, on an average, around 6,500 tonnes of ginger per annum. This is only a small percentage of the annual production. Ginger export from India as well as unit value realization is characterized by wide year to year fluctuations. Since ginger is an annual crop, the farmers go in for planting on substantial scale when the prices rule high, resulting in excess supply and consequent depression of price which enable ginger exporters to effectively compete in the international market. On the other hand, when ginger prices drop, there will be low production, resulting in high internal price, substantially higher than the international prices leading to low exports. Production and export of ginger (quantity and value) in recent years are shown in Table

1.3. The major foreign markets for Indian ginger and their average imports are given in Table 1.4.

As already mentioned Kerala is the most important ginger producing state in the country. In Kerala, Wynad, Ernakulam and Idukki districts are leading producers. Ginger is mostly raised in the state as rainfed crop, with rhizomes planted during May and June. Important varieties grown in the state are Khuruppampadi, Wynad, Manantoddy, Valluvanad, Rio-de-Janero, Maran, Nadea and Jamaica. The crop gets ready for harvest as green ginger, five months after the planting of seed rhizome. For dry ginger, a growth period of seven to eight months is allowed. Ginger producers in the state are mostly small and marginal farmers.

Information on economics of production and marketing of crops are essential for sound agricultural policy formulation as well as for decision making at the micro level. Hence it was felt that a study on economics of production and marketing of ginger will be of considerable use. The main objectives of the study are the following:

1. To examine and explain the past trends in area, production and productivity of ginger.

2. To estimate the cost of production and returns of ginger.

Table 1.3. Production and export of ginger from India during 1982-83 to 1989-90

Year	Production '000 tonnes	Export '000 tonnes	Export % on production
1982-83	94.17	3.95	4.19
1983-84	121.31	4.63	3.81
1984-85	133.86	7.33	5.48
1985-86	138.02	6.82	4.94
1986-87	136.01	4.84	3.56
1987-88	142.84	2.63	1.84
1988-89	152.12	6.23	4.18
1989-90	152.89	9.04	5.91

Source: Spices Statistics 1991, published by Spices Board

Table 1.4. The major markets for Indian ginger and their average imports

Country	Average import (M.T)
U.S.A.	516
Canada	77
U.K.	170
Netherlands	123
Bangladesh	955
Pakistan	1,226
Saudi Arabia	1,654
P.D.R.Y.	101
Kuwait	124
Y.A.R.	709
U.A.E.	176
Japan	83
USSR	84
Morocco	190
Others	325
Total	6,513

Source: Spices Statistics 1991, published by Spices Board

3. To identify the marketing channels.
4. To estimate the marketing cost and margins.
5. To identify the production and marketing problems of ginger growers and to suggest suitable solutions.

Both primary as well as secondary data have been made use of in the study. Secondary data have been used mainly to satisfy the first objective. Primary data have been generated through a sample survey in Idukki district which is an important ginger growing tract in the state.

The thesis is divided in to two parts. The first part consists of four chapters including the present one. Review of relevant studies are dealt in chapter II. Chapter III deals with a brief account of the agricultural economy of the Idukki district. Materials and methods used in the study are dealt in chapter IV. Results of the study and discussions there on are dealt with in second part which consist of five chapters. Chapter V deals with the general economic and social conditions of the sample farmers. Trends in area, production and productivity are dealt with in chapter VI. Economics of production is examined in chapter VII. Chapter VIII is devoted to analyse economics of marketing as well as production and marketing problems. The final chapter summarizes the major findings of the study.

Review of Literature

REVIEW OF LITERATURE

In this chapter an attempt has been made to review past studies which are relevant to the present study in terms of methodologies and subject matter. Hence, trend analysis, economics of production and marketing have been reviewed. The chapter is devided into three sections. In section one studies on trends analysis are included. Section two contains review of studies in economics of production and section three contains studies on marketing.

Trend analysis

Chatterji (1966) opined that linear trend fitting is the most appropriate tool to measure agricultural growth as it would avoid any effect due to seasonal and cyclical variations and he employed it to measure the growth rate of important cereals, pulses and non food crops in India over the period from 1950-51 to 1962-63. If Ft and Fo are the values in the t^{th} and base year respectively, then the comparative growth measured between the base year and t^{th} year denoted by G_{t-o} is defined as

$$G_{t-o} = \frac{F_t - F_o}{F_o}$$

where F_t = trend value of t^{th} year

F_o = trend value of base year

Minhas (1966) commenting on the use of linear trend equation of the type Y = a + bx in measuring agricultural growth, opined that it is more appropriate to devide the absolute periodic increment 'b' by harmonic mean of the dependent variable to express it as compound growth rate.

Narula and Vidyasagar (1973) developed a model for the decomposition analysis of the aggregate output to component elements viz. area effect (with no change in yield per hectare) and yield effect (for a constant area). Emphirical verification was provided using the data on HYV of wheat crop in IADP districts of Ludhiana, Aligarh etc. for the period 1966-1971. The proposed model was

$$P_n - P_o = (Y_n - Y_o)\ A_w + A_n - A_o)\ Y_w$$

Where $Y_w = \frac{Y_n + Y_o}{2}$ and $A_w = \frac{A_n + A_o}{2}$

For partioning the contribution of area and productivity towards changes in production, Sharma (1977) suggested the following method. Mathematically if production, productivity and area were denoted by P_n, Y_n and A_n for the year 'n' and P_o, Y_o and A_o for the base period then

$(P_n - P_o) = (Y_n - Y_o)A_o + (A_n - A_o)Y_o + (Y_n - Y_o)(A_n - A_o)$

Division by (P_n - P_o) and expressing as percentage provide the estimate of percentage contribution of productivity, area and their interaction.

Saraswathi and Thomas (1977) examined the trends in production of food grains and commercial crops which include rice, cassava, coconut, arecanut, pepper, tea, coffee, rubber and cashewnut in Kerala using log normal model for the period 1952-53 to 1973-74. It was found that the model gave satisfactory fit to the data. Estimates of production for the period 1975-76 to 1977-78 were obtained using this model.

Reddy (1978) made a detailed exposition about the various types of functional forms commonly employed to measure agricultural growth viz. linear, exponential, quadratic and gompetz and observed that the statistical analysis consisting of fitting the growth curves, estimating the growth rate, standard errors and choosing the appropritate growth curve was tedious and time consuming and the result based on these exercise are valid only under certain conditions. Use of appropriate simple non-parametric test was suggested for broadly indicating the direction of growth rate. Emphirical verification was provided using the data of the Indian economy in real net national product, industrial production and agricultural

production from the period 1950-51 to 1973-74.

Sawant (1983) investigated the hypothesis of deceleration in Indian agriculture by examining growth of major food grain crops for the post-independance period. The compound growth rates were worked out by employing the log linear function of the form log Y = a + bt.

Lakshmi and Pal (1988) carried out the decomposition analysis of aggregate crop output of Kerala into its component elements using a seven-factor additive model. The study was done for 1952-53 to 1984-85 period and covered crops such as a rice, cassava, pepper, arecanut, cashew, ginger, coconut, rubber, tea and coffee which cover 80 per cent of the gross cropped area in Kerala. The analysis revealed that nearly 50 per cent of change in crop output in Kerala is due to change in total area under the 10 crops and 42 per cent through changes in the yield of concerned crops. The changes in the crop pattern accounted for only 8.4 per cent, much less than the contribution by the interaction of changes in area and yield, which explained 15 per cent of the changes in total output. The total changes accounted by the first and second order interaction was negligible being only 0.1 per cent.

Shad *et al.* (1989) examined the compound growth rate of area, production and yield of ginger in Himachal

Pradesh over the first six five year plans and the annual plan periods since 1951-52. The analysis showed that there is significant increase in production and yield in the third five year plan (1961-62 to 1965-66), the fifth plan (1974-75 to 1979-80) and annual plan (1966-67 to 1968-69) periods. The interaction effect of price structure and yield was favourable in the third, the fifth, the sixth and the annual plan periods. The interaction effect of price structure and cropping pattern remained favourable under all the plans but was highest in the first and the fourth five year plans.

Indira Devi *et al.* (1990) analysed the trend in area, production and productivity of banana in Kerala for the period 1970-71 to 1986-87 using three functional forms viz. semi log, exponential and quadratic. Quadratic function was found to be superior over the others in examining trend, in terms of coefficient of multiple determination. The model could satisfactorily explain the trend in yield during all sub-periods and that of area and production during 1980-87 periods.

Khan (1990) examined the trend in acreage, output and productivity of major spice crops in India between 1970-71 and 1986-87. The over all growth in area, production and productivity of five major spice crops, namely

black pepper, cardamom, chillies, ginger and turmeric were covered in particular. The result indicates that black pepper and chillies are lagging far behind in comparison to other spice crops. There has been no noticeable development in area, production and productivity of spice crops except ginger.

Chandrabhanu *et al*. (1991) examined the trend in area, production and productivity of groundnut in Kerala. Trend in area, production and productivity were analysed both at the district and state levels using time series data for the 1961-62 to 1987-1988 period. Simple indices and three functional forms viz. linear, log linear and quadratic were used to measure the trend. Decomposition analysis was carried out to partition out the relative contribution of area and productivity towards changes in output.

Economics of production

Singh and Bal (1967) studied the economics of cultivation of commercial crops in Punjab with shift in the trends of area, production, yield and price of four major commercial crops mainly Desi and American cotton, groundnut and sugarcane. The operational cost per hectare and yield per hectare for each crop were dealt with. From this profitability of each crop was worked out.

Mittal (1969) examined the economics of ginger cultivation in Sirmur district of Himachal Pradesh. The study was undertaken in two stages during 1963-64 and 1965-66. The result showed that human and bullock labour accounted for 7.9 per cent of the total cost and seed which is the main item of cost accounted for 70 per cent of the total cost. The remaining items of cost are manures, land revenue and other variable cost. The study suggested that use of better seeds, irrigation and improved implements will increase the revenue.

Raghubanshi (1969) studied the comparative gains, input-output relationships and the efficiency of the important vegetable crops in Saproon valley in Himachal Pradesh, viz. cauliflower, Tomato, Hill capricon and pears and found that volume of input and output is inversely proportional to the size of the holding for all four vegetables, because small farmers put in more effort per unit of land. Cauliflower crop earns the highest profit and peas the lowest. The study suggested the use of improved implements to improve production.

Bandall *et al.* (1971) in a study on Australian ginger growing industry presented data on crop management and returns for 52 commercial units in Queensland.

Rathori *et el.* (1973) analysed the economics of vegetable crops like potato, ginger, tomato, french bean and chilli in temperate region. The per hectare total cost of cultivation was found to be Rs.6165, Rs.7667, Rs.7736, Rs.7864 and Rs.5989 respectively. It was also found that one third of total cost of cultivation was claimed by imputed rental value of land. The ratio of marginal value product to factor cost for different variables indicated vast scope for reallocation of resources. It was observed that there was scope for investment in quality seeds except in ginger, and fertilizers and manures except in tomatoes, to increase farm income substantially.

Krishnamurthy *et al.* (1977) studied the yield of dry ginger, oleoresin and volatile oil obtained from seven hilly regions in India and found that the highest yield of dry ginger was obtained from Wynad region of Kerala State.

Ashturkar (1980) made an attempt to examine the performance of turmeric crop in Maharashtra state over a period of 13 years ie. from 1960-61 to 1974-75 in respect of area and production and to investigate the profitability of the crop. The area under the crop did not show any significant increase. However production registered an increase. Per hectare cost of cultivation on cost A basis amounted to Rs.5458 on an average, of which seed alone

account for 45 per cent. On the revenue side cultivators earned on an average Rs.17,024 and thus the net receipt over the direct cost or cost A worked out to Rs.11,506. The expenditure-income ratio worked out to 1:1.77.

Suresh (1980) reported resource use and productivity in grape cultivation in Bangalore North taluk of Bangalore district. The total expenditure incurred was found to be Rs.30941.06 and Rs.36471.38 per hectare for Bangalore blue and Anab-e-shahi. Results of the functional analysis indicated that independant variables namely land, manure and fertilizers, plant protection chemicals explained 88 to 89 percentage of variation in the yields of Bangalore blue and Anab-e-shahi.

Nadda *et al.* (1981) attempted to find out cost and returns for different farm sizes and examined resource use efficiency for ginger production using data from a sample of 108 growers in eight villages in Soomur district of Himachal Pradesh. Seed alone accounted for 38 per cent of the total cost. Average cost of cultivation per hectare was Rs.13,005 and gross income Rs.19,321. One rupee spent on ginger production gave an average net return of fourty nine paise. Cost of cultivation of ginger did not vary significantly among different farm sizes. Net profit was highest for large farmers and minimum for small farmers.

About 62 per cent of variation in production was explained by variables considered viz. seed, manure, human labour and bullock labour.

Singh *et al.* (1981) worked out the cost of cultivation of ginger in Himachal Pradesh and it was found to be Rs.14,250 per ha, inclusive of family labour, fertilizer and other inputs. Net income was estimated as Rs.8500 per hectare.

Muraleedharan (1987) conducted a study on resource use efficiency in kole lands in Thrissur district of Kerala. Functional analysis using output as dependent variable, farm size, human labour, bullock labour, fertilizers and manures as independant variables revealed that use of human labour and fertilizer and manure were higher than their optimum levels. Constant returns to scale was indicated by t-test.

Tewari *et al.* (1987) studied the economics of ginger cultivation in Himachal Pradesh. The study discussed production and marketing problems of ginger in Himachal Pradesh. It examined trends in area, production and productivity, cost of cultivation, marketing channels, and problems faced by growers and government effort, in developing the crop. The study covered three tehsils viz.

Shellai, Paontasahib and Renuka, and suggested that ginger growers should be educated in modern techniques in farming and introduction of agmark grades.

Singh and Rizvi (1988) made an attempt to analyse the comparative economics of production, input-output ratio and returns from soyabean and its competing crops in Uttar Pradesh. The average gross as well as net returns per hectare from soyabean was found to be highest in Nainital and net income from soyabean was found to be thrice the net return from other kharif crops.

According to Bastine (1988) in Irinjalakuda block in Thrissur district, cost of cultivation per hectare of banana was Rs.36,349. The returns worked out to Rs.45,668 and net income was found to be Rs.8,819 on cost C basis. The main item of expenditure was found to be human labour (26.98 per cent) and manure (24.60 per cent). The farm business income, family labour income and farm investment accounted to Rs.20,439, Rs.11,061 and Rs.18,197 per hectare respectively.

Waghmare and Pathak (1988) have compared the costs, returns and employment potential of commercial crops in Sholapur district of Maharashtra using cross-sectional data from unirrigated and irrigated conditions. The economics of crop production under unirrigated condition

reveals that farms with no commercial crops secured higher income (Rs.613/ha) than those with commercial crops mainly because of low productivity of commercial crops. Under irrigated conditions farms with commercial crop secured higher net returns (Rs.2815 per hectare) as against with no commercial crop.

Sharma *et al.* (1989) studied the economics of ginger farming in Kangra district of Himachal Pradesh. They examined cost and return of ginger production on small and large farms in Nagrola, Bagwan and Kangra blocks of Kangra district of Himachal Pradesh in 1986-87 and conducted a production function analysis. Net returns were higher on small farms (Rs.5,166/ha) than on large farms (Rs.3,370/ha) due to better management and greater per hectare input use.

Thakur *et al.* (1990) conducted a study on resource use, farm size and returns to scale on tribal farms of Himachal Pradesh. Production functions were fitted using farm income, human labour, manures and fertilizers, bullock labour and irrigation as explanatory variable for marginal, small and large farms seperately. Highly significant elasticity coefficient for labour indicated that, the hypothesis of zero marginal product of labour was not correct for the three catagories of farms.

Reddy *et al.* (1990) studied resource use efficiency in Betel vine cultivation in Cuddapah district of Andhra Pradesh. Cost and return components for the crop were of high magnitude and it was found that inputed cost of family labour and rental value of land constituted nearly 50 per cent of the total cost. Net income for the first year was Rs.3,000 as against Rs.36,000 is subsequent two years. Functional analysis revealed that there was scope for further use of labour, manure and fertilizers. Increase in expenditure on seeds and miscellaneous cost was not desirable as revealed by non significant elasticity coefficients.

Marketing

Lavania *et al.* (1966) highlighted the existence of high price spread due to multiplicity of charges and market functionaries, distress sale of agricultural produce and malpractices. He also showed that some of the developments beneficial to producers such as confirment of ownership on tenants, provision of cheap institutional finance and storage facilities to the cultivators, adversely affected the flow of marketable surplus.

Kahlon and Singh (1968) in a study of marketing of groundnut in Punjab examined the price spread, price

fluctuations, storage and grading problems. They found that arrivals of groundnut caused some fluctuation in its prices in different seasons of the year. They also found that the correlation between monthly prices and arrivals was negative in all market. They study concluded that factors other than arrivals contributed to the price variation in groundnut in a significant manner. Further they found that producer's share in consumer's rupee was only 65.41 per cent.

Sikka (1976) examined the price spread and marketing problems in ginger trade. The study found that nearly 31.51 per cent and 51.27 per cent of the consumer's price in export trade and internal trade respectively formed payments for moving the produce through marketing channels. A total of 36.04 per cent of the consumer's price was taken by intermediaries in the internal trade against 7 per cent in the export trade. Profit margins of commission agent, in the internal trade was very high. The study pointed out that price spread can be reduced and producer's income increased considerably, provided the producer retain the commodity after proper drying and cleaning and supply it to different markets according to demand and price situation. The study recommended the formation of co-operative sale socities and establishment of ginger curing and processing units.

Chatta and Kaul (1979) in a study on marketing margin of potato in Jallundar district of Punjab worked out the price spread. It was found that there was wide margin between retail and wholesale price to the extent of 45.13 per cent. The study concluded that the spread could be narrowed down without affecting efficiency of marketing and in the process both the producers and consumers surplus could be raised.

Gupta and Ram (1979) studied the behaviour of marketing margins of vegetables. The analysis revealed that producer received a very low share (38 per cent) of the consumer's price where as retailer's margin and the marketing cost were quite substantial each appropriating about one-fourth of the consumer's rupee. Location played an important role in influencing retailers margin. Transport, packing and labour expenses were the major components of the marketing cost. Co-operative endeavour at the levels of producers and consumers, and facilities for cold storatge and processing would probably help in improving the marketing performance.

Mamoria and Joshi (1979) mentioned that the grape growers sold the standing crop to contractors long before it was ready for harvesting. Some growers harvested their own produce and sold in the local or distant markets

directly or through agents. Direct sales by growers brought in about 87 paise per maund more when compared with sales through commission agents.

Singh and Singh (1979) calculated price spread for potato in Jullander district, Punjab in 1977-78 period. Price spread varied from Rs.21.82 to Rs.29.65 per quintal, the optimum time for sale is being November, which yielded a return of Rs.15.35 per quintal above storage cost as compared to sale immediately after harvest in January. The selection of appropriate market is also important. Price ranged from Rs.1.65 for sale in the field to Rs.9.81 for sale in city markets, and Rs.19.72, Rs.31.50 and Rs.36.21 for sale in Delhi, Calcutta and Bombay markets respectively.

Prasad (1982) analysed price spread for paddy and wheat in Alahabad district of Uttar Pradesh. Identifying the marketing agencies and channels involved in the marketing of these two commodities and estimating the price spread were the main objecetives of the study. It revealed that the producer's share in the consumer's rupee was very low due to the presence of a large number of middlemen.

Sikka and George (1983) studied the price spread in important ginger marketing channels. Two channels examined were

(1) producer - village merchant - commission agent - exporter - consumer (Price paid at London)

(2) producer - village merchant - commission agent - wholesaler of assembling market - wholesaler of consuming market - retailer - consumer

Producer received 63.18 per cent and 45.18 per cent of the price paid by the ultimate consumer in the consignment exported and that sold in the internal market respectively. The share of marketing costs ranged between 24.09 per cent in the export trade to 26.39 per cent in the internal market while that of marketing margins between 12.13 per cent in the former and 28.43 per cent in the latter. Amongst all market functionaries the margin of the wholesaler/exporter and commission agent were more in the consignment exported while they were more for the retailer and commission agent in the internal market. The study recommended that in order to increase their returns, producers should perform the assembling functions themselves on co-operative basis by forming primary co-operative societies.

Sambhar (1990) examined the marketing cost, marketing margin and price spread for green and dry ginger produced in Himachal Pradesh. Two pockets, one for green and another for dry ginger were selected from Sremaur

district. The total sample consisted of 19 producers for green ginger and 20 producers for dry ginger. Information was collected from market intermediaries comprising five village traders, six wholesalers and three market officials at Solan, Chandigarh and Delhi markets. The study showed that higher net price for producers and a high share of the consumer price can be ensured by encouraging group sales through producer's co-operative. The wholesaler's net margin appeared to be high which can be reduced by creating competition at the wholesalers level.

Fathimuddin (1991) attempted to study the dynamics of the producer's share and market margin for important food grains in India. The statistical and analytic method used to estimate marketing margins are evaluated and trend in producers share are examined between 1975-76 and 1985-86, for wheat, rice, maize and check peas. It was found that the producer's share in total revenue has increased for all the important commodities. Also, while wholesaler's margins have declined slightly, retailers margins have increased.

Area of Study

AREA OF STUDY

Idukki district situated in the Central part of Kerala, is bounded by the districts of Thrissur and Coimbatore on north, Madurai, Ramnad and Tirunelveli, on the east, Kollam on the south and Kottayam and Ernakulam on the west. It is the biggest district in Kerala sprawling over an area of 5150 sq.Km. The district is rich in scenic splendour with unbelieveably green hills and valleys sewn together by rivers, rivulets and streams. But the place may well lose its distinction, if erosion which is devouring large part of it continues at the current alarming rate. The district is socially and economically backward with poor transport and communication network and other infrastructure. The national highway and railway line do not figure in the district map. The main road systems are Kottayam - Kumily, Kochi - Munnar, Kumily - Munnar, Thodupuzha - Idukki, Kothamangalam - Idukki and Idukki - Kumily/Nedumkandom. There are places in Nedumkandam and Kattappana Blocks where students have to walk more than 10 Km to reach the school.

Administratively, the district is divided into 4 taluks and eight community development blocks. The latter are Devikulam, Adimali, Nedumkandam, Arudae, Kattappana, Idukki, Elamdesham and Thodupuzha. The headquarters of the

district is Idukki which is the seat of the famous Arch dam. About three-fourth of the Kerala's electric power is generated from here. The investigation on cost of cultivation and marketing of ginger was done in the two blocks of Kattappana and Thodupuzha.

Idukki is a high-land district barring a bit of mid-land region on the west flank of Thodupuzha Taluk. The high land ranges in altitude from 750 metres at Kulamavu to over 1500 metres at Munnar. The wide range of elevation permits considerable diversity in vegetation. The soil is mainly laterite and forest loamy types. The district is blessed with salubrious climate of tropical forest. Taluk-wise area in Idukki district is presented in Table 3.1.

Periyar, Thodupuzhayar and Thalayar are the important river system of the district with several feeders. The famous pampa river after originating runs a while through it. Devikulam, Eravikolam and Elavechapoonchira are the three fresh water lakes in the district.

Rainfall

The average yearly rainfall in the district falls within a range of 2500 mm and 4250 mm but it is also in the record that this has gone upto 7000 mm in certain years. The eastern and north-eastern parts, contrastingly

Table 3.1. Talukwise area of Idukki District (in Km^2)

Name of Taluk		Total area	Rural area	Urban area
Devicolam	T	1,774.1	1,768.2	5.9
	H	1,774.1	1,768.2	5.9
	M	-	-	-
Udumbanchola	T	1,071.4	1,071.4	-
	H	1,071.4	1,071.4	-
	M	-	-	-
Thodupuzha	T	973.7	951.8	21.9
	H	789.6	789.6	-
	M	184.1	162.2	21.9
Peermade	T	1,307.8	1,307.8	-
	H	1,307.8	1.307.8	-
	M	-	-	-
Total	T	5,087.0	5,059.2	27.8
	H	4,902.9	4,897.0	5.9
	M	184.1	162.2	21.9

Index: T - Total
H - High land
M - Middle land

Source: Basic Statistics, 1991, Directorate of Economics and Statistics, Thiruvananthapuram

get much lesser rain, the annual average dropping down to 1500 mm in the rain shadow areas of Marayur and Kanthallor. Normal and average monthly rainfall of the district is given in Table 3.2.

Demographic features

As per 1991 census the district has a population of 10.77 lakh with a density of 214/sq.Km which is well below the population density of the state. The male population was 5.45 lakh and female population 5.30 lakh. The sex ratio is 997 females per 1000 males while in state as a whole women out numbers men with 1040 females per 1000 male. The literacy rate in the district as per 1981 census is 67.4 per cent which is below the state level. The population details are shown in Table 3.3.

Occupational pattern

The occupational pattern of the working population is depicted in Table 3.4. It may be seen from the table that farmers and agricultural labourers constitute about 41.9 per cent of the total working population, highlighting the agrarian nature of the economy.

Land use pattern

The land use pattern of the district is given in

Table 3.2. Normal and average monthly rainfall in Idukki district 1991-92 (in mm)

Month	Average	Normal
January	10	19
February	01	23
March	77	47
April	102	129
May	123	228
June	1380	638
July	1235	831
August	613	518
September	126	305
October	344	310
November	91	167
December	02	50
Total	4104	3265

Source: Farm Guide, 1993, Farm Information Bureau, Government of Kerala

Table 3.3. Population - Idukki District

Sl. No.	Particulars	Unit	1981 Census	1991 Census
1	Rural	'000	924.0	NA
2	Urban	'000	45.0	NA
3	Total	'000	969.0	1,077.0
4	Male	'000	493.0	545.0
5	Female	'000	476.0	532.0
6	Scheduled Castes	'000	133.0	NA
7	Scheduled Tribes	'000	38.0	NA
8	Households	'000	187.0	NA
9	Density	Per sq. Km	193.0	214.0
10	Sex ratio	Females/ 1000 males	963.0	977.0
11	Literacy rate	%	67.4	NA
12	Male	%	72.2	NA
13	Female	%	62.6	NA

Source: Basic Statistics, 1991, Directorate of Economics and Statistics, Thiruvananthapuram

Table 3.4. Occupational pattern of working population in Idukki district (1991 Census)

Description	Number	Per cent
Cultivators	75392	19.40
Agricultural labourers	86030	22.25
Household industry workers	4437	1.14
Other workers	220783	57.10
Total main workers	386642	100.00

Source: Farm Guide, 1993, Farm Information Burea, Government of Kerala

Table 3.5. The total geographical area of the district is 514962 ha. Out of which forest covers 51 per cent. The area under cultivation at the end of 1991 was 217905 ha, ie., 42.3 per cent of the total geographical area.

Cropping pattern

The cropping pattern of the district during 1990-91 shows that pepper, rubber, cardamom, tea, coconut and coffee are the major crops in the district. The wide variation of altitude in the district provides considerable variation in soil and climatic condition. So a wide range of crops are grown here. The cropping pattern also shows the prominance of spices and condiments in the district. The cropping pattern of the Idukki district during 1990-91 is shown in Table 3.6.

Irrigation

There are no major irrigation projects in the district. The ground water sources are estimated to be poor. The different sources of irrigation are canals, tanks and wells, in addition to lift irrigation. The source wise net area irrigated is shown in Table 3.7. paddy, sugarcane and cardamom are the major crops irrigated as revealed in Table 3.8.

Table 3.5. Land utilization pattern in Idukki District (1990-91)

Description	Area in hectares	Percentage to total area
Total geographical area	514962	100.00
Forest	260907	50.67
Land put to non-agricultural use	16788	3.26
Barren and uncultivable land	13058	2.54
Permanent pastural and other grazing land	755	0.15
Land under tree crops not included in net area	11162	2.17
Cultivable waste land	22543	4.37
Fallow other than current fallow	737	0.14
Current fallow	1447	0.28
Net area sown	187566	36.42
		100.00
Area sown more than once	30339	5.89
Total cropped area	217905	42.31

Source: Farm Guide, 1993, Farm Information Burea, Government of Kerala

Table 3.6. Cropping pattern in Idukki district 1990-91

Crop	Area in hectare	Percentage of total cropped area
Paddy	5078	2.33
Other cereals	67	0.03
Pulses	1103	0.51
Sugarcane/palm	2932	1.35
Spices and condiments	93671	42.98
Fruits	8500	3.90
Vegetables	8595	3.94
Coconut	14864	6.82
Other oil seeds	178	0.08
Drugs and narcotics	1476	0.68
Tea	23557	10.80
Coffee	10834	4.97
Rubber	34595	15.87
Cocoa	1418	0.65
Fodder crops	268	0.12
Green manure crops	174	0.08
Other non-food crops	10594	4.86
Total	217905	100.00

Source: Farm Guide, 1993, Farm Information Burea, Government of Kerala

Table 3.7. Source wise irrigated area in Idukki district 1990-91

Source	Net area in hectare	Percentage
Government canal	612	19.50
Private canal	27	0.86
Government tanks	46	1.46
Private tanks	146	4.66
Government well	8	0.26
Private wells	29	0.93
Minor and lift irrigation	330	10.50
Others	1934	61.70
Total	3132	100.00

Source: Farm Guide, 1993, Farm Information Bureau, Government of Kerala

Table 3.8. Crop wise irrigated area in Idukki district 1990-91

Crop	Area (in ha)	Percentage
Paddy	1959	59.71
Tuber	2	0.06
Vegetables	3	0.09
Coconut	43	1.30
Arecanut	1	0.03
Clove and nutmeg	14	0.43
Other spices contiments	137	4.18
Banana	5	0.15
Sugarcane	748	22.80
Others	369	11.25
Total	3281	100.00

Source: Farm Guide, 1993, Farm Information Bureau, Government of Kerala

Income

Details on district income given in Table 3.9 reveal that net domestic product at 1980-81 price was Rs.193 crores, 206 crores and 224 crores and at current prices 193 crores, 325 crores and 477 crores, during the period 1980-81, 1985-86 and 1988-89 respectively. Sector-wise, net domestic product at current prices for primary sector was 56.3 per cent, 57.2 per cent and 52.6 per cent for secondary sector 17.4 per cent, 18.1 per cent and 18.8 per cent during 1980-81, 1985-86 and 1988-89 periods respectively. Per capita income was Rs.1,929, 1,955 and 2,019 at 1980-81 prices and Rs.1,929, 3,089 and 4.308 at current prices during periods 1980-81, 1985-86 and 1988-89 respectively.

Table 3.9. District income - Idukki District

Particulars	Unit	1980-81	1985-86	1988-89
NET DOMESTIC PRODUCT				
At current prices	Rs.Crores	193	325	477
At 1980-81 prices	Rs.Crores	193	206	224
Sector-wise distribution of net domestic product at current prices				
Primary sector	%	56.3	57.2	52.6
Secondary sector	%	28.3	24.7	28.6
Tertiary sector	%	17.4	18.1	18.8
PER CAPITA INCOME				
At current prices	Rs.	1929	3089	4308
At 1980-81 prices	Rs.	1929	1955	2019

Source: Basic Statistics, 1990, Directorate of Economics and Statistics, Thiruvananthapuram

Materials and Methods

MATERIALS AND METHODS

This study is based on both secondary as well as primary data. Trends in area, production and productivity of ginger in Kerala have been examined using secondary data for the period 1960-61 to 1990-91, compiled by the State Directorate of Economics and Statistics. For analysing the economics of production and marketing, primary data have been used. Primary data were collected through sample survey in Idukki district which is one of the major ginger growing tracts in the State. Idukki District with an area of 1551 ha under ginger and production of 5734 tonnes ranks third in area and production of ginger in the State. The crop is planted in May-June and harvested during November-January.

Trend analysis

The study examines the trends in area, production and productivity of ginger in Kerala. To examine the year to year variation in area, production and productivity of ginger, indices have been computed. This was done by dividing the current year's figures with base period figure and expressing the same as percentage.

The relative contribution of area and productivity

towards the change in production are partitioned out using the method of component analysis* as follows:

$$P_n - P_o = (Y_n - Y_o) A_w + (A_n - A_o) Y_w$$

$$A_w = \frac{A_n + A_o}{2} \quad \text{and}$$

$$Y_w = \frac{Y_n + Y_o}{2}$$

Where P_n = Production in the n^{th} period

Y_n = Yield in the n^{th} period

A_n = Area in the n^{th} period

P_o = Production in the base period

Y_o = Yield in the base period

A_o = Area in the base period

Percentage share of area : $\frac{(A_n - A_o) Y_w}{(P_n - P_o)} \times 100$

Percentage share of yield : $\frac{(Y_n - Y_o) A_w}{(P_n - P_o)} \times 100$

*
Narula, S.S. and Sagar, V. 1973. Methodology in working out contribution of area and yield in increase in production. *Agric. Situ. India.* 28(7):473-477

Growth rate

For measuring the rate of growth, two functional forms were fitted to the time series data, the linear and the exponential.

1. The leaner function

$$Y = a + bt$$

Where Y = Dependent variable (area/production/ productivity)

a = Y intercept

b = absolute increment in Y per time period

t = time in years starting from the base year (t = 1, 2 ..... n)

The compound growth rate was worked out from b using the

$$\text{relative compound growth } (r) = \frac{b}{\text{H.M.Y.}} \times 100$$

Where H.M.Y. = Harmonic mean of Y

$$= n : \sum_{i=1}^{n} \frac{1}{Y_i}$$

2. The exponential function

$$Y = a\, e^{gt}$$

on logarithmic transformation this takes the linear form

$$\text{Log } Y = \text{Log } a + gt$$

Where Y = Area/production/yield

a = constant

g = Regression coefficient

t = time in years starting from the base year

Sampling procedure and collection of data

The sample survey to collect the relevant data on ginger cultivation and marketing was carried out among ginger growers. The design of the sample survey was multi-stage random sampling with panchayat as primary units, ward as secondary units and holdings as ultimate units. Kattappana and Thodupuzha blocks of Idukki District were selected purposively. From each block, two panchayat were selected randomly, and from each panchayat two wards were randomly selected. Lists of ginger growers were prepared in each selected ward and twelve farmers were randomly selected. Thus the study was confined to a sample of ninety six ginger cultivating holdings. Data collection was carried out by personal interview method during the months of February to May 1993 using a well structured interview schedule. A copy of this interview schedule is appended.

Data on marketing of ginger were collected from different intermediaries around the Kattappana and Thodupuzha area of Idukki District, and also from Kochi, from

where bulk of the produce is exported. Data were collected from seventeen different middlemen selected at random using a well structured interview schedule. The traders were generally hesitant to co-operate because of misconception that the figures supplied by them will be used against them by tax officials. However, every effort was made to remove their suspicion and to get data as accurate as possible.

A specimen of the interview schedule canvassed among traders is attached as Appendix-II.

Method of analysis

The selected holdings were divided into three groups, based on area under ginger. Group I consists of holdings having area under ginger less than 0.2 ha. Group II consists of holdings having area between 0.2 to 0.8 ha and Group III, having area 0.8 ha and above. This classification is followed by Bureau of Economics and Statistics for estimating the cost of cultivation.

Any rational farmer, aiming at earning maximum profit is interested in the cost of production. Cost studies not only furnish information on the relative profitability of an enterprise but also serve as a guideline for better choice of combination of enterprises for

maximising profit. Cost of cultivation of ginger was worked out and relevant data were tabulated. Cost of cultivation was divided into different components according to different cost concepts. Cost of production and input-output ratio were also worked out.

Cost concepts

A number of cost concepts such as cost A, cost B, cost C have been followed in this analysis*. The input costs included in each category are indicated below:

1. Cost A approximates the actual expenditure incurred in cash and kind and includes following items of cost.

Value of hired human labour (permanent and casual)

The item human labour included the labour employed in land preparation, sowing, weeding, mulching, application of manures and chemical fertilizers, plant protection chemicals and harvesting. The actual paid wage labour engaged in crop production was considered as value of hired labour.

*Kahlon, A.S. and Karam Singh. 1992. Economics of Farm Management in India. Allied Publishers Ltd.

Value of seed (farm produced and purchased)

Purchased seeds are evaluated on the basis of their purchase price. Same price was using for evaluating farm produced seeds.

Value of manures and fertilizers (farm produced and purchased)

Expenditure on purchased quantities of manures and fertilizers has been evaluated by multiplying the physical quantities of different manures and fertilizers used with their respective prices. Farm produced items were also evaluated at this market price.

Value of crop protection chemicals

Expenditure on fungicides and insecticide has been calculated by multiplying their physical quantities with their respective prices.

Interest on working capital

Interest on working capital was charged at the rate of 11.5 per cent per annum. This was the rate of interest charged by commercial banks on short term agricultural loans. Interest was charged for only half the

duration of crop, as all the cost are not incurred at the beginning itself.

Land Revenue

This was taken as the actual rate paid to the revenue department which was Rs.10/acre in the area.

2. Cost B - This cost includes cost A + Imputed rental value of owned land + Imputed interest on fixed capital (excluding land).

As leasing out of land is not practised in the study area rental value of land is not considered. Farmers used only minor implements like mammattees, sickles etc. so imputed interest on fixed capital is insignificant. Hence not accounted.

3. Cost C - This cost includes Cost B + Imputed value of family labour.

Family labour

Value of the family labour is imputed at the prevailing wage rate in the locality.

Per hectare cost of cultivation was worked out for the three groups and for the sample as a whole. Cost of production and input-output ratio were also worked out.

Efficiency measures

Efficiency measures are designed to visualize the outcome as envisaged by the objectives or goals of an activity in relation to the efforts made.

In the present study income measures are used as measures of efficiency. Different income measures are associated with different cost concepts. They are as follows:

1. Farm business income - It is gross income minus cost A
2. Family labour income - It is gross income minus cost B
3. Net income - It is gross income minus cost C

Bulk line cost

Bulk line cost of production is that which covers cost of production of predominant proportion of farmers, production or area. Conventionally bulkline cost is calculated so as to cover eighty five per cent of farmers production or area on cost C basis.

Functional analysis

Cobb-Douglus production functions have been fitted to the collected data in order to examine the relationship between output and various inputs used in the production of ginger.

From the production function, elasticities of production of inputs were worked out, which in turn have been used to calculate their marginal value products at their geometric mean. Marginal productivity is the measure of increase in total product for the addition of one unit of particular input above its mean level while other resources are held constant at their respective mean levels. A significant difference between marginal value product and market price of individual input would indicate whether farmers are using, on an average, the factors of production efficiently or inefficiently.

Specification of the model fitted is

$$\text{Log } Y = \text{Log } a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + b_6 \log x_6 + U$$

Where Y represent the value of output in rupees, a is the intercept, 'U' is the error term, b_1, b_2, b_3, b_4, b_5 and b_6 are regression coefficients or elasticities of production corresponding to each variable input.

Explanatory variables used in the function are:

X_1 - Area in cents

X_2 - Expenditure on seeds (Rupees)

X_3 - Expenditure on plant protection chemicals (Rupees)

X_4 - Expenditure on manures (Rupees)

X_5 - Expenditure on chemical fertilizers (Rupees)

X_6 - Expenditure on human labour (Rupees)

Production function was fitted based on the absolute value of production. The function has been estimated by the ordinary least square technique. Co-efficient of multiple determination ($\bar{R}^2$) was tested for its statistical significance by applying F test.

Returns to scale

The sum of all elasticities of production (Σb_1) ie., $b_1 + b_2 \ldots\ldots\ldots\ldots b_6$ would indicate the percentage change in total returns when all the inputs in the production function are increased by one per cent. If sum of all elasticities of production is equal to one ($\Sigma b = 1$) constant returns to scale would prevail. This means that if all the inputs were increased by one per cent total return would also increase by one per cent. Likewise if Σb_i was less than one ($\Sigma b_i < 1$) it would mean diminising returns to scale and if Σb_i is greater than one ($\Sigma b_i > 1$), it means increasing returns to scale.

Marginal value product

Marginal value products of different inputs were calculated using the formula

$$MVP\ (X_i) = \frac{\bar{Y}}{\bar{X}_i}\ b_i$$

$\bar{Y}$ = Geometric mean of total returns Y

$\bar{X}_i$ = Geometric mean of i^{th} input variable

The significance of b_i is tested using student's 't' test.

Marketing

In the present study important marketing channels in the marketing of ginger were identified. Marketing efficiency was measured in terms of marketing costs and margins. Marketing margin is the difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of farm produce. The method of concurrent margin is used in the present study for estimating marketing margins. Concurrent margin refers to the difference between price prevailing at successive stages of marketing at a given point of time.

PART II

RESULTS AND DISCUSSION

General Economic and Social Conditions of the Sample Farmers

GENERAL ECONOMIC AND SOCIAL CONDITIONS OF SAMPLE FARMERS

The chapter contains a brief description of general economic and social conditions of the sample farmers. An understanding of this may help to provide necessary background and proper understanding of the farm economy and economics of ginger cultivation.

Family size

Respondents in the two Blocks from which samples were drawn, viz., Kattappana and Thodupuzha were classified based on their family size. This information is given in Table 5.1. There is marked difference in family size between the two blocks, average being 6.54 in Kattappana and 4.25 in Thodupuzha. For two blocks together average family size was 5.4. On an average 45 per cent of total sample farmers came under family size group of 4-6 members and 35 per cent came under family size of 7 and above. In Kattappana block 62.5 per cent of respondents have family size of seven and above whereas in Thodupuzha block only 8 per cent of respondents come under this category. These differences appear to be due to difference in economic development between two blocks.

Age and sex

Classification of respondents' family according to

Table 5.1. Distribution of respondents according to family size

Name of block	Family size				Average size of family
	1-3	4-6	7 and above	Total	
Kattappana	7 (14.58)	11 (22.92)	30 (62.50)	48 (100)	6.54
Thodupuzha	12 (25.00)	32 (66.67)	4 (8.33)	48 (100)	4.26
Total	19 (19.79)	43 (44.79)	34 (35.42)	96 (100)	5.40

Figures in parentheses show percentages to the total

age and sex is given in Table 5.2. Analysis showed following features. For the sample as a whole, 38.41 per cent of the total members comes under the age group of eighteen to thirtynine, 32.04 per cent belongs to the age group below eighteen and 24.7 per cent is in 40-59 group. There is significant difference in composition of age and sex in two blocks. In Kattappana area 35 per cent of the members comes under below eighteen age group, whereas in Thodupuzha 25 per cent comes under this category. This high concentration of below eighteen age group indicates an increasing trend in growth rate of population in recent past. The level of backwardness of these area is also shown by the sex composition, which shows that as much as 57 per cent of the population is males, resulting in a sex ratio of 888 as against 1040 for the state. Sex ratio is more adverse in Kattappana block where there were only 688 females per thousand males.

Literacy

Classification of respondents according to educational status is given in Table 5.3. Analysis of the educational status of the respondents showed that 92 per cent of the sample farmers were literate. Blockwise analysis shows literacy rate of 98 per cent in Thodupuzha block while it was 89 per cent in Kattappana block.

Table 5.2. Distribution of respondents family according to age and sex

Name of the Block	Age group in years										Total
	Below 18		18-39		40-59		Above 59		Total		
	M	F	M	F	M	F	M	F	M	F	
Kattappana	65 (20.70)	48 (15.28)	62 (19.74)	45 (14.33)	52 (16.56)	30 (9.55)	7 (2.22)	5 (1.60)	186 (59.23)	128 (40.77)	314 (100)
Thodupuzha	22 (10.78)	31 (15.19)	54 (26.47)	38 (18.62)	24 (11.76)	22 (10.78)	8 (3.92)	5 (2.45)	108 (52.94)	96 (47.06)	204 (100)
Total	87 (6.69)	79 (15.25)	116 (22.39)	83 (16.02)	76 (14.67)	52 (10.03)	15 (2.89)	10 (1.93)	294 (56.76)	224 (43.24)	518 (100)

Figures in parentheses show percentages to the total

Table 5.3. Classification of respondents according to literacy

Name of the block	Illiterate	Primary School	Middle School	High School	Pre-Degree	Degree	Total
Kattappana	7 (14.58)	29 (60.41)	5 (10.41)	3 (6.25)	2 (4.16)	2 (4.16)	48 (100)
Thodupuzha	1 (2.08)	15 (31.25)	20 (41.66)	7 (14.58)	5 (10.41)	-	48 (100)
Total	8 (8.33)	44 (45.83)	25 (26.04)	10 (10.41)	7 (7.29)	2 (2.08)	96 (100)

Figures in parentheses show percentages to the total

Educational status of the members of the families of respondents was also studied. About 50 per cent of total members were educated upto primary level, 24 per cent upto middle school, 10.42 per cent upto highschool, 5.2 per cent upto pre-degree level and 2.3 per cent upto degree level. The percentage of illiterate members was 7.5. Blockwise analysis showed higher educational status of Thodupuzha block with 98 per cent literacy. Distribution of members of the respondents according to educational status is given in Table 5.4.

Occupation

Distribution of respondents according to their occupation is shown in Table 5.5. Agriculture was the sole occupation of 39 per cent of the members. Agriculture was the main occupation for 40 per cent of the respondents and sub-occupation for the remaining. Blockwise break-up shows that as much 60 per cent of the respondent in Kattappana block depends entirely on agriculture whereas it is only 16 per cent in Thodupuzha block.

Land holding

The respondents were classified based on their land holding size, and this information is given in Table 5.6. It was found that 60 per cent of the respondents have area

Table 5.4. Distribution of family members of respondents according to educational qualifications

Name of the block	Illiterate	Primary School	Middle School	High School	Pre-Degree	Degree	Total
Kattappana	34 (10.82)	181 (57.64)	55 (17.51)	24 (7.64)	15 (4.77)	5 (1.59)	314 (100)
Thodupuzha	5 (2.45)	80 (39.21)	70 (34.31)	30 (14.70)	12 (5.88)	7 (3.43)	204 (100)
Total	39 (7.50)	261 (50.38)	125 (24.13)	54 (10.42)	27 (5.21)	12 (2.31)	518 (100)

Figures in parentheses show percentages to the total

Table 5.5. Classification of respondents according to their occupation

Name of the block	Occupation			Total
	Agriculture as the only occupation	Agriculture as main occupation	Agriculture as subsidiary occupation	
Kattappana	29 (60.41)	14 (29.16)	5 (10.41)	48 (100)
Thodupuzha	8 (16.66)	24 (50.00)	16 (33.34)	48 (100)
Total	37 (38.54)	38 (39.58)	21 (21.88)	96 (100)

Figures in parentheses show percentages to the total

Table 5.6. Distribution of respondents according to ownership holding

Name of the block	Area in hectares				Total	Average size of holding
	Below 1	1 to 2	2 to 4	Above 4		
Kattappana	28 (58.33)	20 (41.67)	-	-	48 (100)	0.746
Thodupuzha	30 (62.50)	16 (33.33)	2 (4.17)	-	48 (100)	0.750
Total	58 (60.42)	36 (37.50)	2 (2.08)	-	96 (100)	0.750

Figures in parentheses show percentages to the total

below 1 ha. The average size of this group was 0.38 ha. Another 38 per cent are having area between one and two hectares with average size of holding 1.24 hectares. The remaining 2 per cent of the farmers have area between two and four hectares with average size of 2.4 hectares. The classification of respondents based on their area of holding shows that bulk of ginger growers are marginal and small farmers accounting for 98 per cent of total respondents.

Cropping pattern

The cropping pattern of respondent farmers is given in Table 5.7. The major crops grown in the study area were paddy, pepper, cardamom, rubber, ginger, coconut and tapioca. The gross cropped area of the total respondents was 60 hectares.

Area under ginger

Respondents were classified based on area under ginger cultivation. There is no marked difference between the blocks in this respect. Distribution of respondents according to their area is presented in Table 5.8. They are classified into three groups; group I with holding size of less than 0.2 ha, group II with holding size area between 0.2 and 0.8 ha and group III with holding size of

Table 5.7. Cropping pattern of respondent farmers (1991-92)

Crops	Area in hectares	Percentage to gross cropped area
Paddy	2.14	2.19
Tapioca	7.42	7.57
Ginger	21.20	21.63
Other annual crops	4.00	4.08
Cardamom	18.00	18.37
Pepper	12.00	12.24
Rubber	16.00	16.33
Coconut	14.00	14.29
Other perennial crops	3.24	3.30
Gross cropped area	98.00	100.00

Table 5.8. Distribution of respondents according to area under ginger

Name of the block	Area in hectare			Total
	Less than 0.2	0.2 to 0.8	0.8 and above	
Kattappana	30 (62.50)	13 (27.10)	5 (10.40)	48 (100)
Thodupuzha	29 (60.40)	18 (37.50)	1 (2.10)	48 (100)
Total	59 (61.40)	31 (32.30)	6 (6.30)	96 (100)

Figures in parentheses show percentages to the total

0.8 ha and above. This classification is followed by Bureau of Economics and Statistics for estimating the cost of cultivation. Bulk of the farmers (93.7 per cent) have area less than 0.8 hectares. There is no marked difference between the blocks in this respect.

Trends in Area, Production and Productivity of Ginger

TRENDS IN AREA, PRODUCTION AND PRODUCTIVITY OF GINGER

In this chapter trends in area production and productivity of ginger in Kerala are examined first followed by trends in Idukki district. Changes in area, production and productivity of ginger during the period 1960-61 to 1990-91 were examined by computing simple indices. The relative contributions of area and productivity were partitioned out using the model of Narula and Vidyanagar mentioned in Chapter 4. In this model the contribution of productivity is the part of production due to additional yield on the average area (of the base and current year) and contribution of area is the part of production due to additional area with average productivity. The indices together with decomposition analysis facilitate a clear understanding of year to year movements of area, production and productivity and relative contribution of area and productivity in bringing out changes in production.

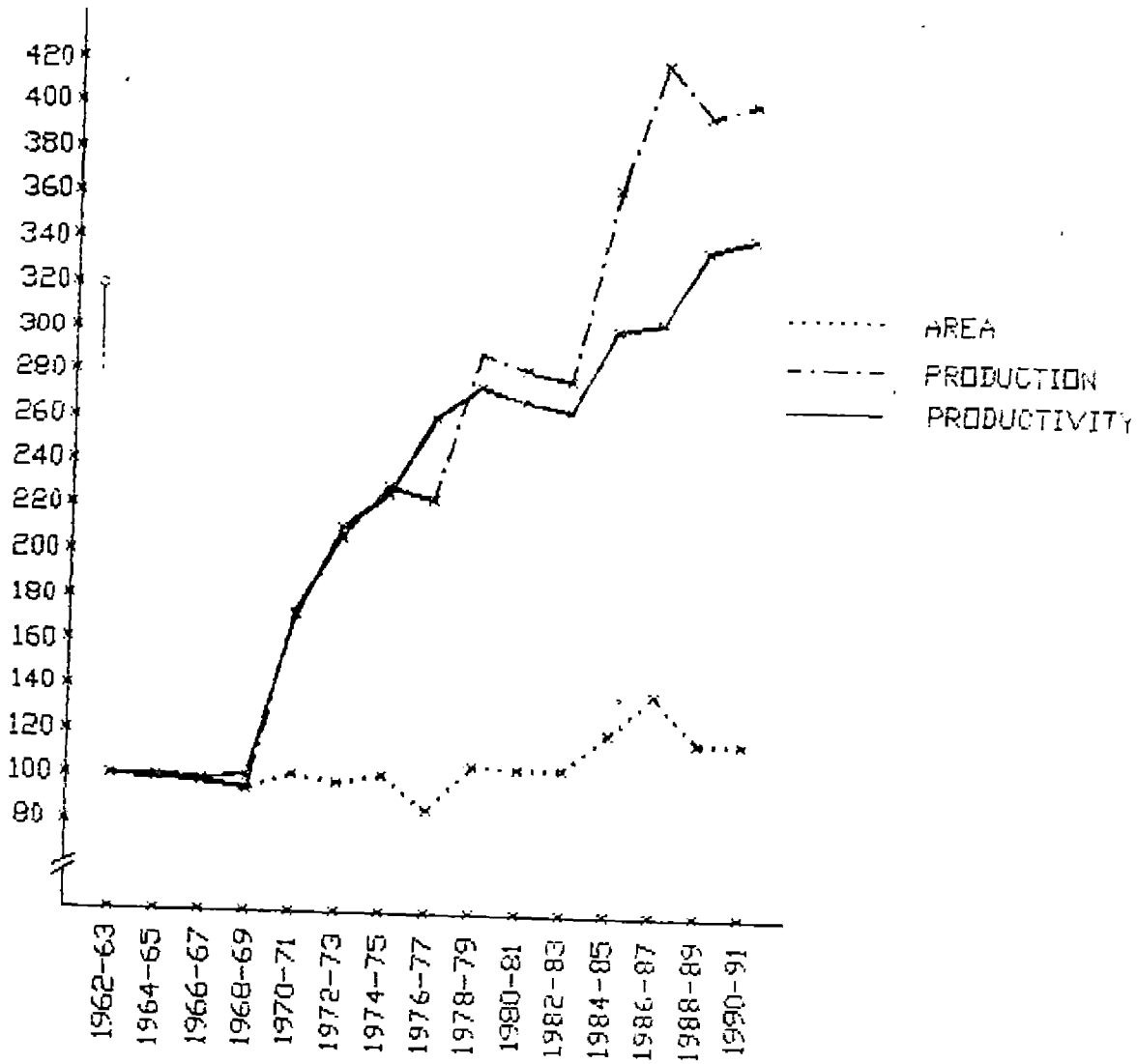
Trends in area, production and productivity of ginger in the state as represented by their respective indices are presented in Table 6.1 and the same have been illustrated graphically in Fig.6.1. Index number of area showed that, during the period from 1962-63 to 1975-76

Table 6.1. Indices of area, production and productivity and percentage contributions of area and productivity towards the changes in production of ginger: Kerala State (Base period: 1960-61 to 1962-63)

Year	Indices of			Contribution of	
	Area	Product-ion	Producti-vity	Area	Productivity
1962-63	100.25	100.70	100.42	37.0	63.0
1963-64	99.34	99.47	100.11	-106.8	206.8
1964-65	99.42	99.91	100.42	-35.7	135.9
1965-66	98.42	98.68	100.21	-280.0	180.0
1966-67	97.92	97.36	99.36	-94.2	-5.4
1967-68	98.01	98.06	100.00	-146.0	46.0
1968-69	94.85	95.51	100.64	-130.9	30.9
1969-70	95.68	105.64	110.39	-64.0	164.0
1970-71	101.08	173.39	171.47	2.5	97.5
1971-72	98.59	205.37	208.27	-1.5	101.5
1972-73	98.01	206.87	211.03	-2.3	102.3
1973-74	100.00	234.98	234.89	-0.4	99.6
1974-75	101.33	229.34	226.30	2.1	97.9
1975-76	96.93	254.10	262.04	-3.2	103.2
1976-77	85.96	224.05	260.55	-19.6	119.6
1977-78	105.23	282.91	268.72	5.5	94.5
1978-79	105.56	289.96	274.55	5.7	94.3
1979-80	117.28	309.43	263.73	15.5	84.5
1980-81	105.56	282.20	268.29	5.4	94.6
1981-82	111.71	303.00	271.16	10.9	89.1
1982-83	105.15	278.15	264.48	5.5	94.5
1983-84	123.59	323.26	261.51	18.6	81.4
1984-85	120.68	363.35	300.95	15.9	84.1
1985-86	130.15	391.72	300.85	20.8	79.2
1986-87	137.87	420.09	304.56	21.5	78.5
1987-88	119.93	400.88	334.15	14.5	85.5
1988-89	117.69	396.65	336.90	13.2	86.8
1989-90	119.85	416.39	347.30	14.2	85.8
1990-91	117.44	402.56	342.63	12.9	87.1

Source: Indices based on data collected from the Directorate of Economics and Statistics, Kerala, Thiruvananthapuram

Fig. 6.1. Index number of area, production and productivity of ginger - Kerala State



area remained almost stagnant with the index hovering around 100 points. There was a sharp decline in area in the year 1976-77 with index down by 14 points from the base year, which was the lowest dip ever. Thereafter, area showed some flucations with index reaching a peak in the year 1986-87, registering 37 point rise over the base year. From this peak index moved downward to 119.93 points and remained in and around it for the remaining four years under study.

After an initial stagnation during 1962-68 productivity showed an increasing trend thereafter. In the year 1970-71 productivity recorded a quantum leap with index moving up by 71 points from the base year. After a moderate growth during the period 1971-74, productivity again showed a sudden improvement with index registering a rise of 162 points over the base period. Thereafter productivity showed minor fluctuation with index moving up and down around 270 points. Productivity again showed a quantum jump in the year 1984 and again in 1987 with index registering steep rise of 200 points and 234 points respectively over the base period. In the year 1989-90 productivity reached the peak level with index reaching 247 points above base year. On the whole, productivity showed an increasing trend with occasional minor deviations but remained always above the base period.

The level of production was stagnant during the first six years as indicated by the index which hovered around 100 points. The next two years showed production first moving down by 5 points and recovering subsequently by gaining 6 points over the base year. The year 1970 showed a tremendous expansion in output with index registering 74 points over the base year. During the period 1970 to 1986, except for occasional deviation to the other side, the output in general showed an increasing trend, reaching a peak in 1986 with index up by 320 points from base year. The remaining four years showed some fluctuation in output with index moving up and down around 400 points.

The decomposition analysis presented in the second half of Table 6.1 helps to indicate the percentage contribution of area and productivity towards production. The overwhelming influence of productivity on total output is evident from percentage contribution it made towards the output during the entire period under study. During the initial seven years the output was almost stagnant. From 1969 onwards the output showed an increasing trend, which was entirely due to positive contribution of productivity. Even the negative contribution in area in some years is more than compensated by increase in productivity. Thus we

can say that productivity determined the output changes.

Summarising what is discussed above, ginger output has shown rising trend, with productivity playing a decisive role and area recording a moderate rise.

Growth rate

The complex nature of agriculture permits no single technique of analysis to provide a comprehensive picture of agricultural growth. So for measuring the growth rate of ginger two statistical functions were fitted to the time series data on area, production and productivity viz. Linear and Log linear. The linear function help to avoid effect due to seasonal and cyclical fluctuation. Suitability of functions tried were determined after considering the sign and statistical significance of the parameter estimates, the coefficient of multiple determination and F values.

Growth rates of area, productivity and production obtained from the two models are presented in Table 6.2. The area movements can be satisfactorily explained by both the functions as indicated by the R^2 values. The b values are significant and possitive indicating expansion in area. The compound growth rate was 1.08 per cent. The estimated trend equation for productivity showed positive

Table 6.2. Estimated trend equation for area, production and productivity of ginger: Kerala State

Y =	a	+	bt	R^2	CGR
Area	90.04	+	1.1438	0.595	1.04
Productivity	77.00	+	9.9187	0.909	5.50
Production	49.22	+	13.3080	0.949	7.20

In Y =	a	+	bt	R^2
Area	1.960	+	0.004947	0.594
Productivity	1.970	+	0.022638	0.848
Production	1.935	+	0.027120	0.906

and significant 'b' values for both the functions fitted. The linear function gives the best fit and could explain 90 per cent of the variation. The highly significant and positive b values indicate increase in productivity. The compound growth rate was 5.5 per cent. Output being a function of area and productivity follows a course which the other two factors compel it to take. With area showing a moderate growth and productivity increasing rapidly, the output naturally increases. Both the functions form good fit for explaining trend in production. However, linear function forms the better fit with R^2 value of 0.95. The b values are significant and positive indicating growth. The compound growth rate was 7.7 per cent.

Trends in area production and productivity of ginger in Idukki district

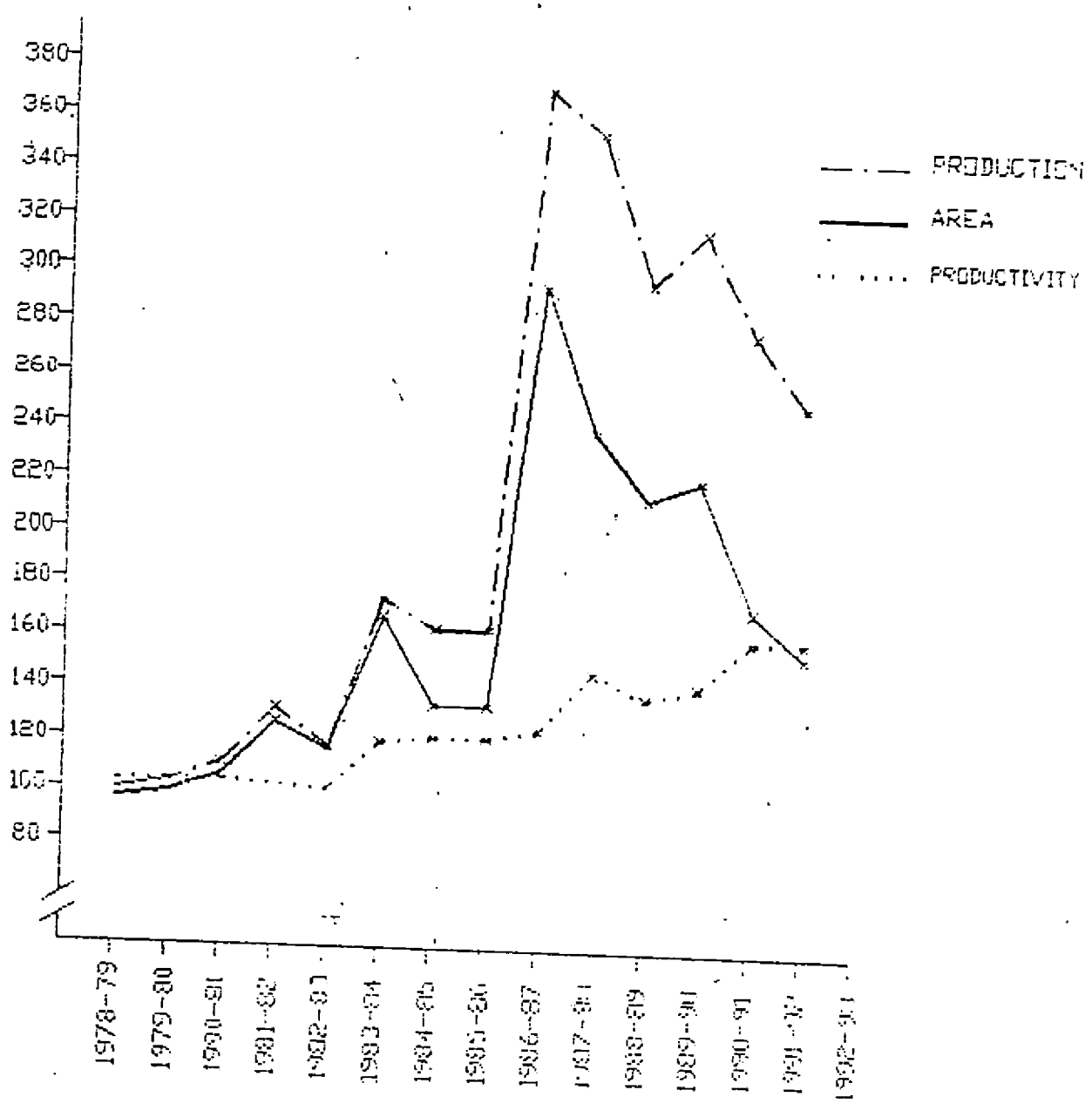
The indices of area, production and productivity of ginger in the Idukki district and result of decomposition analysis are presented in Table 6.3. Data availability restricted the analysis for the period 1978-79 to 1991-92. The indices have also been presented graphically in Fig. 6.2. The area, after an initial mild set back in the first two years, recovered in the next year with index moving up by 9.7 points from the base year. During the period 1981 to 1986 fluctuating trend in area is noticed with index moving up by 30 points in the year 1983 and

Table 6.3. Indices of area, production and productivity and percentage contribution of area and produtvitity towards changes in production of ginger in Idukki district (Base period: 1976-77 to 1978-79)

Year	Indices of			Contributions of	
	Area	Production	Productivity	Area	Productivity
1978-79	96.5	99.5	103.1	-683.9	583.9
1979-80	99.1	103.2	104.1	-97.9	197.9
1980-81	106.2	110.6	104.1	43.7	56.3
1981-82	126.8	132.1	82.4	535.7	-435.7
1982-83	116.9	118.0	100.9	85.2	14.8
1983-84	167.5	174.3	119.7	71.5	28.5
1984-85	134.0	163.0	121.7	56.4	43.6
1985-86	134.0	163.0	121.7	56.4	43.6
1986-87	294.0	369.0	125.4	80.2	19.8
1987-88	239.0	353.6	147.8	66.8	33.2
1988-89	214.0	296.3	138.2	67.9	32.1
1989-90	221.4	316.2	142.7	66.9	33.1
1990-91	172.0	277.0	161.0	56.1	48.4
1991-92	155.4	250.5	161.0	46.4	53.6

Sources: Indices based on data collected from the Directorate of Economics and Statistics, Kerala, Thiruvananthapuram

Fig.6.2. Index number of area, production and productivity of ginger - Idukki District



again reaching a peak in 1986-87 with index registering a sharp rise of 197 points over the base period. The remaining period showed a declining trend in area. Still the index was 59 points above the base year in 1990-91.

Productivity, after stagnating for the first three years, suffered a set back in 1981-82 with index down by 20.7 points from the base period. In the remaining period, except for mild deviation to other side, productivity in general showed a rising trend, reaching a peak in 1990-91 with index registering a 57.9 point rise over the base year and remaining there in the next year.

During the initial four years output showed a increasing trend. After a mild set back in 1982-83, the output rose sharply with index up by 74 points from the base year. The next two years showed output stagnating at 163 points. In the year 1986-87, there is a spectacular rise in output with index registering an increase of 269.5 points from the base year. In the remaining years except for the year 1989-90, the output showed a declining trend, though the index was well above the base year.

The decomposition analysis presented in the second half of Table 6.3 showed overwhelming influence of area on production. Productivity also played a significant role

expecially during the initial years and the final years showed that productivity contribution to output is on rise.

Economics of Ginger Production

ECONOMICS OF GINGER PRODUCTION

Commercial agriculture is profit oriented and hence the relationship of cost to income is very important. The relation between money value of output and input is also a measure of efficiency. The higher the output greater the efficiency of given resources and conversely the greater the efficiency of given resources the greater the output. The data on cost of production and returns are of special interest to farmers since they reveal the input-output relationship of their enterprises and bring out the difference in unit cost between the less efficient and more efficient farm enterprises. This would enable the farmer to choose the right combination of resources or enterprises. Adoption of technical innovation by farmers also increasingly demand precise and detailed information on cost and returns.

In this chapter an attempt has been made to analyse the costs and returns of ginger cultivation in Idukki district on the basis of statistical data from the sample holdings. Cost of cultivation per hectare is studied. Inputwise and operation wise, cost of production per unit of output and bulkline cost are also studied. After analysing the returns and input-output ratio, an attempt has

been made to study the resource use efficiency in ginger cultivation.

Before dealing with costs and returns, it was felt that a brief account of the cultivation practices of ginger will be helpful.

In Idukki, ginger is grown as rainfed crop. The planting season is May-June. The field is repeatedly ploughed and brought to a fine tilth. Depending on the size of the field and topography of the area, beds of convenient length and width and height of about 25 cm are prepared. Rhizomes are planted in shallow pits in the bed with 20 x 20 cm to 25 x 25 cm spacing. Mulching is an important operation and beds are mulched two or three times depending on the availability of mulch materials. Irrigation is not normally given. The crop requires regular weeding and earthing up is done during last weeding. Ginger is a soil exhaustive crop and requires heavy manuring. Fertilizers are applied in two or three split dozes. The plants in this area suffer from heavy incidence of soft rot disease. So plant protection chemicals form an important item of expense. Rhizomes are harvested from November to January.

Cost of cultivation per hectare

The cost of cultivation per hectare of ginger based on different cost concepts is shown in Table 7.1. The average cost of cultivation per hectare of ginger on the basis of cost A, cost B and cost C was Rs.20088.10, Rs.20088.10 and Rs.28888.10 respectively. They were Rs.17883.80, Rs.17883.80 and Rs.29483.80 in group I; Rs.22806.10, Rs.22806.10 and Rs.27706.10 in group II and Rs.27493.60, Rs.27493.60 and Rs.29173.60 in group III in the same order. While analysing the figures size-group wise, it could be seen that the cost of cultivation per hectare of ginger based on cost A, cost B and cost C vary significantly on these size groups. The cost A and cost B increased with increase in size of holdings. The difference in cost A between the groups was mainly because of higher cost of hired labour in group II and group III. The difference in cost C between these groups was also due to difference in utilization of hired labour. For group II per hectare cost of cultivation on cost C basis was lowest. This could be explained by relatively lower expenditure incurred on manures and chemical fertilizers in this group.

Inputwise cost of cultivation

The inputwise cost of cultivation of ginger was

Table 7.1. Cost of cultivation of ginger with reference to different cost concepts (in Rs./ha)

Items	Holding size groups			Aggregate
	Group I	Group II	Group III	
Hired human labour	2220.00	7300.00	10000.00	4360.00
Seeds	9282.00	9441.00	10251.00	9394.00
Manures	2802.00	2635.00	3454.00	2788.90
Fertilizers	1683.00	1313.00	1485.70	1552.00
Plant protection chemicals	900.60	860.80	783.60	880.40
Land revenue	25.00	25.00	25.00	25.00
Interest on working capital	971.20	1231.20	1494.00	1087.80
Cost A	17883.80	22806.10	27493.60	20088.10
Cost B	17883.80	22806.10	27493.60	20088.10
Imputed value of family labour	11600.00	4900.00	1680.00	8800.00
Cost C	29483.80	27706.10	29173.60	28888.10

worked out and presented in Table 7.2. Human labour is the largest single item of expenditure in all size groups. From the table it is clear that human labour accounts for 45.56 per cent of the total cost and the share of human labour to total cost steadily declined with increase in size of holding. For group I (smallest) the percentage share of human labour was 46.87 per cent, 44.04 per cent for group II (medium) and for group III (largest) 40.04 per cent. The percentage share of family labour out of total labour was 83.90 per cent, 40.16 per cent and 14.38 per cent respectively for the first, second and third groups. The shares of hired labour were 16.07 per cent, 59.84 per cent and 85.62 per cent for group I, group II and group III respectively. Level of use of the family labour was the highest for the smallest size holdings (group I) resulting in high labour cost in this class. The actual days of labour employed was 368, 325, 311 and 350 mandays per hectare respectively for the first, second, third groups and for the whole sample respectively. The second largest single item of expenditure was seed. The percentage share of seed in the total cost was 31.48 per cent, 34.08 per cent and 35.14 per cent respectively in the first, second and third size groups, while it was 32.52 per cent for the sample as a whole. The relatively higher expenditure on seed for group III is due to higher

Table 7.2. Inputwise cost of cultivation of ginger (in Rs./ha)

Item	Group I	Group II	Group III	Aggregate
Human Labour	13820.00 (46.87)	12200.00 (44.04)	11680.00 (40.04)	13160.00 (45.56)
a) Family labour	11600.00	4900.00	1680.00	8800.00
b) Hired labour	2220.00	7300.00	10000.00	4360.00
Seeds	9282.00 (31.48)	9441.00 (34.08)	10251.00 (35.14)	9394.00 (32.52)
Manures	2802.00 (9.51)	2635.00 (9.51)	3454.30 (11.84)	2788.90 (9.66)
Fertilizers	1683.00 (5.71)	1313.00 (4.74)	1485.70 (5.09)	1552.00 (5.37)
Plant protection chemicals	900.60 (3.06)	860.80 (3.11)	783.60 (2.69)	880.40 (3.05)
Interest on working capital	971.20 (3.29)	1231.20 (4.44)	1494.00 (5.12)	1087.80 (3.77)
Land revenue	25.00 (.085)	25.00 (.090)	25.00 (.086)	25.00 (.087)
Total cost	29483.80	27706.10	29173.60	28888.10

Figures in parentheses show percentages to the total

seed rate practiced by them. Ginger crop requires heavy manuring and this is the third largest single item of expenditure. The share of manure in the total cost was 9.51 per cent, 9.51 per cent and 11.84 per cent respectively for the first, second and third size groups while it was 9.66 per cent for the sample as a whole. The absolute amounts were comparable in the first two groups while it was much high for the third group. Fertilizer and plant protection chemicals were other important items of expenditure. The share of fertilizers in the total cost was 5.71 per cent, 4.74 per cent and 5.09 per cent respectively for group I, group II and group III while it was 5.37 per cent for the aggregate sample. Ginger crop in the study area is severely infested with soft rot disease so majority of farmers practice seed treatment and regular spraying. The share of plant protection chemicals in the total cost was 3.06 per cent, 3.11 per cent and 2.69 per cent for group I, group II and group III respectively while it was 3.05 per cent for the sample as a whole.

Operation wise cost of cultivation

The distribution of total cost of cultivation of ginger per hectare according to various operations involved in the cultivation was computed and presented in Table 7.3. Total operating cost was Rs.28863.10 per hec-

tare. Seeds and sowing constituted the highest cost per hectare which accounted for 34.46 per cent of total cost followed by fertilizers, manures and manuring for 16.41 per cent, preparatory cultivation 13.85 per cent, harvesting 12.46 per cent, weeding and earthing up 10.80 per cent and mulching 4.43 per cent. Interest on working capital account for 3.77 per cent of the total cost of cultivation. The remaining 0.087 per cent was contributed by land revenue. While examining the data size-groupwise, it was revealed that cost of preparatory cultivation per hectare was higher in smallest size holdings. This was because land preparation had been given better attention in small holdings. Seed and sowing cost per hectare was highest for group III because of the better seed rate followed in the largest size holdings. The cost of fertilizers manures and manuring shows that group III (largest size holdings) incurred more expenditure in this operation compared to other two groups. The expenditure on plant protection chemicals shows higher use of it by group I (smallest size holdings). This group also incurred more expenditure in weeding and earthing up and mulching operations. The expenditure incurred on mulching is almost double for group I compared to group II (largest size holdings). Mulching cost is accounted by labour involved in the operation which in turn depends on availability of

Table 7.3. Operationwise cost of cultivation of ginger (in Rs./ha)

Name of operations	Group I	Group II	Group III	Aggregate
Preparatory cultivation	4160.00 (14.11)	4000.00 (14.43)	3920.00 (13.44)	4000.00 (13.85)
a) Digging and land preparation	1840.00	1800.00	1920.00	1820.00
b) Bed and terrace formation	2320.00	2200.00	2000.00	2180.00
Seed and sowing	9842.00 (33.38)	10041.00 (36.24)	10811.00 (37.06)	9954.00 (34.46)
Fertilizer, manures and manuring	4885.00 (16.57)	4348.00 (15.69)	5380.00 (18.44)	4740.90 (16.41)
Plant protection	1100.60 (3.74)	1020.80 (3.69)	943.60 (3.23)	1080.40 (3.74)
Weeding and earthing up	3200.00 (10.85)	2400.00 (8.67)	2200.00 (7.54)	3120.00 (10.80)
Mulching	1400.00 (4.75)	1160.00 (4.19)	860.00 (2.96)	1280.00 (4.43)
Harvesting and cleaning	3900.00 (13.23)	3480.00 (12.56)	3540.00 (12.13)	3600.00 (12.46)
Interest on working capital	971.20 (3.29)	1231.20 (4.44)	1494.00 (5.12)	1087.80 (3.77)
Land revenue	25.00 (.085)	25.00 (.090)	25.00 (.086)	25.00 (.087)
Total cost	29483.80	27706.10	29173.60	28888.10

Figures in parentheses show percentages to the total

mulch material. This may be the reason for large variation in cost in this operation. Harvesting and cleaning operation is another important item of expenditure. Here the absolute figures are comparable in group II and group III while it is higher in group I.

Production and value of output

The output and value of ginger on per hectare basis is given in Table 7.4. The average yield of ginger were 13107.46 kg, 14437.36 kg, 17078.22 kg and 13785.08 kg respectively for the size group I, II, III and for the aggregate. Correspondingly the values per hectare were Rs.65537.30, Rs.72186.80, Rs.85391.10 and Rs.68925.40. The yield of ginger showed that there is a direct relation existing between the size of holding and yield per hectare. This may be due to better utilization of resources especially following better seed rate and manuring by larger holdings. The lower yield in the first two size group can be attributed to inadequate attention to plant protection aspects. Though the farmers in this group had incurred higher cost in plant protection, they do not give sufficient attention to seed treatment and preventive spraying is not done in most cases. Another reason for the lower yield in this size group may be due to the fact that

Table 7.4. Output and value of ginger

Size group	Output/ha kg	Value/ha Rs.
Group I	13107.46	65537.30
Group II	14437.36	72186.80
Group III	17078.22	85391.10
Aggregate	13785.08	68925.40

ginger is not grown as a pure crop resulting in shade in the field.

Cost of production per tonne of ginger

Cost of production per tonnes of ginger was obtained by dividing cost of cultivation by yield in tonnes per hectare. Estimates of cost of production of ginger according to different cost concept are presented in Table 7.5. The average cost of production of ginger on the basis of cost A, cost B and cost C were Rs.1467.80, Rs.1467.80 and Rs.2119.60 respectively. They were Rs.1382.50, Rs.1382.50 and Rs.2267.30 in group I, Rs.1598.00, Rs.1598.00 and Rs.1939.00 in group II and Rs.1622.40, Rs.1622.40 and Rs.1717.45 in group III. Inverse relationship between cost of production per tonne and size of holding exists, on account of the direct relationship between size of holding and yield.

Input-output ratio

Input-output ratio indicates value of output per rupee of input cost. This gives an idea of returns per rupee invested. Thus the ratio will serve as a measure which would indicate as to whether the cost incurred is commensurate with the returns obtained. Input-output ratio of ginger is given in Table 7.6. Returns generated from a

Table 7.5. Cost of production of ginger (Rs./tonne)

Particulars	Size group			
	Group I	Group II	Group III	Aggregate
Cost A	1382.50	1598.00	1662.40	1467.30
Cost B	1382.50	1598.00	1662.40	1467.30
Cost C	2267.30	1939.00	1717.45	2119.60

Table 7.6. Input-output ratio of ginger based on different cost concepts

Input-output ratio based on	Size group I	Size group II	Size group III	Aggregate
Cost A	3.66	3.16	3.11	3.43
Cost B	3.66	3.16	3.11	3.43
Cost C	2.22	2.61	2.93	2.39

rupee invested was found to be greater than one in all cases. Input-output ratio for the sample as a whole showed that a rupee invested returned Rs.3.43, Rs.3.43 and Rs.2.39 based on cost A, cost B and cost C respectively. A clear cut direct relationship exists between input-output ratio at cost C and size of holding, mainly due to the direct relationship between holding size and yield.

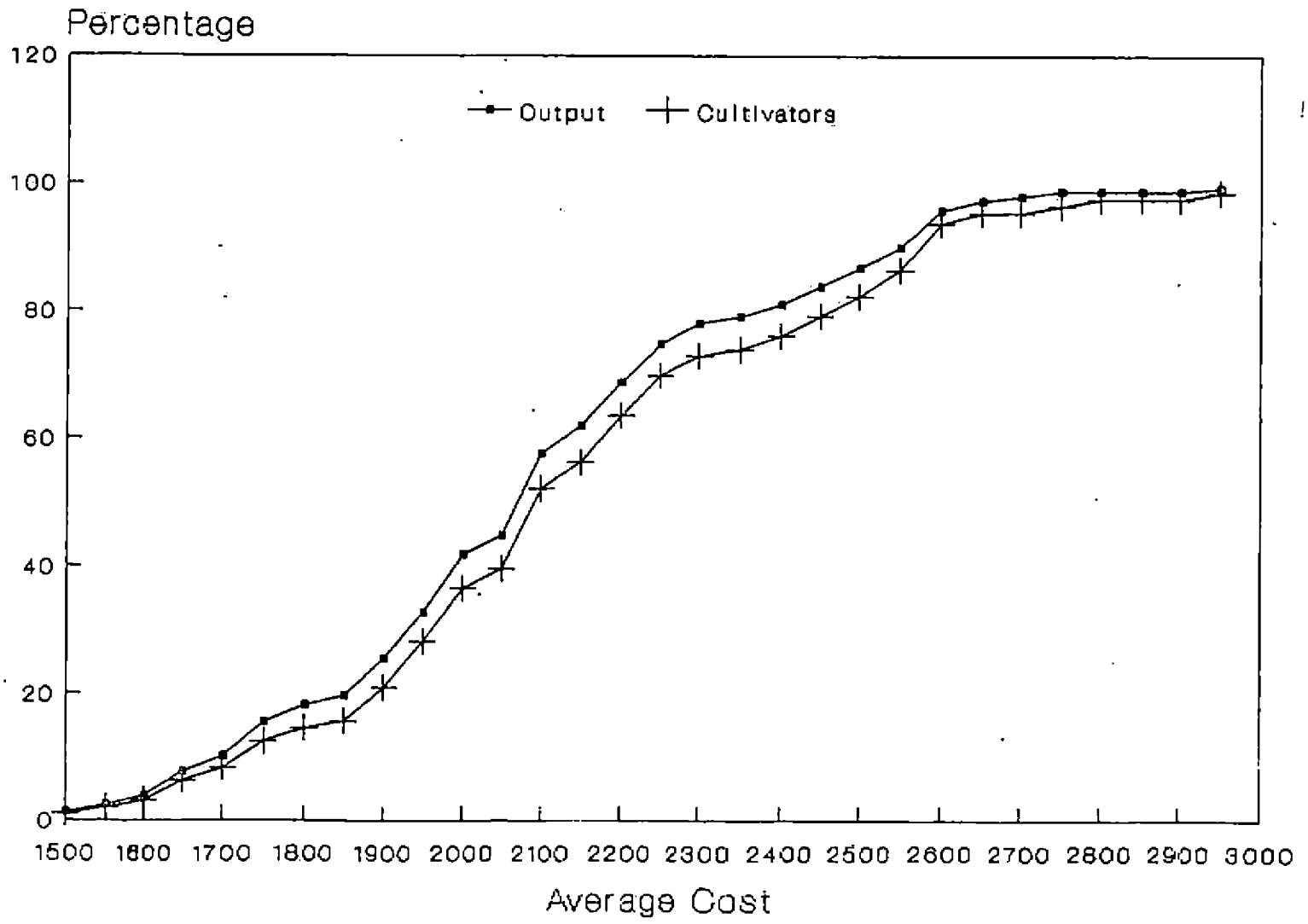
Bulkline cost

Bulkline cost of production is that cost which covers cost of production of the majority of farmers, production or area (Kahlon and Tyagi, 1983). In the case of price support, the price fixing authorities generally attempted to fix the price sufficiently high so as to cover the cost of production from 80 per cent to 90 per cent of the supply and refer to them as bulkline producers. Average cost per tonne on cost C basis was analysed in ascending order and cost at which 85 per cent of total output was supplied was selected as bulkline cost. Bulkline cost of ginger has been worked out and presented in Table 7.7. It was estimated at Rs.2500/tonne. The bulkline output was supplied by 83 per cent of the cultivators.

Table 7.7. Bulkline cost of ginger

Average cost per tonne (1)	Percentage of total output supplied (2)	Percentage of cultivators producing at cost indicated under (1) and (2)
Upto 1500	1.29	1.04
1550	2.51	2.08
1600	3.86	3.12
1650	7.66	6.25
1700	10.08	8.33
1750	15.49	12.49
1800	18.23	14.58
1850	19.62	15.62
1900	25.39	20.83
1950	32.56	28.12
2000	41.69	36.45
2050	44.75	39.58
2100	57.61	52.08
2150	61.95	56.25
2200	68.80	63.54
2250	74.69	69.79
2300	77.96	72.91
2350	79.13	73.95
2400	81.06	76.03
2450	83.84	79.16
2500	86.71	82.29
2550	89.99	86.45
2600	95.72	93.75
2650	97.24	95.30
2700	97.90	95.30
2750	98.72	96.43
2800	98.72	97.47
2850	98.72	97.47
2900	98.72	97.47
2950	99.34	98.51
....	...	...
....	...	...
3550	100.00	100.00

Fig 7.1 Bulkline cost curve



Measures of efficiency

Income measures in relation to various cost concepts were worked out. The profitability of crop production can be judged better from the income measures. Farm business income or profit at cost A in the three groups were Rs.51041.60, Rs.49380.70 and Rs.57897.80 respectively. The income for group III was 13 per cent (Rs.6856.20) more than income for group I. Family labour income or profit at cost B was worked out as gross income minus total expenses of production, excluding inputed wages of unpaid family labour. The profitability of the crop could be judged better from net income. The net income or profit at cost C is calculated as the gross income minus total expenditure on production. The net income was highest for group III and was 56 per cent (Rs.20164) more than net income for group I. Income measures revealed a direct relationship existing between income and size of holding. This increasing trend in income could be explained by the direct relation between yield and holding size. Income measures in relation to different cost concepts is given in Table 7.8.

Resource use efficiency

Production function analysis was used as an analytical tool to study the resource use efficiency. This

Table 7.8. Income measures in relation to different cost concepts

Particulars	Size group			
	Group I	Group II	Group III	Aggregate
1. Farm business income	51041.60	49380.70	57897.80	48837.30
2. Family labour income	51041.60	49380.70	57897.80	48837.30
3. Net income	36053.50	44480.70	56217.50	40037.30

will provide a guideline to the farmers to operate at the least cost combination and to get maximum profit. The efficiency of each input can be studied from the production function analysis by deriving marginal productivities or elasticities of those resources.

In this study Cobb-Doughlas production function was applied for studying the relationship between output and various input variables used. Cobb-Doughlas production function is most frequently used in agriculture since it is the best method of measuring the nature of resources in agriculture and it allows deminishing marginal produtivity, increasing or decreasing return to scale. The choice of the function is also based on its computation managibility. The function has been estimated by applying ordinary least square technique.

The majority of farmers (98 per cent) in the sample comes under the category of small and marginal farmers with total holding size less than 2 hectares. So a single production function was fitted for the whole sample.

The specification of the function is given below:

$$\text{Log } Y = \text{Log } a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + U$$

where Y = value of output in rupees

X_1 = area in cents

X_2 = Expenditure on seed (rupees)

X_3 = Expenditure on plant protection chemicals (rupees)

X_4 = Expenditure on manures (rupees)

X_5 = Expenditure on chemical fertilizers (rupees)

X_6 = Expenditure on human labour (rupees)

From the production function, coefficient of multiple determination (R^2), the F ratio, regression coefficient, their standard error and their t values are determined. They are given in Table 7.9.

The coefficient of multiple determination is 0.96 implying that 96 per cent of variation in the output could be explained in terms of variation in the independent variables.

The estimated regression coefficient (b_i) of independent variables are the production elasticities of the respective factors (x_i). The regression coefficient b_i indicate the percentage change by which the output Y would change if input x_i changes by one unit while all other factors remain constant at the geometric mean level.

The result of the study showed that the elasticity

Table 7.9. The regression coefficients of output in various inputs, standard error of regression coefficient and t values in the model fitted

	Regression coefficient	Standard error	't' values
X_1	0.3060	0.3184	0.961
X_2	0.5306	0.2506	2.117*
X_3	0.0344	0.0275	1.249
X_4	0.1361	0.0443	3.072*
X_5	0.0723	0.0320	2.259*
X_6	-0.0581	0.2512	0.232

* Significant at 5 per cent level of probability

coefficient for the input human labour was found negative. The rest of the coefficients had positive sign indicating the positive effect on total output. The negative regression coefficient of human labour indicated that labour use is in excess and cut in this expense will add to the net returns (Y). The seed rate, manures and chemical fertilizers had positive and significant influence in output.

Returns to scale

The returns to scale imply the behaviour of the change of total returns when all the inputs are changed simultaneously in the same proportion and is indicated by the sum of the individual elasticities of various factors included in the Cobb-Doughlas function. The sum of elasticities was 1.0213 which does not differ significantly from unity indicated constant returns to scale.

Marginal produtivities of input

Marginal productivity is the measure of the increase in total product, for the addition of one unit of particular resources above its mean level while other resource are held constant at their respective mean level. Marginal value product is the marginal physical product expressed in value terms. In the present study all the inputs in physical term except land were changed in to

values. Therefore, marginal value products and marginal value productivity ratios at factor cost have the same value except for land.

Marginal value products and marginal value product to factor price ratio can be seen from Table 7.10. A negative marginal value product of human labour showed that this factor was used in excess quantities. Seed manure chemical fertilizer, plant protection chemicals were used at less than desired level. The marginal value product and factor price ratio indicate that on investment of additional rupee in each input will yield an additional return worth Rs.4.16, 4.10, 4.08 and 3.94 from manures, chemical fertilizers, plant protection chemicals and seed respectively.

From this input-output relationship it can be concluded that the variables considered in the production function have significant impact on the output, but these were not used efficiently and judiciously because, out of six inputs considered in the above production function, there was an over investment of one input and under investment on the rest. Reallocation should be considered for increasing the output with the given level of technology and fixed resources.

Table 7.10. Marginal value products ($MVPX_1$) and marginal value products and factor price ($MVPX_i/PX_i$) ratio

Variables	$MVPX_i$	$MVPX_i/PX_i$
X_1	85.05	-
X_2	3.94	3.94
X_3	4.10	4.10
X_4	4.16	4.16
X_5	4.08	4.08
X_6	-0.309	-0.309

Marketing of Ginger

MARKETING

Marketing is as critical to better performance in agriculture as farming itself and should be treated with equal care. Effort to increase production may go waste unless the product is efficiently marketed. Marketing should therefore be rightly considered as much an essential aspect like good seeds and fertilizers in modern agriculture. Marketing system as a whole is divided in to three broad segments viz., producers, consumers and middleman, each with apparently conflicting interests. Producer-farmer wants the marketing system to purchase the product without loss of time and provide the highest possible price. Consumer interest is to get required quantities of goods of proper quality at lowest possible price while middlemen aim at realizing maximum profit from the deal. As all these groups are indespensible to the society, an efficient marketing system ought to aim at balancing this apparently conflicting interests in such a way that each segment will get a fair deal.

Ginger is a cash crop and it is mainly grown for the purpose of sale. It is traded in different forms, ie., green form, pickled or preserved and dried. The rhizome gets ready for use after a certain period of growth. The

duration of crop depends mainly on variety, cultural practices and agroclimatic condition of the area. The harvesting of the crop is carried out in stages especially where it is sold as green for spice as such. For the preparation of preserves or pickles it is harvested at an early stage. The crop gets ready for harvest as green ginger five months after planting. For dry ginger, a growth period of about seven to eight months is allowed. After harvesting, the rhizomes are cleaned, roots are removed and given a light drying in the sun before being marketed as green ginger.

In Kerala bulk of the produce is traded in dry form and it is a major source of dry ginger in the international market. For curing rhizomes are freed from roots and soil particles and washed in water. The skin is then removed using sharpened bamboo poles or coconut shell. The peeled ginger is then spread out uniformly in a clean mat and allowed to dry for seven to nine days. When the rhizomes break even drying is considered complete.

In the present study an attempt has been made to identify the important marketing channels and to analyse the marketing efficiency on the basis of marketing margins. The difference in price paid by the consumer and price received by the producer for an equivalent quantity

of farm product is termed as marketing margin and it includes marketing costs and net margins of intermediaries. As already mentioned, an efficient marketing system will avoid unnecessary cost and provide a balanced share in margin.

Ginger in the study area is mostly traded in dry form. The Thodupuzha ginger which in trade parlance known as Cochin ginger is of export quality. The curing is done on contract basis and charges vary from Rs.2 to Rs.4 per 11 kg of green ginger. In the Thodupuzha area curing charges are on the lower side because drying can be carried out easily due to availability of exposed rocky terrain. Kattappana and Thodupuzha are the important assembling centres in the study area. The general pattern of marketing is that producers bring the produce to the primary market and sell it to village merchants. Rates are settled between the producers and village merchant based on the moisture content of the produce, which is estimated by village merchant from his experience. Generally village merchants have upper hand in settling the price. When substantial stocks are accumulated, the commodity is carried to main assembling centres. Another practice prevalent in the area is agents of wholesalers coming in direct contact with farmers and procuring the produce. The price prevailing in Cochin market is taken into account

for fixing the price to be paid to the farmers. The growers and dealers ascertain the market prices from newspapaers and All India Radio broadcast. Ginger from the assembling centres moves to different places. It was found that large quantities of ginger from Thodupuzha were transported to Bombay and Bangalore for the extraction of oil and oleoresins. The demand from these quarters will also influence the market price.

Marketing channels

Marketing channels are routes through which produce moves from producers to consumers. Ginger is traded in dry and green form. The marketing channel identified are given below:

For green ginger

Producer - Retailer - Consumer

Producer - Wholesaler - Retailer - Consumer

Producer - Commission agent - Wholesaler - Retailer - Consumer

Producer - Village merchant - Commission agent - Wholesaler - Retailer - Consumer

For dry ginger

Producer - Village merchant - Commission agent - Wholesaler - Secondary wholesaler/retailer - Consumer

Producer - Village merchant - Commission agent - Exporter

Producer - Wholesaler - Retailer - Consumer

Among the channels identified, the producer - village merchant - commission agent - wholesaler - secondary wholesaler/retailer - consumer was found to be the most important.

Distribution of the farmer respondent according to the type of buyer is given in Table 8.1. As much as 81 per cent of the sample farmers sold their produce to village merchants, 8 per cent to wholesalers through commission agents, 6 per cent to wholesalers and 4 per cent to retailers. Local village merchant has a prominant role in ginger marketing. This is because of the reason that it will be uneconomical for the marginal farmers to take their produce to assembling centres. The transportation cost incurred did not fall in proportion to quantity transferred. In other words, the transportation cost to the assembling centres did not vary very much relating to whether farmers transported 50 kg or 100 kg of the produce. So the farmers sell the produce to village merchant even though the price offered by them is lower than that of wholesalers in the assembling centres.

Marketing efficiency

Ginger marketing in the state is mainly under

Table 8.1. Distribution of farmer respondent according to type of buyer

Product sold to	Dry ginger	Green ginger	Total
Village merchant	12	66	78 (81.25)
Wholesaler	4	2	6 (6.25)
Wholesaler through commission agent	-	8	8 (8.34)
Retailer	-	4	4 (4.16)
Total	16	80	96 (100.00)

Figures in parentheses show percentages to total

private agencies. A few Co-operative marketing societies have been established but the quantity of ginger handled by them is very samll.

In this study average prices received by the ginger growers are compared with prices prevailing in the assembling centres, viz., Kattappana, Thodupuzha and Cochin. For green ginger which is also traded in vegetable market, price prevailing in the wholesale and retail vegetable market is also taken note of. Marketing cost and margin are calculated and presented in Table 8.2.

In the marketing of dry ginger producer sale price formed 62 per cent of the retail price. The corresponding share in the green ginger trade was 57 per cent. The combined net margins of the village merchants, wholesalers and secondary wholesaler/retailers in dry ginger trade come to 19.6 per cent of the consumer price. The maximum margin was taken by retailer (12.5 per cent) followed by village merchant (3.7 per cent) and wholesaler (3.4 per cent). In the green ginger trade also the maximum net margin went to retailer (13.7 per cent) followed by village merchant (4.9 per cent) and wholesaler (4.5 per cent). There combined net margins come to 23.1 per cent of consumer rupee. The marketing cost incurred by these intermediaries are low. So it was evident the middlemen

Table 8.2. Marketing margin and cost for dry ginger and green ginger

Sl. No.	Shares	Dry ginger	Percent-age	Green ginger	Percent-age
1.	Producers sale price or price paid by village merchant	1750	62.01	500	57.10
2.	Processing charges	125	4.43		
3.	Cost incurred by producer	50	1.70	60	6.80
4.	Net price received by producers	1575	55.85	440	50.20
5.	Cost incurred by village merchant	60	2.10	70	8.00
6.	Commission charges paid by village merchant	45	1.50	6.60	0.75
7.	Village merchants net margin	105	3.70	43.40	4.90
8.	Price received by village merchant or price paid by wholesaler	2250	7.90	620	70.80
9.	Cost incurred by wholesaler	62	2.10	20	2.20
10.	Net margin of wholesaler	98	3.40	40	4.50
11.	Price received by wholesaler or price paid by retailer/ secondary wholesaler	2400	85.10	680	77.70
12.	Cost incurred by retailer	65	2.30	75	8.50
13.	Net margin taken by retailer/secondary wholesaler	355	12.50	120	13.70
14.	Retailer sale price or price paid by consumer	2820	100.00	875	100.00

took away substantial share of the consumer rupee. The producers net share in consumer price was 55.85 per cent for dry ginger and 50.20 per cent for green ginger.

Production and marketing problems of ginger growers

Ginger growers in the study area are facing many difficulties both in the production and marketing front. Here an attempt is made to analyse the major problems of ginger growers.

Problems in production

Ginger is an annual crop and mostly cultivated by small and marginal farmers. Non availability of good planting materials in sufficient quantities, lack of scientific know-how among farmers, incidence of diseases especially soft rot, failure of monsoon rains, non availability of mulch materials and unscientific post harvest operation are the major problems facing the ginger growers.

In ginger cultivation as in any other crop, selection of proper planting materials is important. There is wide variation in the yield for different varieties. For eg. the average per hectare yield of Kuruppampadi is only 9571 kg where as that of Nadia is 28,554 kg. Most of the farmers in the study area pay little attention in the

selection of rhizomes. They usually cultivate local varieties which yield less because of non availability of good planting materials in sufficient quantities. This may be one of the reasons for farmers sticking to the traditional ones.

In the hilly areas ginger is cultivated in the slopes. After harvesting the rhizomes, the field is left as such. The loose soil in the slopes is thus subjected to heavy erosion resulting in lose of fertility. The continuous erosion year after year will make the field unsuitable for cultivation.

Ginger is susceptible to various types of diseases and pests causing considerable damage. Rhizome rot or softrot disease is widely prevalent in the study area causing considerable damage. In some cases loses of more than fifty per cent have been reported. The leaf spot is the other common disease prevalent in the study area.

Mulching is an important operation for the ginger cultivation. The mulching is done once or twice depending on the availability of mulch material. Mulching helps in the conservation of water and germination of seed rhizomes. In hilly areas mulching has greater significance as it helps in preventing erosion. The non availability of mulch material is another important problem. Often the

farmers have to walk long distances to collect mulch materials.

In Idukki ginger is grown as rainfed crop and irrigation facilities hardly exists. Therefore absence of rains particularly during planting season would result in considerable loses of crops.

Another important problem facing the ginger growers is in the storage. After harvesting rhizomes are sold either as green or processed in to dry ginger. Green ginger is perishable where as dry ginger can be stored for long periods. Ginger growers in the study area lack clean, dry spacious storage places. They usually store the produce in the corners of the rooms and is susceptible to pests and diseases and deterioration in quality. Lack of good storage structures forces the producers to sell their produce immediately after harvest resulting in lower prices to their produce.

Farmers in general lack scientific knowledge regarding new technology of cultivation. They do not follow proper seed rate and little attention is paid to seed treatment, split application of fertilizers, processing and cleanliness in storage.

Problems in marketing

The instability in prices is identified as the first and foremost problem. Ginger prices fluctuate widely from year to year and also with in a season as is evident from Table 8.3. Accumulation of unsold stock, mainly due to over production and consequent fall in price sometimes, even below the economic level are common problem in ginger trade. The instability in prices adversely affect the producers most of them marginal and small farmers.

In the marketing of ginger it was evident that substantial share in the consumer price was taken away by intermediaries. There is no proper marketing facilities or system available to farmers. This is one of the reasons which forced them to depend on village merchants.

Transportation is a major problem in hilly areas. Jeeps are the chief mode of transport. The cost incurred by the farmers for transportation bears no relation with the quantity transferred. Regardless whether the quantity transported is 50 kg or 100 kg the transportation cost is same. So farmers are forced to depend on local village merchants who after accumulation of sufficient stock transport them to wholesalers.

The other problems include, lack of scientific

Table 8.3. Monthly average prices of ginger at important markets in India
(Price: Rs./kg)

Month	1985-86 Cochin (U.B)	1986-87 Cochin (U.B)	1987-88 Cochin (U.B)	1988-89 Cochin (U.B)	1989-90 Cochin (U.B)	1990-91 Cochin (U.B)	1991-92 Cochin (U.B)	1992-93 Cochin (U.B)
April	20.81	8.94	15.56	20.50	22.10	27.88	27.50	22.25
May	20.25	8.15	14.30	18.19	21.50	28.56	24.25	22.05
June	22.10	7.94	14.64	17.38	20.94	29.10	25.90	20.81
July	20.19	8.09	13.00	16.83	23.69	29.56	26.48	22.10
August	17.33	7.20	16.93	16.00	23.50	29.69	28.06	26.60
September	14.47	10.44	18.72	13.69	22.81	29.37	28.00	33.16
October	13.69	12.91	17.75	12.60	23.00	30.09	25.18	32.85
November	11.83	11.50	15.53	12.71	21.70	32.81	24.75	29.25
December	10.22	12.66	15.81	11.85	24.36	28.25	24.00	31.25
January	9.72	14.93	14.67	17.13	22.13	24.75	21.75	27.00
February	9.16	16.56	21.94	21.56	21.13	22.37	20.71	23.75
March	8.79	13.59	20.34	22.19	24.05	27.00	21.75	23.16
Average	14.88	11.08	16.60	16.72	22.58	28.29	24.91	26.19

U.B - Unbleached

Source: Offices of Directorate of Marketing & Inspection, Ministry of Agriculture

storage facilities at the village level, poor bargaining power of farmers, lack of grading at the producers level, and lack of holding power of the producers due to their poor financial position. All this leads to lower price for the producer making their economic health miserable.

Summary

SUMMARY

The present study on production and marketing of ginger was undertaken in Idukki district during the year 1992-93. The major objectives of the study were to examine the past trends in production, estimation of cost of cultivation, cost of production, resource use efficiency, marketing cost and margins and to identify the marketing channels. The study also examines major constraints in production and marketing of ginger.

The study is based on both primary as well as secondary data. Secondary data on area, production and productivity of ginger was obtained from Directorate of Economics and Statistics, Thiruvananthapuram. Primary data is collected from a sample of farmers. Multistage random sampling was adopted for the selection of farmers and data were collected by personal interview method with the help of a well structured interview schedule. Farmers thus selected are classified in to three groups based on their area under ginger crop. They are group I with area less than 0.2 ha, group II with area between 0.2 ha and 0.8 ha and group III with area above 0.8 ha. Information regarding marketing were collected from traders using another well structured interview schedule.

group II and Rs.27493.60, Rs.27493.60 and Rs.29173.60 for group III.

The input wise cost of cultivation per hectare of ginger showed that human labour was the largest single item of expenditure accounting for 45.60 per cent of total cost. The percentage shares of family labour and hired labour in total labour cost were 66.90 per cent and 33.10 per cent respectively. Seed is the second largest item of expenditure accounting for 32.50 per cent. The other important items of expenditure were manures and chemical fertilizers and plant protection chemicals. Group wise analysis revealed that group III (large size holdings) incurred more expenditure on seeds and manures. The level of use of family labour was highest for smallest size holding (group I) resulting in high labour cost in that group.

The operation wise cost of cultivation of ginger per hectare showed that seed and sowing constituted the highest cost per hectare accounting for 34.46 per cent of total cost followed by fertilizers, manure and manuring for 16.41 per cent, preparatory cultivation 13.85 per cent, harvesting 12.46 per cent, weeding and earthing up 10.80 per cent and mulching 4.43 per cent. Group wise analysis revealed that group III (large size holdings) incurred the highest expenditure in sowing and manuring.

The trends in area production and productivity of ginger in the state as well as in Idukki district were examined. Ginger production in the state has shown an increasing trend during 1962-63 to 1990-91 period. The decomposition analysis carried out to partition out the relative contribution of area and productivity indicated that rise in production was mainly due to increase in productivity with area playing a complementary role. Linear and quadratic functions were fitted to examine the growth rate. Both the functions could satisfactory explain the movements in area, production and productivity. However, linear function forms better fit for explaining movements in production and productivity. Idukki also recorded increase in area, production and productivity during 1978-79 to 1991-92 period. Decomposition analysis revealed that contarary to what has happened in the state, increase in area was mainly responsible for the rise in production with productivity playing significant role especially during the final years under study.

The average costs of cultivation per hectare of ginger based on cost A, cost B and cost C were Rs.20088.10, Rs.20088.10 and Rs.28888.10 respectively. They were Rs.17883.80, Rs.17883.80 and Rs.29483.80 for group I. Rs.22806.10, Rs.22806.10 and Rs.27706.10 for

The average yield of ginger was 13783.08 kg/ha. Group wise analysis showed that per hectare yields of ginger were 13107.46 kg, 14437.36 kg and 17078.22 kg respectively for group I, group II and group III, showing a clear cut direct relationship between size and yield.

Costs of production per tonnes of ginger based on cost A, cost B and cost C were Rs.1467.30, Rs.1467.30 and Rs.2119.60 respectively. They were Rs.1382.50, Rs.1382.50 and Rs.2267.30 for group I, Rs.1598.00, Rs.1598.00 and Rs.1939.00 for group II and Rs.1662.40, Rs.1662.40 and Rs.1717.45 for group III. There exist an inverse relationship between cost of production per tonne and size of holding on account of direct relationship between holding size and yield.

Input-output ratio for ginger showed that returns generated from a rupee invested were always greater than one. One rupee invested returned Rs.3.43, Rs.3.43 and Rs.2.39 on the basis of cost A, cost B and cost C respectively.

Bulkline cost per tonne of ginger on cost C basis was Rs.2500. This was the cost at which 86 per cent of total output was supplied by 83 per cent of the cultivators.

Farm business incomes or profit at cost A were Rs.5104.60, Rs.49380.70 and Rs.57897.80 for group I, group II and group III respectively. Family labour income or profit at cost B is also the same. Net income or profit at cost C for the three groups were Rs.36053.50, Rs.44480.70 and Rs.56217.50 respectively, indicating a direct relationship with holding size.

Production function was used as an analytical tool to study the resource use efficiency. The independent variables considered are area in cents, cost of seeds, cost of plant protection chemicals, cost of manures, cost of chemical fertilizers and expenditure on human labour. These independent variables could explain 96 per cent of variation in the output. The regression analysis revealed that seed rate, manures and chemical fertilizer had positive and significant influence on output. The elasticity coefficient for human labour was negative indicating that total income responded negatively to increase in this input. The marginal value product to factor cost ratio revealed that seeds, manures, chemical fertilizers and plant protection chemicals were used at less than the optimum level. Investment of an additional rupee will yield additional returns worth Rs.4.16, Rs.4.10, Rs.4.08 and Rs.3.94 from manures, chemical fertilizers, plant protection chemicals and seeds respectively.

Ginger in the study area is mostly traded in dry form. Drying is undertaken either by the village merchant (first buyer) or by growers themselves. Out of the total sample farmers 81 per cent sold their produce to village merchants. The most important marketing channel identified for both dry and green ginger was

Producer - Village merchant - Commission agent - Wholesaler - Secondary wholesaler/retailer - Consumer.

In the case of dry ginger producer sale price formed 62 per cent of the retail price. The corresponding share in the green ginger trade was only 57 per cent. The combined net margin of intermediaries were 19.6 per cent of the consumer rupee in dry ginger trade while it was 23.3 per cent in green ginger.

The major problems facing the ginger growers in the study area are non-availability of good planting materials in sufficient guantities, lack of scientific know-how among farmers, incidence of diseases especially soft rot, failure of monsoon rains, non-availability of mulch materials, unscientific post harvest operations and price/supply fluctuations.

Recommendations

1. A number of varieties are under cultivation in study area. Most of them are local ones with poor yield and susceptible to pests and diseases. Therefore, there is urgent need to develop disease resistant high yielding varieties suitable for hilly areas. The existing improved varieties released by research stations and those introduced from foreign countries are not available to farmers in sufficient quantities. So efforts should be made to supply good quality planting materials to farmers in sufficient quantities and at proper time. For this Agricultural Department should establish seed farms for the multiplication and supply of good quality rhizomes.

2. Ginger in the study areas is mostly traded in dry form. All the varieties are not suitable for drying. So farmers should be made aware of this aspect.

3. Soft rot disease prevalent in the study area is causing large scale distruction. Measures should be taken to educate farmers about the disease and control measures to be taken. Seed treatment and preventive spraying will help in long way to control the disease.

4. Farmers in general lack scientific know-how regarding site selection, proper manuring, processing and cleanliness in storage. So every effort should be made to recognise the importance of these aspects. Krishibhavan and Radio broadcast could play a significant role in extension activities.

5. In hilly areas transportation is a major problem. Green ginger being perishable, part of it is lost during handling, transportation and storage. Measures should be taken to reduce the wastage. Quick transportation will help in minimising the loss to a great extent. Both green ginger and dry ginger are packed in gunny bags. Aeration is an important consideration for green ginger. Suitable containers should therefore be developed for green ginger to minimise wastage.

6. For balancing the price fluctuation in ginger market the following steps could be considered.

   When supply exceeds demand, the state and central level co-peratives should enter the market and procure the excess supply.

   Agricultural Produce Market Act should be introduced in Kerala State. All important markets should be regulated and open auction in ginger be introduced.

Steps should be taken to boost export by product diversification and aggressive marketing stratagies. According to a survey conducted by Spices Board, the future out look for ginger products like ginger oil, ginger oleoresin, ginger powder is good.

7. Under the existing systems of marketing, a substantial share in the consumer rupee was taken away by intermediaries. So for increasing their returns producers should perform the assembling function themselves on co-operative basis by forming primary co-operative societies. This societies could also perform the function of storage and grading so that producers get a better return.

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Appendices

APPENDIX-I

Economics of production and marketing of ginger in Kerala with special reference to Idukki district

Date of interview:

I. Identification

1. Block
2. Panchayat
3. Ward
4. Name of the respondent
5. Address

II. Family details

Name	Sex	Age	Relation with	Literacy	Occupation/ activity		Annual income		
					Main	Subsidiary	Main	Sub	Others

III. Land holdings 1992-93

Total area owned

Total area leased in

Total area leased out

Net area operated

Number of fragments

Net cultivated area

IV. Cropping pattern during 1992-93

Name of the crop season	Area/plants	
	Total area/ No. of plants	Irrigated area/ No. of plants

V. Taxes

Land revenue

Water tax

Panchayat tax

Income tax

Others (specify)

VI. Irrigation details

Source	Net area	Irrigated area under	
		Ginger	Others
Canal			
Tank			
Well			
Others (specify)			
Hours required per irrigation of ginger plot			
Frequency of irrigation			
Total Number of months during which irrigation was undertaken			

VII. Implements and machinery

Item	Number	Year of purchase	Purchase price	Maintenance cost	Expected life
1. Ploughs					
2. Sprayers					
3. Dusters					
4. Mammattees					
5.					
6.					
7.					

VIII. Borrowing during 1992-93

Source	Purpose	Security	Amount availed	Amount repaid	Amount overdue	Terms	Remarks

IX. COST OF CULTIVATION OF GINGER IN 1992-93

Variety Area in cents Time of planting

Wage rate: Male : Female:

Sl. No.	Details of operation	Materials used		Labour												Total cost of labour	Total cost
				Hired						Family							
				Male			Female			Male			Female				
		Qty.	Value	No.	Hours	Cost	No.	Hours	Cost	No.	Hours	Cost	No.	Hours	Cost		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A.	Preparatory cultivation																
	Land clearing																
	Taking beds																
	Organic manure																
	Fertilizer																
B.	Planting																
	Preparation of seed material																

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Seed treatment																
	Planting																
	Mulching																
C.	Intercultural operation																
	Mulching																
	Hand weeding and earthing up																
	Fertilizer																
D.	Plant protection																
	Spraying and drenching																
E.	Harvesting																
	Harvesting																
	Cleaning																
	Sorting																
	Storing																

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
F. Processing																	
Washing																	
Cleaning																	
Peeling																	
Drying																	
Storing																	
G. Bleaching																	
Lime																	
Bleaching cost																	
Storing																	
Miscellaneous expenses																	
Rent on land																	
Hire charges																	
Marketing cost																	
Transportation cost																	
Labour cost																	

X. Production and Returns

Total production and price per unit	Green ginger
	Dry ginger
	Bleached
Total returns	

XI. Awareness and adoption of KAU recommendation

Whether farmer is aware of KAU Recommendations?

a. Selection of rhizomes

b. Rhizome treatment

c. Storage

d. Manures and fertilizers

e. Plant protection

Source of knowledge

Whether farmer is following scientific management practices: Yes/No

Reasons

XII. Major problems faced by ginger growers

XIII. Marketing aspects - Producer's level

1. Total quantity produced
   a. Wet ginger
   b. Dry ginger
   c. Bleached ginger
2. Quantity spoiled during
   a. Handling
   b. Transportation

3. Quantity used for home consumption

4. Quantity retained for seed purpose

5. Others (excluding marketing)

6. Total quantity marketed

   a. Wet ginger

   b. Dry ginger

   c. Bleached ginger

7. Method of sale

Sl.No.	Method of sale	Qty.	Price and other terms
1.	Pre-harvest contract		
2.	Village merchant		
3.	Wholesale market		
4.	Co-operative society		
5.	Direct sale to consumer		

8. For direct selling

   A. Cost incurred by farmer from farm to market

      a. Preparation of market

      b. Loading and unloading

      c. Transporation cost

         Mode

         Distance

   B. Cost incurred by the farmer at the market

      a. Weighing charges

      b. Grading

c. Gate fee

d. Market fee

e. Commission

f. Brokerage

g. Taxes

h. Others

9. Payments

10. Problems in marketing

11. Suggestions for improvement

APPENDIX-II

Marketing Aspects - Intermediaries

1. Type of intermediary

2. Name and address

3. Type of commodities handled

4. Fixed costs

Sl. No.	Particulars	Amount per month	Present value	Depreciation
1.	Rent paid			
2.	Furniture used			
3.	Permanent staff			
4.	Licence fee			
5.	Other items (specify)			

5. Working cost

Sl.No.	Particulars	Expenditure
1	Casual labour charges	
2	Electricity/month	
3	Water charges/month	
4	Taxes	
	a. Sale tax	
	b. Income tax	
	c. Local tax	
	d.	
5	Postage/Telephone etc.	

6. Total quantum of sales per year (all commodities)

7. Volume of ginger business during 1992-93 (monthwise)

Month	Total purchase			Total sales		
	Qty.	Price/Unit	Value	Qty.	Price/unit	Value

8. Is grading of ginger done? Yes/No

Grade: Cost/unit Price/unit

9. Approximate percentage graded

Storage

a. Period of storage

b. Method of storage

c. Cost of storage

d. Loss in storage

10. Processing method and cost

11. Quantity exported

1. Destination

2. Cost involved

a. Preparation for market

b. Transportation cost

c. Loading charges

d. Market fee/commission

e. Weighing charges

f. Shipping charges

g. Gate fee deduction

h. Tax

i. Other charges (specify)

3. Problems in export

4. Export incentives

12. Sources of finance for farmers

a. Total own funds (Rs.)

b. Borrowing

c. From other sources if any

d. Terms on which money is borrowed

13. Problems in marketing

14. Suggestions to improve marketing

APPENDIX-III

Area and production of ginger in Kerala State
(1960-61 to 1990-91)

Year	Area '000 ha	Production '000 tonnes
1960-61	12.00	11.26
1961-62	12.05	11.38
1962-63	12.07	11.43
1963-64	11.96	11.29
1964-65	11.97	11.34
1965-66	11.85	11.20
1966-67	11.79	11.05
1967-68	11.80	11.13
1968-69	11.42	10.84
1969-70	11.52	11.99
1970-71	12.17	19.68
1971-72	11.87	23.31
1972-73	11.80	23.48
1973-74	12.04	26.67
1974-75	12.20	26.03
1975-76	11.67	28.84
1976-77	10.35	25.43
1977-78	12.67	32.11
1978-79	12.71	32.91
1979-80	14.12	35.12
1980-81	12.66	32.03
1981-82	13.45	34.39
1982-83	12.66	31.57
1983-84	14.88	36.69
1984-85	14.53	41.24
1985-86	15.67	44.46
1986-87	16.60	47.68
1987-88	14.44	45.50
1988-89	14.17	45.02
1989-90	14.43	47.26
1990-91	14.14	45.69

Source: Directorate of Economics and Statisticts, Kerala, Thiruvananthapuram

APPENDIX-IV

Area and production of ginger in Idukki district (1976-77 to 1991-92)

Year	Area 'ha	Production 'tonnes
1976-77	918	2075
1977-78	918	2075
1978-79	870	2058
1979-80	894	2136
1980-81	958	2289
1981-82	1144	2733
1982-83	1054	2442
1983-84	1511	3606
1984-85	1209	3379
1985-86	1209	3379
1986-87	2653	7635
1987-88	2156	7315
1988-89	1930	6131
1989-90	1997	6542
1990-91	1551	5734
1991-92	1402	5183

Source: Directorate of Economics and Statistics, Kerala, Thiruvananthapuram

ECONOMICS OF PRODUCTION AND MARKETING OF GINGER IN KERALA WITH SPECIAL REFERENCE TO IDUKKI DISTRICT

By

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ABSTRACT OF A THESIS

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ABSTRACT

The present study on production and marketing of ginger was undertaken in Idukki district during the year 1992-93. The major objectives of the study were to examine the past trends in production, estimation of cost of cultivation, cost of production, resource use efficiency, marketing cost and margin and to identify the marketing channels. The study also examines the major constraints in production and marketing of ginger.

The study is based on primary and secondary data. Primary data is collected from a sample of farmers. Multi-stage random sampling was adopted for the selection of farmers.

Ginger production in the state during the period 1962-63 to 1990-91 showed a rising trend, with productivity contributing significantly to rise in production. In Idukki district also increase in trend in production is recorded during 1978-79 to 1991-92 period. Contarary to what has happened in state area played a major role with productivity playing a complementary role.

Average cost of cultivation per hectare of ginger based on cost A, cost B and cost C were Rs.20088.10, Rs.20088.10 and Rs.28888.10 respectively. The average

yield of ginger was 13785.08 kg per hectare. The gross value of output at prevaling price rate was Rs.68925.40. Cost of production per tonne of ginger based on cost A, cost B and cost C were Rs.1467.30, Rs.1467.30 and Rs.2119.60 respectively. Input-output ratio based on cost A, cost B and cost C were Rs.3.43, Rs.3.43 and Rs.2.39 respectively. Bulkline cost per tonne of ginger was Rs.2500. Farm business income was Rs.48837.30 and net income was Rs.40037.30. Cobb-Doughlas production function fitted with returns (rupees) as dependant variable and area, expenditure on inputs like seed, chemical fertilizers, manures, plant protection chemicals and human labourer as independent variables revealed that additional expenditure on seed, chemical fertilizers, manures and plant protection chemicals could increase the output. The input human labour was found to be in excess use.

The most important marketing channel identified for both green and dry ginger was producer - Village merchant - commission agent - wholesaler - retailer/secondary wholesaler - consumer. In the case of dry ginger producer sale price formed 62 per cent of the retail price. The corresponding share in the green ginger trade was 37 per cent. The combined net margin of the intermediaries were 19.6 per cent of the consumer rupee in dry ginger trade while it was 23.3 per cent in green ginger.

The major problems facing the ginger growers are instability in prices and loss due to softrot disease. The study suggest the formation of co-operative societies to arrest price fluctuations. The study also recommend to educate farmers in modern techniques of cultivation.