PRODUCTION AND MARKETING OF VANILLA

By
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THESIS

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DECLARATION

I hereby declare that the thesis entitled **"Production and marketing of vanilla"** is a bonafide record of research work done by me during the course of research and 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
28-09-05

Deepa.U.V

CERTIFICATE

Certified that the thesis entitled **"Production and marketing of vanilla"** is a record of research work done independently by **Ms. Deepa.U.V,** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, associateship or fellowship to her.

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Introduction

INTRODUCTION

The spice industry is poised for a major leap in the 21 st century with the world trade in spices attaining greater importance due to anticipated advances in the food industry. Organically produced spices are gaining great impetus from the health and environment conscious world. India, known as the spice bowl of the world, possesses a wide range of agroclimatic regions specially suited for the cultivation of superior quality spices. The total spice exports from India during April-March 2004-05 was 3,35,488 tonnes valued at Rs.2200 crores (490million US $). The spice export during 2004-05 has registered a growth rate of 32 per cent in terms of quantity and 15 per cent in terms of rupee value during 2004-05 (Spices board, 2005). The market trend is moving away from synthetic to natural products due to the growing awareness on the nutritional aspects of spices. The present trend shows that there is great potential for export of organic spices. Hence there is need for promoting spices like vanilla which has a strong demand in the developed countries as the crop has a direct bearing on the health and flavour industry.

Vanilla (*Vanilla planifolia*) is a climbing terrestrial orchid having an economic value in the food and related industries owing to its unique flavour and pleasant aroma. Out of the hundred and ten species of vanilla reported, only three are economically relevant. They are *Vanilla tahitensis* J.W Moore (Tahitian vanilla), *Vanilla pompona* Schiede (West Indian Vanilla) and *Vanilla planifolia* Andrews. *Vanilla planifolia* Andrews is the most preferred and commercially cultivated species. The substance chiefly responsible for the unique fragrance is vanillin obtained primarily from the fully grown but, unripened vanilla beans that have been subjected to fermentation-curing process to produce the characteristic aroma.

According to Correll (1953) attempts to introduce vanilla cultivation in India dates back to 1835. In Kerala preliminary works on the cultivation and

processing of vanilla was initiated by the Regional Agricultural Research Station at Ambalavayal, Wynad during 1960. The Government of Kerala also initiated a small scheme at Cheengeri at Ambalavayal for settlement of tribals through cultivating vanilla in an area of 2 hectares. All these gardens served as a source of planting materials for vanilla development programmes initiated by various agencies.

Vanilla is one of the expensive spices traded in the global market. Vanilla essence is largely used in the preparation of ice creams, chocolates, bakery products, puddings, pharmaceuticals, liquors and perfumes. Only a small proportion of vanilla beans is consumed directly, except in France where the proportion is 20 per cent. The world demand for vanilla is estimated to be 12, 000 tonnes (Jose, 2004). The total area of vanilla cultivation in the world during 2004 was 39051 hectares and production 5478 metric tonnes (Food and Agricultural Organisation, 2004). The major vanilla producing countries are Madagascar, Indonesia, Mexico, Comoro, China, and Reunion. In recent years, dominance in production has shifted from Mexico to Madagascar and of late to Indonesia.

The producing countries export vanilla to the major consumers who either use them for domestic consumption or re-export a part of it after value addition. Although vanilla products are traded globally, USA, France and Germany are the primary importers accounting for 80 per cent of the world imports (Nambiar, 2003a). These three countries are the major re-exporters of both processed vanilla extract and repackaged fresh beans to other countries.

In India vanilla cultivation is feasible in Tamil Nadu, Karnataka, Kerala, North east region, Lakshadweep and Andaman and Nicobar Islands. The production of green vanilla beans in India was 133.62 tonnes during 2003-04 from an area of 3543 hectares. Karnataka has the largest acreage with a total of 1931 hectares. The area under vanilla in Kerala had increased from 812 hectares during 2002-2003 to 1147 hectares during 2003-04. Karnataka has the largest production

of 82.36 tonnes followed by Kerala (33.44 tonnes) and Tamil Nadu (17.82 tonnes). Total export of cured vanilla from India during the year 2003-04 was 26 million tonnes valued at Rs. 36.06 crores. During 2003-04 Kerala exported 5 million tonnes of cured vanilla beans, thereby earning 585 lakhs (Government of Kerala, 2004).

Vanilla is the spice most subjected to competition from imperfect substitutes (low cost flavourings). At present vanilla flavour in India is almost entirely from synthetic substitutes like vanillin and ethyl vanillin, which are imported into India. The rising global production and a surge in synthetic imitations are threatening to sharply reduce vanilla earnings. However the overall demand for natural products will increase the share of natural vanillin to a great extent. The unprecedented increase in price of vanilla beans during the period 2000-03 was due to the imbalance created in demand –supply chain as a result of the decrease in production in the major producing countries like Madagascar, Comoros and Reunion. This was followed by a price crisis in the international market during 2004 as a result of surplus supply from the major producers.

Even though the market for synthetic vanillin will remain strong because of their relatively low and stable prices the trend towards natural flavorings in food products will continue to keep demand for vanilla beans steady. The area under vanilla in Kerala has increased during the recent years indicating the growing importance of the crop in the state. This calls for an understanding of the extent of profitability of the crop as well as the marketing scenario in the context of wide fluctuations in prices in the recent years. But farmer level studies on the production and marketing of vanilla has not been undertaken in Kerala. In the above background, an attempt has been made in the present study to analyse the economics of production and marketing of vanilla with the following specific objectives.

- To estimate the costs and returns of vanilla

- To identify the marketing channels and marketing costs
- To analyse the price behaviour and competitive advantage of vanilla

Scope of the study

Vanilla beans constitute nearly 0.75per cent of the world import of spices in volume and in terms of value its share is six to seven per cent of global spice trade (Nambiar, 2003a). As there is a visible trend of shifting towards natural produce, the consumption of synthetic vanilla may not grow at the present level. Even a one percent shift towards natural vanilla will ensure a substantial market for natural vanilla. In these perspectives, the demand for natural vanilla beans by 2010 is expected to be 15000 tonnes (Madan *et al.*, 2003). This indicates the great potential for vanilla development in India even if a part of the consumption of synthetic vanillin is to be met by natural source both in International and domestic markets. In the above context a study on the production and marketing aspects of vanilla appears to be highly relevant.

Limitations

The study was based on both primary and secondary data. In the case of secondary data, often data from different sources may not agree with each other and some efforts to choose the better among them are inevitable. The competitiveness of the spices was also studied within the specific period though the competitiveness is subject to change due to fluctuations in price. Since the data for international and domestic prices of vanilla was available for only a limited number of years price behaviour was examined by analyzing the fluctuations in price using graphical method instead of trend fitting.

In the case of primary data, the study area was selected based on purposive selection so as to ensure representative and reliable sample. Respondents were collected from vanilla growers association. The data collected may not be fully reliable and accurate as the respondent farmers were not in the habit

of maintaining records regarding costs and returns, but every effort was made to make it reliable through cross checking.

Presentation of the study

The report of the study has been spread out under five chapters as given below. The first chapter deals with introduction, in which the statement of the problem, objectives of the study, the scope and limitations are discussed. The second chapter covers review of related studies in the light of the present study. The third chapter relates to the details of study area and methodology used in the process of investigation. The results and discussions are presented in the fourth chapter and chapter five gives the summary and conclusion of the study followed by references and abstract.

Review of Literature

2. REVIEW OF LITERATURE

The review of literature having bearing on the main objectives and scope of the study provides information to the researchers regarding the previous work done in the area of research and helps to identify the theoretical frame work and methodological issues relevant to the study there by providing a proper direction to carry out their research work. As literature on production and marketing of vanilla was scanty economics of related crops are also reviewed. The past studies related to the objectives of the study are presented in this chapter under various headings as given below.

2.1 Cost of production
2.2 Trade competitiveness
2.3 Price behaviour
2.4 Marketing studies

2.1 COST OF PRODUCTION

Agarwal (1952) in a study on the problems of evaluating the cost of cultivation of crops found that the allocation of overhead costs like depreciation, interest, maintenance charges on fixed capital and rental value of land should be made on the basis of the ratio between total prime expenditure on the holdings and on the individual crops. The rent usually should be allocated to various crops on the basis of their area and period for which the field remained occupied by them.

In analyzing the problems in calculating the cost of cultivation of crops, Singh (1952) concluded that the service ability and value of an asset diminished as depreciation continued till it became exhaustive. He pointed out that charges of depreciation, repairs and interest should be apportioned based on their proportion of use on different enterprises.

Based on a study on pepper in Sarawak, Blocklock (1957) reported that the first harvest of pepper was due only after two and half to three years after planting. It was observed that during 4-7 years age group yield increased with age and during 8-15 years age group, yield decreased with age.

Venkataram (1964) classified the costs into establishment costs and maintenance costs in his study on the economics of grape cultivation in Bangalore. The expenditure in the first year of planting was the establishment costs and the costs incurred in the subsequent years were the maintenance costs. The establishment costs was apportioned over the productive life of the vineyards taken as 25 years.

While evaluating the unit cost of production of cardamom, Muniraj (1968) assessed the efficiency of resources in a case study on the economics of production in cardamom plantation in Bodinayakanar area in Tamil Nadu. The average cost of production per acre was Rs.259.59 with a unit cost of production of Rs.6.83 per kg with a profit of Rs. 405.18.

Madappa (1970) analysed the cost of production of coffee in Chikmaglur district in Karnataka. He observed that the labour cost accounted for 40 per cent and material cost 20 per cent of the total costs of cultivation. It was furthur observed that the size of estate has no direct bearing on the cost of production of coffee. The total cost of production of coffee was Rs. 900 per acre out of which cultivation cost was Rs.500 (55 per cent), product preparing cost was Rs 100 (10 per cent) and other costs were Rs. 300 (35 per cent). The difficulties encountered in the cost studies identification mentioned were costs apportioning problems due to intercropping mixing several varieties of crops and lack of proper records etc.

Cost benefit analysis was found to be the practical way of assessing the desirability of projects. The discount rates should be based on the rate of interest at which capital could be raised or borrowed. An affirmative decision for the

project could be possible if the internal rate of return exceeded the interest rate or if the present worth of the project was positive or if discounted benefit cost ratio exceeded unity (Peters, 1970).

George and Joseph (1973) found out the costs and returns from tree crops namely coconut, rubber, and oil palm with an establishment period of seven years and the project life period as 40 years. At the discount rate of 9 per cent the net present worth of a hectare coconut garden was calculated as Rs.8.70. The internal rate of return was obtained as 9.5 per cent, benefit –cost ratio was 1.07 and pay back period worked out to 16 years.

Following the study in certain pockets in Idukki, Wayanad districts and Nelliyampathi hills in Palakkad district in Kerala, Jose (1976) discussed about need for enhanced cardamom production. The cost of cardamom arrived was Rs.58 per kg. While the cost of maintenance was Rs.1200 per acre per year during 1975. The cost of establishment of one acre plantation was estimated as Rs. 2765.

An attempt to examine the performance of turmeric crop was made by Ashturkar (1980) in Maharashtra state over a period of 13 years ie.from 1960-61 to 1974-75 in respect of area and production in order to investigate the profitability of the crop. Per hectare cost of cultivation on Cost A basis amounted to Rs.5458 on an average of which seed alone accounted 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.

An attempt was made by Joseph (1980) to evaluate the economic efficiencies of coconut, cashew and rubber cultivated in Kerala. Economic efficiency was expressed in terms of net returns per hectare of crop activity. The results revealed that the discounted net returns from cashew (Rs. 10537) were

higher than that of rubber (Rs. 6854) and coconut (Rs. 4758) while BC ratio was 5.3,1.6 and 2 with an IRR of 30,16 and 17 percentage for cashew, rubber and coconut respectively. The analysis helped to understand the economic basis of the allocation of land to facilitate optimum crop mix at the farm level.

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. It was found that average cost of cultivation per hectare was Rs.13, 005 and seed alone accounted for 38 per cent of the total cost. 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.

Das (1984) estimated the cost of production of coconuts in Kerala as Rs. 1.10 per nut without taking the value of land into consideration. When a moderate price of Rs. 50,000 per hectare of land was added to the investment on coconut, the production costs came to Rs. 1.94 per nut. Considering the average production cost and farm gate price of coconut as Rs. 1.10 and Rs. 1.50 per nut respectively, the net returns worked out to be Rs. 4,200 per hectare. The cost of bringing one hectare of coconut garden to bearing or the total establishment cost per hectare came to be Rs.5500. The study thus revealed that coconut cultivation under good management was a profitable proposition in Kerala.

Santhosh (1984) in his study on the cost of cultivation and marketing of pepper in Cannannore district of Kerala found that the per hectare aggregate cost for a period of 7 years was Rs.29, 465. The expenditure was the minimum during second year and from third year onwards went on increasing till it reached the maximum in the seventh year. Labour input contributed the maximum with low family labour contribution. He found that pay back period was around 9 years at 10 percent discount rate BC ratio was 1.6, IRR 17.22 per cent and NPW Rs. 6656.

In his study on cost of cultivation of pepper in Idukki district in Kerala, Vinod (1984) found that cost of cultivation decreased as the size of holding decreased. He observed that pay back period of pepper was 10 year, BC ratio 1.09 and NPW Rs.4180 at 10 per cent interest rate. The IRR was found to be 13.48 per cent.

The average annual cost of maintaining a coconut garden in Kerala was estimated by George and Rajasekharan (1985) using budgeting techniques which worked out to Rs. 3888 per hectare and on adding interest on capital investment at 15 per cent at the value of land to the annual maintenance costs, the total annual costs worked out to Rs.18888. On the basis of an average yield of 9000 nuts per hectare average costs per 100 nuts worked out to be Rs. 210 excluding the costs of management and own labour.

Nagaraja (1987) evaluated investments in coconut gardens in Tumkur district in Karnataka employing discounted cash flow technique. The economic life of coconut garden was assumed to be 60 years and the discount rate used was 15 per cent. The results of the study showed that NPW was Rs. 19112, Rs. 20663, Rs. 30021 and Rs. 59,476 respectively per hectare for medium, small, rainfed large and irrigated large gardens. The BC ratio was 1.17, 1,15, 1.30 and 1.22 respectively, while IRR was 28.84 24.02, 44.92 and 27.04 percentage respectively.

In a study on the economics of coconut cultivation in Calicut district in Kerala, Premaja (1987) reported that the total cost of cultivation for 16 years was Rs. 91311. The average annual returns from production of nuts was estimated to be Rs.10049 per hectare and the cost of production to be Rs.1.12 per unit. The estimated net returns on investment came to Rs.13835 per year per hectare. The pay back period of coconut was found to be 13-18 years, BC ratio 1.44, IRR 16.39 per cent and NPW Rs. 24,454 at 11 per cent interest rate

In a size category wise analysis of the cost of cultivation of bearing coconut plantations in North Kerala, Bastin and Abdurazak (1988) found that the cost of maintenance of coconut per hectare was Rs. 6,297.65, Rs.5, 431.62, Rs.5, 100.52 and Rs. 4,183.73 respectively for the four size categories of the farms in the district. The average cost worked out to Rs. 4,442.05 per hectare and for application of manures and fertilizers 65 per cent of the total costs was incurred. The family labour utilization showed wide variations among strata and the average profit per hectare worked out to Rs.10, 360.43.

Mahabala *et al* (1990) studied the resource use efficiency and age return relationships in cardamom plantations in Chickmaglur district in Karnataka and recorded the peak returns in cardamom cultivation during the seventh year. The annuity value worked for the returns at 15 per cent discount rates for pure and intercropped cardamom was the highest during the tenth year suggesting that it would be ideal to replace cardamom after ten years of planting.

The performance and economics of replanting of cardamom was analysed by Korikanthimath (2000) at Chettali in Karnataka. The results revealed that a total investment of Rs.56, 697.82 per hectare was incurred towards replanting of cardamom. The results revealed that the total annual maintenance cost during the bearing period was Rs.82, 411.09 per hectare. The highest expense (69.45 per cent) was incurred on labour charge.

Alagappan and Manoharan (2001) attempted to estimate the cost of production, returns and capital productivity of pepper cultivation in Idukki district of Kerala. It was found that total cost per acre reached a maximum of Rs.14, 930.03 during 7-12 years of age. The unit cost of production was estimated to be Rs.58.16 per kg.

Sethi (2002) opined that vanilla has great potential for livelihood generation in the State of Tripura. He estimated the establishment cost for 1600

vanilla vines per hectare for the first three years to be Rs.50, 000. During the fourth year the maintenance cost was Rs.13, 000 per hectare and from fifth year onwards it was 15,000 per hectare. The total investments during the total yield cycle of 15 yeas including the pre-bearing stage was Rs.2, 13,000 per hectare. The total yield of processed beans was 3210 kg, and at the rate of Rs.400 per kg, the net return was Rs. 12,84,000.

Korikanthimath and Rajendra (2002) in their study in Uttar Kannada district of Karnataka and Wynad district of Kerala reported that it was highly compatible and profitable to grow cardamom as mix crop with Arecanut as nearly 70 per cent of the land space remains unutilized in the sole crop of Arecanut. Since the effective root spread of Arecanut is of 75 cm radius, the root competition in the mix crop system was minimum. The total cost of raising a new garden (13 years) was estimated to be Rs.1, 40,000 per hectare where as gross income per year per hectare was Rs.3, 05,000 with cardamom and arecanut as components.

John (2003) reported that the cost of cultivation and processing of vanilla for a bankable project as assessed by the NABARD, during the late 1990s worked out to Rs.50, 000 per hectare over a period of three years and its annual maintenance cost was Rs.12,000 per hectare. The economic analysis gave a benefit cost ratio of above 1.5 and internal rate of returns above 50 per cent.

In an analysis of the costs and returns for cultivating turmeric in Chamarajanagar district of Karnataka the cost of production was estimated to be Rs.1005 per quintal of turmeric rhizome. The net Benefit Cost ratio was 1.34. The cost of Farm yard manure formed 9.2 per cent of the total cost where as cost of pesticides formed nearly 6.6 per cent (Lokesh and Chandrakanth, 2003).

In a study on the production, marketing and economics of vanilla cultivation in Karnataka state, Madan *et al.* (2003) found that the total cost of

production per acre (700 vines) in the first year of bearing was Rs.27542. The average net return per acre from green beans worked out to Rs.62933 with a benefit cost ratio of 3.28.

Potty (2003) observed that the center for maximum world production of vanilla has shifted in course of time from the native Mexico to Sub Saharan Africa during 1950s and from there to countries in the Pacific basin during late nineties. Though Madagascar met 70 per cent of the world supply of vanilla during 1970s,it stood only next to Indonesia in production during 2001. Indonesia, which produced 24 million tonnes during 1940s, increased the production to 2102 million tonnes during 2001.

Madan (2004) estimated the cost of cultivation of spices and tested the economic viability of recommended management practices. The cost of cultivation of vanilla from the first year to the seventh year was estimated using farm –budgeting approach. The establishment cost per acre (700vines) for three years was estimated to be Rs.46438. The maintenance cost per acre per year was Rs.21084. Among the inputs, compost formed the major item of costs (66 per cent) followed by labour charges (21 percent). The average net return per acre was Rs.62933 with a benefit cost ratio of 3.28.

Patil *et al.* (2004) analysed the cost of cultivation for turmeric cultivation in Sangli district of Western Maharashtra. The per hectare Cost A, Cost B, and Cost C was estimated to be Rs. 1,63,824.31, Rs.2, 29098.67 and Rs.2, 36,298.67 respectively. It was concluded that turmeric cultivation was a profitable enterprise with an input-output ratio of 1:1.48 and the per hectare gross income from turmeric was Rs.3, 72,520.98.

In his study on the economics of vanilla cultivation in Karnataka, Suryanarayana (2004) analysed the cost of cultivation of vanilla under natural shade conditions and reported that the establishment cost for three years worked

out to Rs.1,71,200 per hectare. A total yield of 96 kg, 153 kg and 168 kg of green beans per acre during fourth, fifth and seventh year was also reported. The cost for establishing a processing unit was found to be Rs.1, 46,000. Cost towards vanilla cuttings formed the major component of the total establishment cost.

Johnkutty (2005) examined the unit cost for establishment of one hectare of vanilla (1600 vines) and it worked out to Rs.65075 during establishment period. The maintenance cost during fourth year and fifth year was Rs.20,000 and Rs.25,000 respectively. It was also found that vanilla yielded 50 to 60 kg of processed beans in the fourth year, 150 kg in the fifth year followed by a stabilized yield of 300 kg from sixth year to fifteenth year.

2.2 TRADE COMPETITIVENESS

In a study conducted during 1970-71 and 1979-80, Gill and Ghuman (1982) reported that the share of spices in the international market had been fluctuating throughout the 1970s. This has varied between 12.7 per cent and 20.5 per cent in that period mainly due to the fluctuations in production.

The committee on spices of Government of India (1988) remarked that the prices of almost all spices produced in India were comparatively higher in world markets due to low productivity coupled with high proportion of consumption, so if India has to remain as a major supplier in the world market catering at the same time to the increasing domestic market it was imperative to increase production with a strong ascend on productivity of all spices.

The level of protection and comparative advantage of agriculture in Tamil Nadu during 1980-81 to 1991-92 was examined by Selvaraj et al (1998) using Nominal Protection Coefficient (NPC). NPC was approximately 0.9 for rice and cotton and 2.5 and 2.2 for sugarcane and groundnut respectively. It was observed from the analysis that within agriculture, levels of protection were found to be

very uneven among the crops. Rice and cotton was disprotected and in contrast sugarcane and groundnut was highly protected.

Based on the data on percent market share of top 20 countries exporting/importing agricultural products in the year 1980 and 1985,Pandey and Sharma (1989) reported that in the case of seven commodity groups, including spices, the market share in the export was observed to be relatively well spread among the top 20 countries. The study also revealed that in both exports and imports, the trade was dominated by the developed countries like U.S.A, U.K, Canada, France, West Germany, Belgium, Luxembourg, Netherlands, Italy, and Australia. The developing countries showing dominance were Mexico and Brazil.

Sandhu (1989) compiled the export demand and income elasticities of pepper in general and in USSR market in particular, during the eighties. The result indicated a favourable response for exports in the markets in terms of price competitiveness and income growth, basic as well as changing consumption patterns. The study also showed that Indian pepper was priced high in the U.S.A. market and the export market share was prominent relative to Brazilian and Indonesian pepper and the market was favourable to Indian black pepper, because of its superior quality.

Gill (1990) examined the prospects for agricultural exports from India and observed that exports of spices which amounted to 93,800 tones valued at Rs.250.8 crores in 1987-88 showed a drop in value by about 19 per cent in spite of increase in volume of 12.9 per cent owing to fall in unit realization by 28.3 per cent. The exports of cardamom have suffered both because of higher prices in the domestic market and severe competition in West Asia from Guatemala. The exports of pepper have suffered due to the constraints of high standards of cleanliness expected in the major import markets.

In a neo-classical world, it was generally agreed that costs of labour, land and capital especially in developing countries, did not reflect their opportunity costs with any accuracy because of market imperfections, although there was wide disagreement as to the extent of the typical discrepancies and how these might change over time. It was opined that trade liberations were associated with a substantial growth in the volume of trade. The developed market economies significantly increased their imports of meat and other food and in the case of rice, changed from being net exporters to net importers, which provided an indication of revealed comparative advantage (Goldin, 1990).

Pal (1992) studied the agricultural exports of India and opined that the comparative advantage in the production of agricultural products could not be exploited by least developed countries in the real world mainly because of poor bargaining power in the world market and tariff and non tariff protection strategy followed by developed countries. The unstable export tended to destabilize the income of least developed countries as long as export earnings constituted a significant proportion of national income, which in turn had serious political and economic implications.

Reddy and Narayana (1992), argued that the exports of agricultural and agro based commodities linked with adverse effects on the domestic economy should be discouraged. Their analysis brought out that the share of agricultural exports had been declining over the years due to stagnant output, low yield rates, non competitiveness in the world markets and dependence on traditional export crops and they suggested a shift in the composition of exports in favour of non traditional; high value products like processed foods.

Significant changes in the direction of pepper exports from India for the period 1975-90 was noticed by Jeromi and Ramanathan (1993). It was observed that country-wise annual compound growth rate of pepper exports was positive and significant only in the case of USSR (3.38 per cent). On the other hand, India

not only failed to increase its exports to US in tandem with increased consumption in that country but also could not sustain the quantity exported in the past years.

Bhatia (1994) in his study on agricultural pricing, marketing and international trade under new economic environment opined that relatively low prices in the domestic market would indicate that the country had comparative advantage in the export of that commodity if the international prices were higher than the domestic price plus transport and other handling charges, in contrast to which, if international prices plus insurance and freight charges were lower than the domestic price, then the country was placed at a disadvantage in the production. He also observed that the ratio of domestic prices to world prices during 1992 was significantly lower than one in the case of wheat, rice, maize, cotton, jute, tea, coffee, rubber, tobacco, pepper and oil cakes and horticultural products like potato, mango and banana except oil seeds and sugarcane.

Swaminathan (1995) identified the major challenges to Indian spice industry were the productivity challenge, the quality challenge and value addition challenge. He emphasized the role of excellence in quality, reliability of supplies and price competitiveness in international trade and suggested ecologically sound methods of production, improved post harvest technology and maximum value addition for spices with particular attention to processing, packaging, transportation and marketing.

Based on the study on relative price analysis of pepper in India in relation to Indonesia and Malaysia, Jeromi and Nagarajan (1996) found that it was negatively associated with India's export. This implied that India was facing competition from these countries and any increase in our export price and/or any decline in the competitor's price tend to reduce our exports. Among the competing countries Indonesia was found to be the dominant competitor followed by Malaysia.

Ravi and Reddy (1998) studied the export competitiveness of jowar, maize, groundnut, sunflower, cotton and coffee using Nominal Protection Coefficient with particular reference to Karnataka and found that Karnataka lacked comparative advantage in most of the crops except in cotton. Even though Karnataka was the leading coffee exporting state, the domestic market seemed more favorable than the export market and export potential of jowar, maize, groundnut and sunflower was significantly low.

Damodaran (2000) opined that freight and marketing costs accounted for more than 50 per cent of our cost on exported spices (small cardamom) and flowers. In the case of cardamom this has resulted in withdrawal of producers from the export market and concentration on the domestic market. Any drastic reductions in the export subsidies for this sensitive commodity will considerably affect our exports of the traditional, high quality spice.

Based on a study on market assessment and exports of agricultural products, Naik (2001) observed that the competitiveness of countries in individual products/commodities is expected to play a major role in the international trade. India would have to increase productivity and improve quality to compete effectively in the international market. It was found that India had high share in the low potential market and low shares in high potential market.

The correlation between quantity of export of black pepper and its fob price was analysed by Chand (2002). He found that it was negative or close to zero, which showed that fluctuations in export of black pepper might have resulted from fluctuations in domestic production. He also calculated Nominal Protection Coefficient of black pepper for the period 1991-92 to 1999-2000 and the result revealed that during 1997-98 NPC was greater than one and in other years it varied between 0.84 and 0.98. It indicated that the exporters of black pepper were operating at a very low margin and domestic prices were only slightly lower than the export prices.

Ali (2003) in his case study on the global trade of vanilla and its consequences on developmental policies of Comoro islands and Madagascar found that more than 70 per cent of the active population working in rural areas was involved in the production of vanilla in the Comoros. The vanilla exports were monopolized by the Government and association of vanilla exporters as it contributed a large portion of Government revenues in Comoros and Madagascar. It has also been reported that quality is the key feature for trade of vanilla. Despite the absence of a particular dispute regarding vanilla from the agenda of most multi-lateral organizations, an emerging trend of using alternative products to natural vanilla for- shadows potential disputes. It was felt that with the increasing use in developed countries of synthetic vanilla, a legal issue might arise within the current framework of the WTO, particularly under the Agriculture Negotiations

In his study on the market profile of Vanilla, Nambiar (2003 b) ascertained the need for India to be competitive through high productivity. India should adopt strict quality control measures to attract global buyers and the farmers should adhere to modern farming practices and scientific processing to ensure high productivity.

Nambiar (2003b) opined that the export of spices from India which was growing at an annual average growth rate of 10 per cent during seventies and eighties achieved a consistent growth touching 2,35,611 metric tonnes. The pepper exports from India has shown a steep decline during 1999-2000 due to the high FOB prices in Indian pepper which was a function of both productivity and high domestic demand.

Babu *et al.* (2004) reported that the Indian vanilla enjoys certain strengths even though it is not a major player in the world market. The export competitiveness measured by NPC by relating the domestic price of commodity

with its border price showed that Indian vanilla is highly Competitive in the International market with an NPC of less than unity.

2.3 PRICE BEHAVIOUR

Narayana *et al.* (1985) analysed the short term cyclical fluctuations in prices of small cardamom. They observed that the turning points of upswings and downswings in prices recurred alternatively at regular intervals. In the long term the prices showed a significant upward trend with a ten- fold rise in 25 years.

Based on a study on the trends in prices of pepper, Das (1988) observed that the prevailing price in the local markets was closely related to the unit value realization, which in turn was closely associated with the international prices. Pepper being an export oriented commodity, its international price obviously influenced the domestic market price of the producing countries.

Joseph and Naidu (1992) analysed the seasonal phenomenon in the prices of small cardamom along with the seasonality in related variables like sales at auction centres and export price. The analysis showed that the seasonal index of prices was the highest in January and the lowest in July, while the seasonal index of market sales was the highest in November and lowest in July. The extent of seasonality was higher in sales compared to prices, and compared to export prices, sales prices showed more market seasonality. The analysis showed that market prices would be well explained (97 per cent) by the two variables namely export and export price.

Jeromi and Ramanathan (1993a) examined the trends in pepper prices and its volatilities using an exponential model. The results showed that during the period 1960-61 to 1989-90, the annual compound growth rate of wholesale and export prices were around 10 per cent and in the decade wise analysis, seventies and eighties recorded highest growth at all levels of prices. However the later half of the eighties witnessed significant negative growth. The analysis revealed that

the rate of growth of pepper price was substantially higher than the corresponding growth rates of alternative crops

Baharumshah and Habibullah (1994) employed the co-integration technique to analyse the long run relationship between weekly pepper prices in six different markets in Malaysia for the period 1986-91. The empirical findings of the study indicated that regional pepper markets in Malaysia were highly co-integrated and the price of pepper, tended to move uniformly across spatial markets indicating competitive pricing behaviour.

Sudhakar (1996) analysed the price trends of turmeric in Andhra Pradesh markets during 1981-82 to 1993-94 by using the method of second degree parabola of the form $Y= a+ bx+ cx^2$. The price line showed a cyclical trend in the price of turmeric in all the selected markets. Each cycle spreads about eight year span in which recession was observed for five years and the revival was for three years.

Selvaraj *et al.* (2000) opined that an increase in the degree of openness was bound to increase domestic price variability due to direct transmission of world prices. But the results of residual trend analysis showed that variability in domestic price was significant in pre-reform period where as variability in international prices were significant in the post reform period.

The analysis of trends in auction, wholesale and fob prices of cardamom during 1971-72 to 1997-98 by Madan (2001) showed an overall upward trend with cyclical variations and short term fluctuations. Estimated growth equation indicated that while the auction price registered an average annual growth rate of 6.8 per cent, both the wholesale and export prices increased at the rate of 6.4 per cent. The closeness of growth rates of the three prices was indicative of the high degree of market integration at different levels of trade.

Divya (2003) analysed the price behaviour of spices and found that there was a higher growth in international prices compared to domestic prices in cardamom, ginger and turmeric. The measurement of trade competitiveness using NPC during pre WTO (1988-1995) and post WTO (1996-2003) periods exhibited a value of less than one during the two periods and NPC was lesser in post WTO period indicating high competitiveness in cardamom,ginger,and turmeric while for pepper NPC remained the same in both the periods.

Madan *et al.* (2003) observed that the parallel movement of Indian and International price for cured beans indicated that Indian vanilla was gaining importance and is on par with the international requirements. Vanilla being an export oriented crop, the international prices obviously influence the domestic market price.

2.4 MARKETING ASPECTS

In a study of market conditions, Mariwalal (1957) observed that, high freightage for export of pepper to U.S.A and other countries, made the price of Indian pepper higher than that of the competing countries in the world market. He observed that the freightage was around Rs 26 per cent to the USA. In comparison the freight charge of Singapore pepper to U.S.A was only Rs.22.00 percent. He pointed out further, that the problems in black pepper export were lack of export promotion and difficulties regarding detentions by the food and drug administration.

Simon (1964) conducted a regression analysis of pepper prices and exports. The price elasticity of exports was worked out as –0.1034 .the correlation co-efficient was –0.4683. He pointed out that since pepper is on the non essential list of consumers abroad,price variation will have significant effect on purchases.

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

Gandhi (1967) observed that the system of marketing in Kerala was old, unsystematic and not in the interest of the growers. He suggested the formation of co-operatives at the planters level to promote orderly marketing.

Kumar and Subbarao (1968) examined the instabilities related to the volume and unit value of black pepper exports from India during the period 1957 to 1965-66. They worked out instability indices related to the above-mentioned parameters. They observed that pepper recorded the highest unit value instability, compared to tea, coffee, groundnut tobacco, cashew kernels, oil seed and castor oil.

The price spread and marketing problems in ginger trade was studied by Sikka (1976) and 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. Intermediaries took a total of 36.04 per cent of the consumer's price in the internal trade against 7 per cent in the export. 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 societies and establishment of ginger curing and processing units.

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 –whole saler of assembling market –whole saler of consuming market –retailer –consumer.

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.

Narayanan *et al.* (1985) observed that small quantities of produce per cultivator at each harvest, lack of curing facilities and the need for immediate cash were the factors which compelled the small cardamom growers to go in for distress sale. An important aspect of cardamom marketing was that the small growers sold their produce to the local dealers and merchants and therefore they got lesser price than the planters.

On examining the marketing cost, marketing margin and price spread for green and dry ginger produced in Himachal Pradesh, Sambhur (1990) found that higher net price for produces and a high share of the consumer price can be ensured by encouraging group sales through producers co-operative, the whole salers net margin appeared to be high which can be reduced by creating competition at the whole salers level.

Jayesh (1994) studied the economics of production and marketing of ginger in Kerala with special reference to Idukki district and found that the most important marketing channel identified for both green and dry ginger was producer-village merchant-commission agent-whole saler-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 37 per cent. The combined net margins of the intermediaries were 19.6 per cent of the consumers rupee in dry ginger trade while it was 123.3 per cent in green ginger. The major problem faced by farmers were instability in prices.

Madan (2000) found that the marketing system of pepper was very efficient and it provided increased share of consumer prices (87.7 per cent to farmers with comparatively low marketing cost (6.74 per cent). The over all price spread (11.06 per cent) was much low compared to that of other export oriented agricultural products.

Madan and Selvan (2001) observed that more than 60 per cent of pepper produced moves through the most common channel of producer-village assembler-local trader-whole saler-exporter. The marketing system for pepper was found to be more efficient by providing increased share of consumers price (87.7 per cent) to the farmers with comparatively low marketing cost (6.74 per cent) and low price spread of 11.06.

In their study on the production, marketing and economics of vanilla cultivation in Karnataka state Madan *et al.* (2003) identified the following marketing channels for vanilla, farmer-local agent-exporting company-exporter, farmer-exporting company-exporter, vanilla development trust -exporting company-exporter. It was also reported that the absence of an organized marketing system for vanilla, the vanilla growers entered into a new venture of Co-operative marketing by establishing vanilla development trust.

Madan (2004) opined that unlike other spices there was no organized marketing system for vanilla. He identified four marketing channels for vanilla. farmer-local agent-exporting company-exporter, farmer-exporting company-exporter, vanilla development trust -exporting company-exporter. It was concluded that like in Cardamom vanilla auction centers should be started in the major production centers.

Materials and Methods

3. MATERIALS AND METHODS

Appropriate research design is a pre-requisite to draw meaningful inferences about any study. The present study on the economics of production and marketing of vanilla aims to estimate the costs and returns in vanilla cultivation, identify the marketing channels and marketing costs along with the analysis of the price behaviour and trade competitiveness of vanilla in Kerala. A brief description of the area of study and the methodology adopted is presented in this chapter.

3.1 AREA OF STUDY

Ernakulam district which is well known for the developments in spices sector especially with respect to vanilla production was selected for the study "production and marketing of vanilla" in Kerala. From this district the block having the largest area under vanilla cultivation viz, Pambakkuda block, was selected.

3.1.1 Ernakulam district

Ernakulam district is widely known across the country for its abundant backwater system. Cochin harbour which is a major natural harbour is situated here. The Periyar and Moovattupuzha are the main rivers of the district. Willington island, and Bolgatty island occupy a prime position in the tourist map of the country.

3.1.1.1 *Location*

About 38 kilometers from north to south and 48 kilometers from east to west, the district is bounded by a 46.2 kilometer coastline of the Arabian Sea on the west, Kottayam and Alappuzha districts on the south, Idukki on the east and

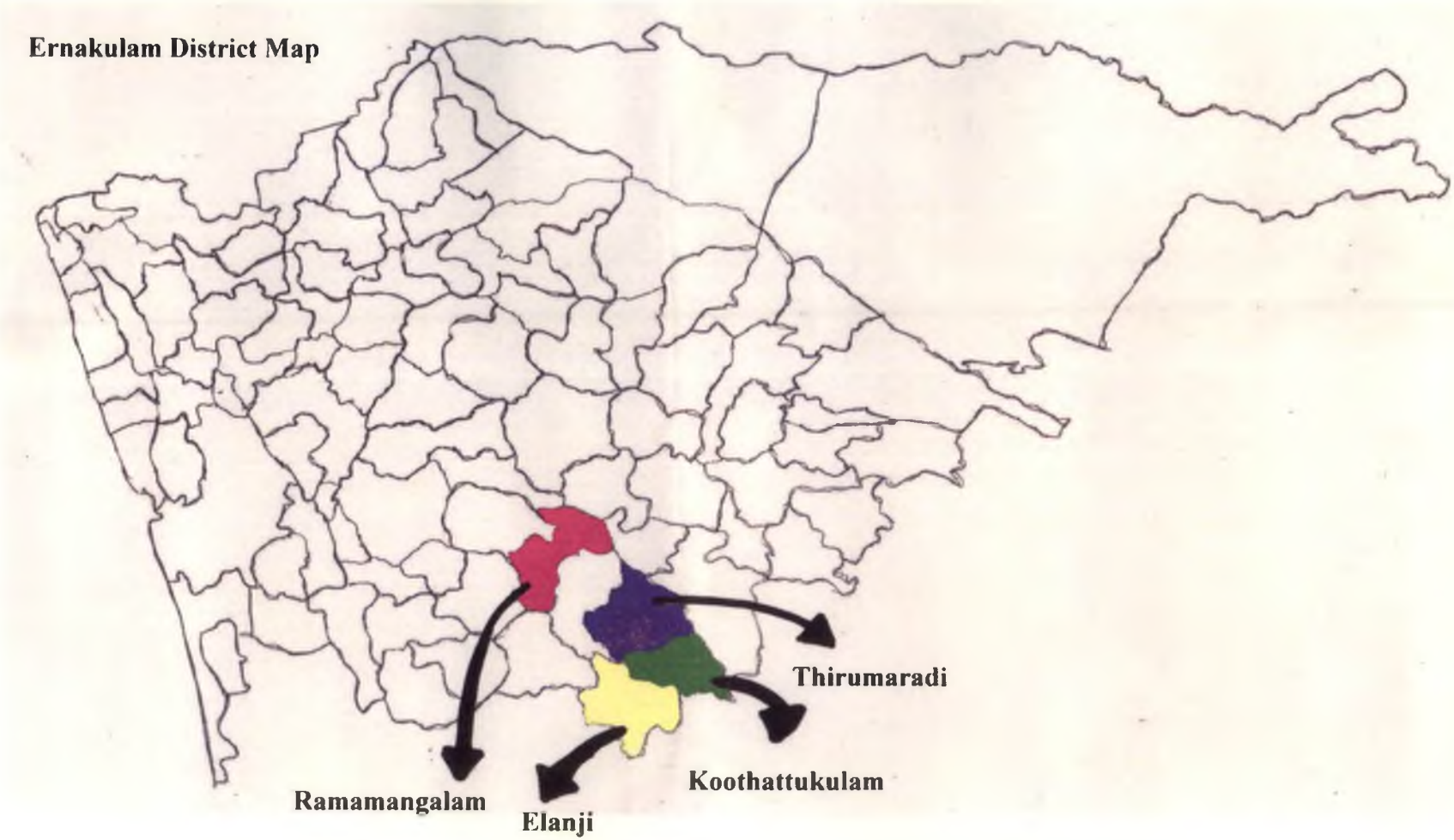


Fig. 3.1. Map of the study area

Thrissur on the north. It lies between latitude 9^0 42' to 10^0 18' north and longitude 76^0 12' to 76^0 46' east with an area of 235319 hectares.

There are seven taluks and fifteen blocks in the district. The population density per square kilometer for the district as per 2001 census was 1012 .

3.1.1.2 Geographical features

Ernakulam has many unique topographical and geographical characters. The district is divided into three well defined parts-highland, midland and the lowland consisting of hills and forests, plains and the seaboard respectively. The hilly or eastern portion is formed by a section of the Western Ghats. Muvattupuzha, Kothamangalam and Alwaye can be called the hilly taluks. Kottanna (1502 feet) and Kurisumudi (1274 feet) lie in the northern portion of the highlands. The midland consists mainly of plain land having natural facilities of drainage via backwaters and canals.

3.1.1.3 Land pattern

The flora of this district is tropical. The heavy rainfall combined with moderate temperature and fertile soil support luxuriant vegetation. The district has an abundant backwater system adjoining which are vast areas of paddy fields, which are subject to inundation, and movement of water in accordance with the ebb and flow of the tides.

3.1.1.4 Land use pattern of Kerala state and Ernakulam district

The land use pattern of Kerala state and Ernakulam district is presented in Table 3.1. It is clear from the table that out of a total geographical area of 235319 ha in the district the net cropped area is 165810 (70.46 per cent), while for the state, net cropped area is 2189940 which accounts for 56.36 per cent of total geographical area.

Table 3.1 Land use pattern of Kerala state and Ernakulam district (Area in hectares)

Sl.No	Item	Kerala	Ernakulam
1	Geographical area	3885497 (100)	235319 (100)
2	Forest	1081509 (27.83)	8123 (3.45)
3	Land put to non agricultural uses	395980 (10.19)	43448 (18.46)
4	Barren and uncultivable land	28803 (0.74)	1375 (0.58)
5	Permanent pastoral and other grazing land	316 (0.008)	14 (0.001)
6	Land under miscellaneous crops	10831 (0.28)	139 (0.006)
7	Cultivable waste	67285 (1.73)	6512 (2.77)
8	Fallow other than current fallow	41261 (1.06)	2954 (1.26)
9	Current fallow	68679 (1.77)	6902 (2.93)
10	Net sown area	2189940 (56.36)	165810 (70.46)
11	Area sown more than once	764514 (19.68)	43971 (18.69)
12	Total cropped area	2954454 (76.03)	209781 (89.15)

(Figures in parentheses indicate per cent to total geographical area)
Source: Government of Kerala (2004)

3.1.1.5 Cropping pattern

The district has agro climatic conditions suitable for the cultivation of crops like paddy, coconut, arecanut, rubber, pepper, ginger, mango, cashew nut, etc. The cropping pattern of Ernakulam district as presented in Table 3.2 revealed that spices contributed 9.84 per cent of the total cropped area. Major crops are coconut (30.59 per cent) and rubber (30.03 per cent).

Table 3.2 Cropping pattern of Ernakulam district.

Crop	Area (hectares)	Per cent to total cropped area
Pepper	6973	3.68
Arecanut	5275	2.78
Ginger	349	0.18
Other spices	5372	2.84
Rubber	56892	30.03
Coconut	57964	30.59
Paddy	29495	15.57
Jackfruit	4650	2.45
Banana	5872	3.10
Cocoa	1158	0.61
Mango	4305	2.27
Pappaya	1470	0.78
Pineapple	6696	3.53
Turmeric	484	0.26
Tamarind	809	0.43
Sesamum	126	0.07
Cashew	1241	0.65
Tea	3	0.002
Tapioca	5642	2.98
Betel leaves	69	0.04
Lemon grass	2	0.001
Total	189475	100

(Figures in parentheses indicate percent to total geographical area)
Source: Government of Kerala (2004)

3.1.1.6 Contribution of Agriculture to employment in the district.

Agriculture constitutes the most important segment of the district's economy and it is the biggest source of employment. About seventy per cent of the geographical area is under cultivation. Recently, floriculture, mushroom cultivation, medicinal plant cultivation, and vanilla cultivation and so on are being taken up by large number of farmers. A paddy cultivation system called pokkali is peculiar to the district.

3.1.1.7 Demographic features

According to 2000 census, the total population of the district is 31.06 lakhs of which 15.38 lakhs are male and 15.67 lakhs are female. The sex ratio is 1019 female per 1000 males. The literacy rate is 83.03 per cent. Out of the total population in the district, 58700 (1.89 per cent) are cultivators, and 89026 (2.87 per cent) are agricultural labourers.

3.1.2 Pambakkuda block

Pambakkuda block comes under Moovatupuha taluk and four panchayaths in the block namely Koothattukulam, Elenji, Thirumaradi and Ramamangalam have been selected for the study.

3.1.2.1 Kothattukulam panchayath

Koothattukulam panchayath is located in the southern part of Ernakulam district occupying an area of 23.18 squarekilometers. It is bounded by Thirumaradi panchayath in the north, Palakuzha panchayath in the east, Veliyannur and Elengi panchayaths in the west. It has an undulating topography of steep hills, valleys and plain lands. Red laterite soil is the main type of soil seen in the high ranges. The agriculture sector of the panchayaths lie in the plainlands. Highly fertile alluvial soils were seen in the low lying areas of the panchayath. Streams and canals were the major water resources of the koothattukulam panchayath. About 10.23 per cent of the total area of the panchayath is put apart for paddy cultivation. Nearly 6.28 per cent of the paddy fields were converted to level lands for the cultivation of rubber, arecanut, coconut, banana, nutmeg etc. The cropping pattern of the panchayath as shown in Table 3.3 revealed that out of the total area 31.28 per cent is occupied by intercrops. Vanilla is the major intercrop cultivated in the area.

Table 3. 3 Cropping pattern of the selected panchayaths

Crop	Area in hectares			
	Elengi	Koothattukulam	Ramamangalam	Thirumaradi
Paddy	155.36 (7.04)	237.04 (11.72)	157.12 (14.18)	298.16 (13.38)
Cocoa	9.92 (0.45)	1.60 (0.08)	0	0
Intercrops (Mainly vanilla)	17.12 (0.78)	632.59 (31.28)	19.62 (1.78)	3.20 (0.14)
Vegetables	5.12 (0.23)	4.32 (0.21)	2.32 (0.21)	4.12 (0.18)
Banana	15.84 (0.72)	2.08 (0.10)	3.84 (0.35)	0.96 (0.04)
Coconut	46.56 (2.1)	49.20 (2.43)	5.60 (0.51)	59.52 (2.67)
Arecanut	5.28 (0.24)	2.24 (0.11)	6.40 (0.58)	4.16 (0.19)
Cashew	0.64 (0.03)	3.36 (0.17)	0	6.40 (0.29)
Rubber	1951 (88.41)	1089.81 (53.90)	912.80 (82.39)	1851.20 (83.11)
Total	2206.84 (100)	2022.24 (100)	1107.7 (100)	2227.72 (100)

(Figures in parentheses indicate percent to total geographical area

Source: Government of Kerala (2004)

3.1.2.2 Thirumaradi panchayath

Thirumaradi panchayath located in the southern region of Ernakulam panchayath have a total area of 29.24 squarekilometers .This panchayath is bounded by Maradi panchayath in the north, Palakuzha and Arakuzha panchayaths in the east, Koothattukulam and Elengi panchayaths in the south and Pambakkuda panchayaths in the west. Geographically Thirumaradi panchayath is demarcated in the midland zone. Laterite and metamorphic rocks were observed in the area. Rubber is the major crop cultivated (63.31 per cent). The cropping pattern of the panchayath as shown in Table 3.3 revealed that out of the total area 0.14 per cent is occupied by intercrops in which a major part is contributed by vanilla.

3.1.2.3 Elengi panchayath

Elengi panchayath has a total area of 29.48 squarekilometers. Geographically it is divided into three regions- the highranges, hills and slopes and valleys. Major portion of the panchayath is utilized for rubber cultivation (66.2 per cent). The cropping pattern of the panchayath as shown in Table 3.3 revealed that out of the total area 0.14 per cent is occupied by intercrops and vanilla is the main intercrop. 152 hectares of land is under paddy cultivation.10.46 hectares of the panchayath are barren land while 28.16 hectares is covered by rocks. Severe water scarcity is the major problem of the panchayath.

3.1.2.4 Ramamangalam panchayath

The panchayath having a total geographical area of 23.04 squarekilometers is bounded by Moovatupuha river in the northern and western area. The panchayaths consists of hilly areas, sloppy lands as well as plain lands. Moovattupuha river formed the major water source for the panchayath. Rubber is the most important crop covering 39 per cent of the total area. Intercropping was observed in 1.78 per cent of the total cultivated area (Table 3.3). Vanilla is the

major intercrop in the panchayath. Paddy occupies 36 percent of the total cultivated area.

3.2 METHODOLOGY

The procedure used in the selection of sample, collection of data, analytical techniques employed and the concepts used in the study are presented below.

3.2.1 Location of the study and sampling design

3.2.1.1 Selection of study area

The study was undertaken in Kerala state. Ernakulam district was selected for gathering information on production and marketing aspects of vanilla, considering the importance of vanilla cultivation in the district.

3.2.1.2 Sampling design

From the Ernakulam district pambakkuda block having the largest area under vanilla cultivation was selected and from this block four panchayaths namely Koothattukulam, Elengi,Thirumaradi and Ramamangalam were selected since these were the typical vanilla growing areas where the representative farmers with at least 300 vanilla vines were available. The list of vanilla growers was collected from the vanilla growers association of the respective panchayaths.

From this list the farmers were stratified into three groups based on the age of vanilla vines viz, establishment stage (1-3 year old vines), steady yield stage (5-9 year old vines), and declining yield stage (10-15 year old vines). A total of 120 farmers belonging to these strata were selected from each panchayaths in proportion to the total number of farmers in each stratum. Panchayath wise distribution of the farmers is shown in Table 3.4.

Table 3.4 Distribution of respondents based on study area

District	Block	Panchayath	Number of farmers
Ernakulam	Pambakkuda	Koothattukulam	30
		Elengi	30
		Ramamangalam	30
		Thirumaradi	30
Total			120

The selected farmers were post stratified into three classes on the basis of the number of vines under vanilla, viz farmers having 300-499 vines (Class-I), 500-699 vines (Class-II), and more than 700 vines (Class-III). Class wise distribution of farmers as presented in Table3.4 indicate that out of the total 120 farmers, establishment stage was represented by 50 farmers, and the steady yield stage and

Table 3.5 Class wise distribution of sample farmers

Age groups	Class-I	Class-II	Class-III	Total
Establishment stage	20	15	15	50
Steady yield stage	13	9	13	35
Declining yield stage	20	9	6	35
Total	53	33	34	120

declining yield stage by 35 farmers each. Following the post stratification of sample farmers, 53, 33 and 34 farmers belonged to Class-I, Class-II and Class-III respectively.

3.2.2.Collection of data

Both primary and secondary data have been used for the study. The secondary data on domestic prices, international prices, exports and import were collected from the various publications of Directorate General of Commercial Intelligence and Statistics (DGCI&S), Kolkata and Spices Board, Kochi. In order to analyse the Nominal Protection Coefficient, the international and domestic prices during the year1996-2004 were used. The fluctuations in the market prices of vanilla was analysed using the international price of cured vanilla beans during the period 1992-2004 and domestic price during the period 1996-2004.

The primary data were collected from the selected respondents through personal interview method using a pre tested interview schedule. This was done during April-May 2005. The details on marketing aspects such as marketing channels, marketing costs etc was obtained using the same interview schedule.

The details on marketing of green beans were collected from the above120 farmers and as processing was carried out only by few farmers, data pertaining to the processing of vanilla beans were collected from 20 farmers who do on farm processing, as well as the major exporters of processed beans.

3.2.3 Analysis of data

The analytical tools used have been presented in two sections. The first section deals with the methodology involved in the analysis of primary data. The second section deals with the methods for estimating the Nominal Protection Coefficient and the price behaviour of vanilla.

Primary data collected were analysed using averages and percentages in order to work out costs and returns of vanilla cultivation.

3.2.3.1 Cost of Cultivation

The cost of cultivation was worked out using operation wise approach and input wise approach by employing the ABC cost concepts in farm management.

3.2.3.1.1 Operation wise approach

Operation wise costs were worked out for the three stages as well as for the three classes. Here the costs incurred by farmers were grouped under the following heads namely costs for land preparation, establishment of standards and vines, manures and its application, plant protection chemicals and its application and the cost for cultural operations like mulching, weeding, shade regulation, irrigation and other miscellaneous operations.

3.2.3.1.2 Input wise approach

Input wise costs were also worked out for the three stages as well as for the three classes. Here the analysis was carried out by making use of three cost concepts, of Cost A, Cost B, and Cost C.

Cost A_1 -It consists of cash and kind expenses actually incurred by vanilla growers. The components under cost A_1 include

Cost of planting materials-

Farmers included in the study area used planting materials obtained from their own farms as well as procured from fellow farmers, spices board or other private agencies. The standard cost of Rs. 13/- per metre of vine cutting was taken as the cost towards purchase of planting material. The planting materials procured from own farm were valued at the lowest market rate of Rs. 11/- per metre of vine cutting.

Cost of live support

Glyricidia is the live support used for vanilla during its entire life period. Farmers included in the study area used live support either from their own farm or

purchased from fellow farmers. The cost towards purchase was taken as Rs. 6/- per support. For the support collected from own farm the value was taken as Rs. 4/-, which was the lowest rate prevailing in the area.

Cost of manures

Cowdung, groundnut cake and neemcake were the common organic manures used by the farmers for vanilla cultivation. These were valued at the prevailing market rate for each in the locality. It was evaluated by multiplying the physical quantities of different manures with their respective prices.

Cost for non living support

The farmers in the study area used additional support for the vines using concrete poles, bamboo poles, ropes etc. The costs for these were computed at their market price.

Cost of plant protection

Application of bordeaux mixture and biocontrol agents like *Pseudomonas* were commonly practiced by the farmers. Costs of the plant protection chemicals were computed at their market prices.

Cost for irrigation

This includes the costs incurred for establishing the sprinkler irrigation system as well as the electricity cost for irrigating vanilla.

Hired human labour

Cost of hired labour was one of the important constituents of the direct costs of vanilla cultivation. Hired labour was evaluated on the basis of the actual wages paid during the period of study in the district.

Depreciation on fixed assets

Depreciation was worked out by the straight line method. It is given as the difference between original value and salvage value divided by the life of the asset.

Land revenue

Land tax was uniform through out the district and was computed on the basis of actual amount paid to the government.

Interest on working capital

It was taken at the rate of 3.5 per cent per annum. Interest was charged only for half of the duration of the crop, as all the costs are not incurred at the beginning itself

Cost A_2 : Cost A_1 plus rent paid for leased in land

Since the farmers did not practice the method of leasing in land the value was taken as zero

Cost B_1 : Cost A_2 plus interest on own fixed capital assets (excluding land)

Fixed capital excluding land was evaluated @ 9 per cent per annum on the value of the fixed assets during the time of study. Land was not taken into consideration as an item of investment. Vanilla was cultivated as an inter-mixed crop in the arecanut, coconut fields under regulated shades, assuming that suitable land is readily available for vanilla cultivation.

Cost B_2 : Cost B_1 plus rental value of own land

Rental value of own land was imputed on the basis of the rate that was prevalent in the region. This as stated above was Rs. 5000 per hectare.

Cost C_1 : Cost B_1 plus imputed value of family labour

Family labour costs were evaluated at the market wage rate that prevailed over the district during the study period.

Cost C_2 : Cost B_2 plus imputed value of family labour

Cost C_3 : Cost C_2 plus cost of management which is reckoned as 10 per cent of Cost C_2.

Gross income -The income from vanilla is obtained from two source

Main product

The cost for green beans was taken as Rs. 250/- per kg, which was the prevailing market rate.

By product

The by product from vanilla cultivation was one metre long vine cuttings which were sold as fresh planting materials. The price for the by-product was estimated to be Rs.13/- per metre of vanilla vine.

3.2.3.2 Cost of production

Cost of production was worked out in terms of the cost involved in producing one kg of green vanilla beans.

Annuity value method

Costs of production have two major components, *viz.*, establishment cost and maintenance costs. At the first stage the total investment for the initial three years (pre bearing period) was totaled to get the establishment cost and the compound interest thereon were reduced to an annuity bearing 11 % interest, being the rate at which credit could be available during the period of study. The annuity was studied using the formula by Das (1985).

$$A = \frac{P}{\sum_{i=1}^{n} \frac{1}{(1+r)^n}}$$

A = annuity value

P = total investment

r = rate of interest

n = life of plantation

The annuity value thus obtained was added to the annual maintenance cost to arrive at the total annual cost per unit area. Furthur interest on annual maintenance cost @ 11 per cent for a period of six months was also added to this to get the total cost for cultivating one hectare of vanilla. Net cost of production was found out after deducting the income from by product and this was divided by estimated production per hectare to obtain the cost for cultivating one hectare of vanilla.

The estimate was for 1 ha, planted with a spacing of 3m x 2m (1600 vines per ha). The total costs and returns of the sample farmers in each class were

divided by the number of vines in each class to arrive at costs and returns per vine. This was then multiplied by 1600 to estimate cost and returns per ha of vanilla.

3.2.3.3 Capital Productivity analysis

Capital productivity analysis brings out the efficiency of capital use in production. There are various methods to measure the capital productivity. The four measures used in this study are

a) Pay-back period (PBP)
b) Benefit cost ratio (BCR)
c) Net present value (NPV)
d) Internal rate of return (IRR)

Pay back period is an undiscounted measure while other three measures are discounted measures of assessing investment worth. For estimating these parameters costs and returns are discounted at 11 per cent, being the rate at which medium and long term credit could be obtained from commercial banks.

Pay-Back Period

It is an undiscounted measure of the worth of an endeavor, which measures the efficiency of cultivation by indicating the period within which the returns offset the investment (Gittinger, 1984). According to pay-back criterion, shorter the pay back period the more desirable the project. The year at which progressive total of returns exceeds progressive total of costs is considered as pay back period.

Benefit cost ratio

The benefit cost ratio indicates the return on a rupee of investment. It is the ratio between the present worth of benefits and that of costs (Gittinger, 1984). A project with benefit cost ratio greater than unity is considered viable.

$$BCR = \frac{\Sigma\{B_t/(1+i)^t\}}{\Sigma\{C_t/(1+i)^t\}}$$

Where,

t=1……n years

(n =Total number of years of the project)

B_t = Benefits in t^{th} year

C_t = Costs in t^{th} year

I =Discount rate

Net present value

This is the present worth of the net cash flow stream (Gittinger, 1984). This is a most straightforward discounted cash flow measure of the project worth. It is expressed as the difference between the discounted stream of cumulated gross benefits and that of cumulated gross costs. The selection criterion for the net present value measure of project worth is to accept all projects with a positive net present value when discounted at the opportunity cost of capital.

$$NPV= \frac{\Sigma (B_t - C_t)}{(1+i)^t}$$

where,

t=1….n years

(n=Total number of years of the project)

Other symbols are as mentioned earlier.

Internal rate of return

This is the discount rate which just makes the net present value of the cash flow equal to zero. This discount rate is termed the Internal rate of return and it represents the average earning power of the money used in the project over the project life (Gittinger, 1984). If internal rate of return is above the opportunity cost of capital a project is considered worth to be to be accepted.

$$NPV = \frac{\Sigma (B_t - C_t)}{(1+i)^t} = 0$$

Other symbols are as mentioned above.

Sensitivity analysis was adopted to know how sensitive the returns from vanilla cultivation is to a fall in prices. The computation was done by trial and error method. The prices were reduced to find out the minimum price for green vanilla beans, below which the NPW will be negative and BCR will be less than 1 there by indicating financial non viability of the crop.

3.2.3.4 Trade competitiveness of vanilla

The export competitiveness of vanilla has been assessed by using Nominal Protection Coefficient (NPC). It measures the actual divergence or distortion between any given commodity's domestic price and its international or border price. Since a divergence represents the response of market interventions such as taxes, subsidies, government controlled prices and other policy instruments.

The NPC of commodity is the ratio of domestic price to its border price (international price)

$$NPCi = \frac{Pdi}{Pbi}$$

NPCi=Nominal protection coefficient for the i^{th} commodity in a given country.
Pdi =domestic price of i^{th} commodity at the producer or wholesaler level.
Pbi = border price of the i^{th} commodity.

3.2.3.5 Price behaviour

Price movements tend to affect the decisions of producers, buyers, consumers and the economy as a whole. Graphical method was employed to get a clear picture of the variations in international and domestic price of vanilla.

Results and Discussion

4. RESULTS AND DISCUSSION

The present study analyses the cost of production and marketing of vanilla along with the price behaviour and trade competitiveness. Keeping the objectives in view the data collected were subjected to statistical analysis and the results are presented and discussed in this chapter. This chapter is arranged in 8 sections as given below

4.1. General socio economic status of the respondents

4.2. Cultivation practices of vanilla

4.3. Cost of cultivation

4.4 Cost of production

4.5 Capital productivity analysis

4.6 Marketing of vanilla

4.7 Constraints in production and marketing

4.8. Trade competitiveness and Price behaviour

4.1 GENERAL SOCIO ECONOMIC STATUS OF THE SAMPLE FARMERS

A brief description of the general socio economic features of the respondent farmers with respect to land holding, family size, age, education, occupation and cropping pattern has been included in this section in order to serve as a background to the study.

4.1.1 Land holding

The sample farmers were grouped into three size groups on the basis of number of vanilla vines cultivated, viz, Class-I having 300-499 vines (C-I), Class –II with 500-699 vines (C-II) and Class –III having 700 and above (C-III). The distribution of respondents in the different size classes and the area under vanilla are given in Table 4.1.The number of vanilla growers under the three classes viz,

I, II and III were 53, 33 and 34 respectively. The respondents had an aggregate area of 70 hectare under vanilla

Table 4.1 Distribution of respondents according to area under vanilla

Class	Holding size (Number of vines)	Number	Area under vanilla (ha)	Average size of holding (ha)
C-I	300-499	53	18 (25.71)	0.34
C-II	500-699	33	24 (34.29)	0.73
C-III	700 and above	34	28 (40)	0.82
	Total	120	70 (100)	0.58

(Figures in parentheses indicate per cent to total)

with an average size of 0.58 hectare per holding. C-I class accounted for 25.71 per cent of the total area with an average size of 0.34 hectare per holding. For C-II, average holding size was 0.73 hectare and this group contributed 34.29 per cent to the total area. In the case of C-III, which contributed 40 per cent of the total area under vanilla, the average holding size was 0.82 hectares.

4.1.2 Age, sex and family size

The classification of family members of the respondents on the basis of age, sex and family size as given in Table 4.2 revealed that out of a total of 556 family members, 306 were males and 250 were females.

Regarding age groups, around 40 percent of total family members belonged to 20-40 years age group, followed by below 20 years (25.90 per cent) and 40-60 years (25 per cent). The class wise analysis revealed a similar pattern of distribution with males out numbering females in all the classes with 20-40 years age group dominating closely followed by below 20 years age group. The

average family size was found to be 4.6, and it was 3.32 in C-I, 5.73 in C-II and 5.62 in C-III.

Table 4.2 Classification of respondent's family based on age, sex and family size

Age groups	C-I		C-II		C-III		Total		
	M	F	M	F	M	F	M	F	Total
<20	35 (33.65)	13 (18.06)	28 (29.17)	20 (21.51)	30 (28.30)	18 (21.18)	93 (30.40)	51 (20.40)	144 (25.90)
20-40	27 (25.96)	44 (61.11)	32 (33.33)	46 (49.46)	40 (37.74)	31 (36.47)	99 (32.35)	121 (48.40)	220 (39.57)
40-60	32 (30.77)	9 (12.5)	28 (29.17)	18 (19.35)	24 (22.64)	28 (32.94)	84 (27.45)	55 (22)	139 (25)
>60	10 (9.62)	6 (8.33)	8 (8.33)	9 (9.68)	12 (11.32)	8 (9.41)	30 (9.80)	23 (9.2)	53 (9.53)
Total	104 (100)	72 (100)	96 (100)	93 (100)	106 (100)	85 (100)	306 (100)	250 (100)	556 (100)
Average family size	3.32		5.73		5.62		4.6		

(Figures in parentheses indicate per cent to total)

4.1.3 Education

The classification of the respondents according to their educational status as given in Table 4.3 showed that all the respondents were literate and 41 per cent of the total were having primary level education followed by 33.33 per cent having degree, 26.67 per cent having SSLC qualification and only 5.83 per cent of the respondents were post graduates. Class wise analysis pointed out that majority of respondents of C-I had a degree (39.62 per cent), while majority of C-II respondents had only primary level education (36.36) and 35.30 per cent of the respondents of C-III had SSLC qualification.

Table 4.3 Educational status of the respondents

Education	C-I	C-II	C-III	Total
Primary level	18 (33.96)	12 (36.36)	11 (32.35)	41 (34.17)
SSLC	14 (26.42)	6 (18.18)	12 (35.30)	32 (26.67)
Degree	21 (39.62)	9 (27.28)	10 (29.41)	40 (33.33)
Post graduation	0 (0.00)	6 (18.18)	1 (2.94)	7 (5.83)
Total	53 (100)	33 (100)	34 (100)	120 (100)

(Figures in parentheses indicate per cent to total)

4.1.4 Occupation

The distribution of respondents based on their occupation is given in Table 4.4.

Table 4.4 Distribution of respondents based on occupation

Occupation	C-I	C-II	C-III	Total
Govt. Service	3 (5.66)	10 (30.30)	5 (14.70)	18 (15.0)
Private	17 (32.08)	6 (18.18)	8 (23.53)	31 (25.83)
Agriculture	33 (62.26)	13 (39.40)	15 (44.12)	61 (50.84)
Business	0 (0)	4 (12.12)	6 (17.65)	10 (8.33)
Total	53 (100)	33 (100)	34 (100)	120 (100)

(Figures in parentheses indicate per cent to total)

It was observed that, majority of the respondents were engaged in agriculture (50.84 per cent) followed by private service (25.83 per cent) and government service (15 per cent). Among the three classes 62.26, 39.40, and 44.12 per cent in

C-I, C-II and C-III respectively were engaged in agriculture. Around 32.08 per cent of the respondents were working in private services in C-I, 18.18 per cent in C-II and 23.53 per cent in C-III.It was also observed that 30.30 per cent of the C-II respondents were in government services, while 17.65 per cent of C-III were engaged in business.

4.1.5 Cropping pattern of sample households

The cropping pattern of sample households as presented in Table 4.5 showed that the major crops grown by the respondents were perennials like rubber, arecanut, coconut, nutmeg, cocoa, banana, vanilla and miscellaneous crops which included both annuals and perennials. The gross cropped area of the respondents was 336.5 hectares. At the aggregate level rubber occupied major share (86.46 per cent) followed by arecanut (74.30 per cent). Vanilla, which was grown as an intercrop in arecanut and coconut gardens, accounted for over 61.95 per cent of the gross cropped area.

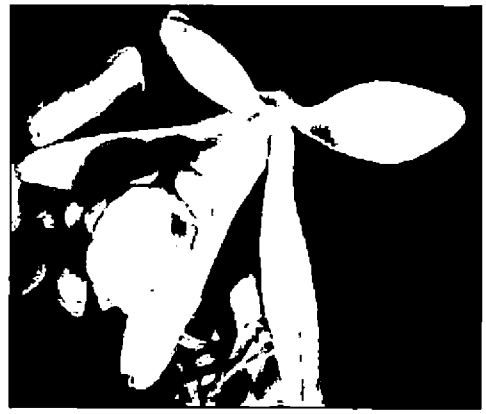
Table 4.5 Cropping pattern of sample households (Area in hectares)

Class	Coconut	Arecanut	Rubber	Nut meg	Cocoa	Miscellaneous crops	Banana	Vanilla	Total
C-I	16	23	26	3	1	6	2	18	95
	(16.84)	(24.21)	(27.37)	(3.16)	(1.05)	(6.32)	(2.11)	(18.95)	(100)
C-II	18	26	32	4	2	7	2	24	115
	(15.65)	(22.61)	(27.83)	(3.48)	(1.74)	(6.09)	(1.74)	(20.87)	(100)
C-III	20	32	36	2	0.5	6.5	1.5	28	126.5
	(15.81)	(25.30)	(28.46)	(1.58)	(0.40)	(5.14)	(1.18)	(22.13)	(100)
Total	54	81	94	9	3.5	19.5	5.5	70	336.5
	(48.30)	(74.30)	(86.46)	(8.22)	(3.19)	(18.14)	(5.01)	(61.95)	(305.57)

(Figures in parentheses indicate per cent to total)

Class wise analysis revealed similar pattern with rubber occupying the major share of gross cropped area in all the three classes. Vanilla accounted for 22.13 per cent of the total cropped area in C-III, 20.87 per cent in C-II, while in C-I it was 18.95 per cent.

Vanilla vine



Vanilla flower

Vanilla beans

Plate 1. *Vanilla planifolia*

4.2 CULTIVATION PRACTICES OF VANILLA

Vanilla requires a warm climate with an annual rainfall of 150-300 cm which is well distributed with the dry periods during flowering and harvesting. The optimum temperature for the successful growth of vanilla ranged from 25 ^{0} C to 32 ^{0} C.

4.2.1 Method of intercropping vanilla in coconut/arecanut gardens

Vanilla could be successfully grown as an intercrop in the coconut or arecanut based cropping systems and this provided additional revenue to the farmers. The farmers in the study area differed widely in the system of intercropping followed. The farmers grew vanilla as an intercrop either in arecanut gardens, coconut gardens or in a mixed plantation of coconut and arecanut. The method of intercropping followed by the different classes belonging to different stages of growth viz, establishment stage, steady yield stage and declining yield stage and their distribution is presented in Table 4.6. Regarding the establishment stage majority of farmers belonging to C-I (45 percent) and C-III (60 per cent) classes cultivated vanilla in the arecanut garden, while 60 per cent of the farmers of C-II grew vanilla as an intercrop in both arecanut and coconut gardens.

Among the farmers of steady yield stage, 78.9 percent of C-I and 61.54 per cent of C-III intercropped vanilla in a mixed plantation of arecanut and coconut while all the farmers of C-II resorted to the cultivation of vanilla in the arecanut garden. It was pointed out that intercropping of vanilla among arecanut was prevalent among farmers of C-I (40 per cent) and C-III (66.66 per cent) in the declining yield stage.

Plate 2. Farmers field in the study area

Table 4.6 Method of intercropping vanilla

	Establishment stage			Steady Yield stage			Declining Yield stage		
Cropping system	C-I	C-II	C-III	C-I	C-II	C-III	C-I	C-II	C-III
Arecanut	9 (45)	3 (20)	9 (60)	3 (21.1)	9 (100)	5 (38.46)	8 (40)	4 (44.45)	4 (66.66)
Coconut	8 (40)	3 (20)	0	0	0	0	6 (30)	0	2 (33.34)
Arecanut and coconut	3 (15)	9 (60)	6 (40)	10 (78.9)	0	8 (61.54)	6 (30)	5 (55.55)	0
Total	20	15	15	13	9	13	20	9	6

(Figures in parentheses indicate per cent to total)

While 55.55 per cent of C-II farmers intercropped vanilla in both coconut and arecanut gardens.

4.2.2 Type of support used

Vanilla requires a support upto a height of 130-135 cm. Low branching and leguminous trees with rough bark and small leaves were ideal support for trailing vanilla. Cuttings of *Plumaria alba*, *Erythrina lithosperma*, *Jatropa carcass* and *Glyricidia maculata* were suitable as live supports. Purchase, preparation and establishment of live and non-live support formed major component of the establishment cost. The farmers in the study area used *Glyricidia maculata* or the existing arecanut palms as live support.

Table 4.7 Type of support

Support	Establishment stage			Steady Yield stage			Declining Yield stage		
	C-I	C-II	C-III	C-I	C-II	C-III	C-I	C-II	C-III
Glyricidia	4 (20)	0	0	5 (38.46)	0	0	0	0	0
Glyricidia +Arecanut	0	0	0	0	0	0	4 (20)	0	0
Glyricidia+Non living support	16 (80)	12 (80)	0	0	5 (55.56)	4 (30.77)	0	4 (44.44)	0
Glyricidia +Arecanut +Non living support	0	3 (20)	15 (100)	8 (61.54)	4 (44.44)	9 (69.23)	16 (80)	5 (55.56)	6 (100)
Total	20	15	15	13	9	13	20	9	6

(Figures in parentheses indicate per cent to total)

In addition to the live support the farmers also practiced the system of providing additional non-living support for the trailing and coiling of vines. Table 4.7 showed the distribution of the farmers based on the type of the support used by them.

The farmers followed different practices for trailing the vanilla vines. 80 per cent of the farmers of C-I and C-II belonging to the establishment stage used non-living support in addition to glyricidia. The C-III farmers used non living support only for those vanilla trailed on arecanut palms. The same method was adopted by 61.54 per cent farmers belonging to C-I and 69.23 per cent belonging C-III of the steady yield stage. The farmers belonging to declining yield stage trailed vanilla on glyricidia itself. With the increase in age of palms, the farmers ascertained the need for providing additional support to the vines in order to prevent the uprooting of glyricidia due to the heavy weight of the vines. This too explains the reason why majority of small (80 per cent), medium (55.56 per cent)

and large (100per cent) farmers belonging to the declining yield stage provided additional non living support for the vines.

The cuttings of the support trees were planted at least six months before the planting of vanilla vines. The farmers in the study area did not follow a specific spacing for the support. After the establishment of support, planting of vanilla was carried out during august. One metre vine cuttings were used by the farmers for planting as they came to flowering and fruiting from the third year of establishment onwards. The recommended spacing for setting out vanilla cuttings was 3 m between plants and 2 m between rows in pits of size 40 x 40 X 40 cm. The farmers normally prepare pits of size 30 x 30 x 30 cm about 35 cm away from the base of the standard and filled it with FYM, sand and top soil and planted the vine. While planting one-metre long cuttings, the basal three or four leaves were pruned and the pruned basal portion of the cutting was pressed into the soil in such a way that all the three or four nodes were in close contact with the soil. The top portion of the vine was then tied to the support for facilitating trailing of vines. The farmers generally took the planting materials from the juvenile unflowered portion of the vine as yielded and over matured portion of the vines were shy in rooting and slow in sprouting. In order to ensure early rooting and better establishment, slight wilting of vine cuttings prior to planting was practiced among the farmers.

4.2.3 Source of planting material

Good quality planting material is a critical input necessary for the successful establishment of vanilla vines. The farmers obtained the planting materials from different sources like large growers, Spices Board, private agencies and own farm. The distribution of farmers based on the source of planting material as given in Table 4.8 showed that in the establishment stage all the farmers of C-III used the planting materials from their own farm while 70 per cent of farmers in the C-I and 80 per cent of C-II procured the planting material from

large growers. It was generally observed that the farmers relied on the quality of the planting materials procured from the large established vanilla growers. The same was the case with the farmers belonging to steady yield stage where 78.9 percent of farmers of C-I, all farmers of C-II and 38.46 percent of C-III classes purchased planting material from large growers.

In contrast to these it was observed in the declining yield stage that majority of the farmers (70, 77.78 and 100 per cent of C-I, C-II and C-III respectively) procured the planting material at the time of planting from the Spices Board.

Table 4.8 Source of planting material

	Establishment stage			Steady Yield			Declining Yield period		
	C-I	C-II	C-III	C-I	C-II	C-III	C-I	C-II	C-III
Own farm		3 (20)	15 (100)						
Large growers	14 (70)	12 (80)		10 (78.9)	9 (100)	5 (38.46)	6 (30)	2 (22.22)	
Spices board	2 (10)			3 (21.1)		8 (61.54)	14 (70)	7 (77.78)	6 (100)
Private agencies	4 (20)								
Total	20 (100)	15 (100)	15 (100)	13 (100)	9 (100)	13 (100)	20 (100)	9 (100)	6 (100)

(Figures in parentheses indicate per cent to total)

4.2.4 Manures

The farmers adopted the practice of using organic manures as it was considered to be ideal for vanilla cultivation. FYM, neem cake, and groundnut cake were commonly used for manuring. It was observed that the farmers varied in the application of manures. Dry cowdung was applied once in a year followed

by the application of fermented slurry of cowdung, neem cake and ground nut cake three to four times a year. The source of cowdung was either from their own farms or from nearby farms. The quantity of manures applied per hectare for the different periods of growth is shown in Table 4.9 revealed that the quantity of cowdung applied was more during the establishment period for C-I class compared to the steady yield period and declining yield period. But in C-III more quantity of cowdung was applied during the steady yield period. The quantity of ground nut cake and neem cake applied was more during the declining yield stage in C-I.

Table 4.9 Quantity of fertilizers applied (kg per hectare)

	Establishment stage			Steady Yield stage			Declining Yield stage		
	C-I	C-II	C-III	C-I	C-II	C-III	C-I	C-II	C-III
Cowdung	7045	5549	6066	5631	5193	6233	5023	5211	5113
Ground nut cake	147	304	430	153	295	250	160	227	278
Neem cake	147	304	340	153	295	250	160	227	286

Figures in parentheses indicate per cent to total

Contrary to this in C-II the quantity of groundnut cake and neem cake applied was more during the establishment period. The C-III farmers used maximum quantity of ground nut cake and neem cake during the steady yield stage.

4.2.5 Trailing and coiling of vines

In order to facilitate induction of flowering and promotion of vegetative growth the farmers practiced a special system of trailing and coiling. When the vines attained a height of 150 cm, the after growth has to be trailed downwards very close to the ground leaving a gap of 35 cm and again coiled up like a loose

loop. Support trees were suitably pruned at the convenient height for easy trailing of vines. The system of establishing ropes in between the support for trailing the vines was widely practiced among the farmers. This was an essential farm operation for flowering, easy hand pollination as well as for facilitating the formation of aerial roots. According to the farmers more number of yielding vines also could be produced by adopting this system of trailing. The top most leaf of the hanging vine which was positioned at the point of coiling, i.e., 150 cm height from the ground, was folded backwards and the axillary bud was exposed to sunlight. A new shoot would develop from the axillary bud. It was necessary to remove the yielded senile portion of the vine periodically in order to reduce the biomass of the vanilla vines.

4.2.6 Shade regulation

Pruning or lopping of the support trees was carried out to provide 50 per cent shade to the vanilla vines. This was an operation carried out two times in a year before the onset of south west monsoon and north east monsoon. A slight reduction in shade was also provided one – two months prior to flower bud initiation.

4.2.7 Weeding and Mulching

Vanilla is a surface feeder and the surface soil should not be disturbed once the crop is established. However the farmers resorted to removal of weeds by slashing and these weed biomass were spread around vanilla basins as mulch. The practice of spreading organic waste materials such as dry leaves, bushy, chopped dry stems, loppings from the support trees etc. was widely practiced among the farmers for enriching soil organic matter around the base of plants.

4.2.8 Irrigation

The farmers practice both manual irrigation as well as irrigation through the sprinkler system. Internal plant water status decided the pattern of growth in vanilla. A lower plant water potential result in induction of flowering and a higher potential encourages vegetative growth. Being an orchid, it is able to absorb moisture if the atmospheric moisture potential is higher than that of vanilla. So, the farmers were seen to adopt sprinkler irrigation as it provided a favourable microclimate for absorption of moisture through leaves besides supplementing soil moisture. The distribution of farmers based on the system of irrigation followed is presented in Table 4.10 and it was found out that in the establishment stage 50 per cent of the small farmers resorted to the use of manual irrigation while 73.33 of medium farmers and 100 per cent of large farmers adopted the system of sprinkler irrigation.

Table 4.10 Type of irrigation followed by the farmers

	Establishment stage			Steady yield stage			Declining yield stage.		
Irrigation system	C-I	C-II	C-III	C-I	C-II	C-III	C-I	C-II	C-III
Sprinkler	10 (50)	11 (73.33)	15 (100)	3 (23.07	3 (33.33)	8 (61.54)	5 (33.33)	4 (44.44)	4 (66.66)
Manual	10 (50)	4 (26.67)	0	10 (76.93)	6 (66.64	5 (38.46)	15 (66.67)	5 (55.56)	2 (33.34)
Total	20 (100)	15 (100)	15 (100)	13 (100)	9 (100)	13 (100)	20 (100)	9 (100)	6 (100)

(Figures in parentheses indicate per cent to total)

Majority of large farmers in Class III in the steady yield stage and declining yield stage adopted the sprinkler system of irrigation while small farmers preferred manual irrigation.

4.2.9 Flowering and pollination

Flowering of vanilla vines commenced usually from the third year of planting. Regulation of shade and slight wilting of vines encourage flowering. The farmers avoided irrigation two months prior to the flower bud initiation. One month prior to flower bud initiation, they pruned the top 1 m of vine and sold it as

fresh planting material. The normal flowering season in the area was from February to April and there was only one flowering season in a year. It took 45 days from the initiation of inflorescence to opening of first flower. Due to peculiar structure of flowers self pollination is not possible in vanilla. Hence the farmers adopted hand pollination for fruit set. The farmers did pollination from 6 am to 11 am in the morning. Successful fertilization was indicated by the retention of floral parts even after four days of pollination.

4.2.10 Harvesting

The pods ripen in about 9-11 months time. Before attaining maturity the fruit will be dark green in colour and when ripe yellowing will commence from the tip of the pod. This is the optimum time for harvesting the pods. The harvesting started in October and ended in December. As there was no uniformity in the development of pods even in a single inflorescence due to variations in flower bud initiations, there was no synchronization in the maturity of pods and each pod should be harvested separately by looking at its colour.

Every hanging shoot prepared for flowering has the potential to produce an inflorescence from every leaf axil. Once the hanging vine has fully transformed into fruiting vine and the leaf nodes have produced a flower bunch, the vine should be cut and removed to reduce the biomass load on the vanilla plant.

4.2.11 Plant protection

It was observed that the farmers in the study area generally sprayed 1 per cent Bordeaux mixture two times a year from third year onwards to control major diseases of vine. The spraying was not practiced during the period of flowering and pod setting. The farmers also practiced soil application of biocontrol agent like *Pseudomonas.*

4.2.12 Source of information regarding the cultivation practices of vanilla

The major sources of information were the fellow farmers, Spices Board, magazines and others like television, radio and training programmes. The distribution of farmers based on their source of information as presented in Table 4.11 revealed that majority of the farmers in all the three classes C-I (54.75 per cent), C-II (48.48 per cent) and C-III (35.29 per cent) relied on fellow farmers for the information on cultivation practices of vanilla.

Table 4.11 Source of information regarding the cultivation practices of vanilla

Source of information	C-I	C-II	C-III
Fellow farmers	29 (54.72)	16 (48.48)	12 (35.29)
Spice board	14 (26.42)	8 (24.24)	8 (23.53)
Magazines	10 (18.87)	5 (15.15)	10 (29.41)
Others	0	4 (12.12)	4 (11.76)
Total	53 (100)	33 (100)	34 (100)

(Figures in parentheses indicate per cent to total)

4.3 COST OF CULTIVATION OF VANILLA

Vanilla is a perennial crop where the flow of income and expenditure is spread over a long period. The first three years represent the establishment stage while the steady yield stage is represented by five to nine years and the declining yield stage is represented by ten to fifteen years. The farmers were post stratified into small sized farmers (300-499 vines), medium sized farmers (500-699 vines) and large sized farmers (700 vines and above) here in after referred to as C-I, C-II and C-III.

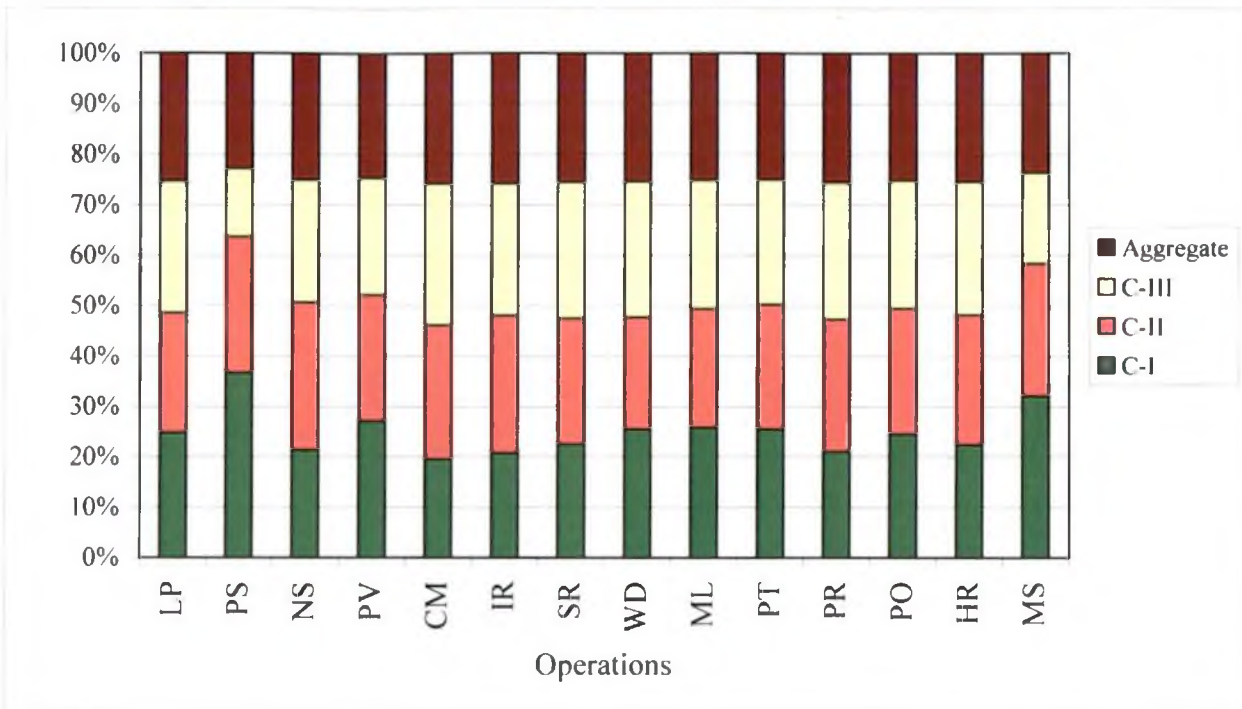


Fig.4.1 Comparison of operation wise costs during the establishment stage

LP-Land preparation
IR-Irrigation
ML-Mulching
PT-Plant protection chemicals and application
CM- Cost of manures and manuring
SR-Shade regulation
PV-Preparation and planting of vines
MS-Miscellaneous
PS-Preparation and planting of support
NS-Establishment of non living support
PR-Pruning
PO-Pollination
HR-Harvesting
WD-Weeding

and it was Rs. 55456, Rs.58343 and Rs.58577 per hectare for C-I, C-II and C-III respectively. The major share of cost was accounted by manures (28.35 per cent) followed by plant protection (17.04 per cent) and pollination (16.36 per cent). Class wise analysis pointed out that manures contributed Rs.14158, Rs.16468, and Rs.17273 in C-I, C-II and C-IIII respectively. The share of cost for plant protection ranged from Rs.8235 in C-I to Rs.10490 in C-III.

Table 4.13 Cost of maintenance during steady yield stage (Rs/ha/year)

Particulars	C-I	C-II	C-III	Aggregate
Manures /application	14158 (25.53)	16468 (28.23)	17273 (29.49)	16393 (28.35)
Plant protection/application	8235 (14.85)	9851 (16.88)	10490 (17.91)	9840 (17.04)
Shade regulation	5447 (9.82)	5506 (9.43)	5538 (9.45)	5508 (9.52)
Weeding	2655 (4.79)	2704 (4.63)	2616 (4.47)	2645 (4.57)
Mulching	2757 (4.97)	2720 (4.66)	2706 (4.62)	2721 (4.7)
Irrigation	3881 (7)	3107 (5.33)	3061 (5.23)	3254 (5.62)
Pruning	2264 (4.08)	3115 (5.35)	2386 (4.07)	2358 (4.08)
Pollination	9999 (18.03)	9432 (16.17)	9252 (15.79)	9460 (16.36)
Harvesting	3183 (5.74)	2382 (4.08)	3012 (5.14)	3061 (5.29)
Miscellaneous	2877 (5.19)	3058 (5.24)	2243 (3.83)	2589 (4.47)
Total	55456 (100)	58343 (100)	58577 (100)	57829 (100)

(Figures in parentheses indicate per cent to total)

It may be noted that during the steady yield stage, there was not much variation among the classes with respect to the total maintenance cost. Small vanilla plantations recorded the lowest cost on account of low expenses incurred for manures, and plant protection. Small farmers incurred a higher cost towards

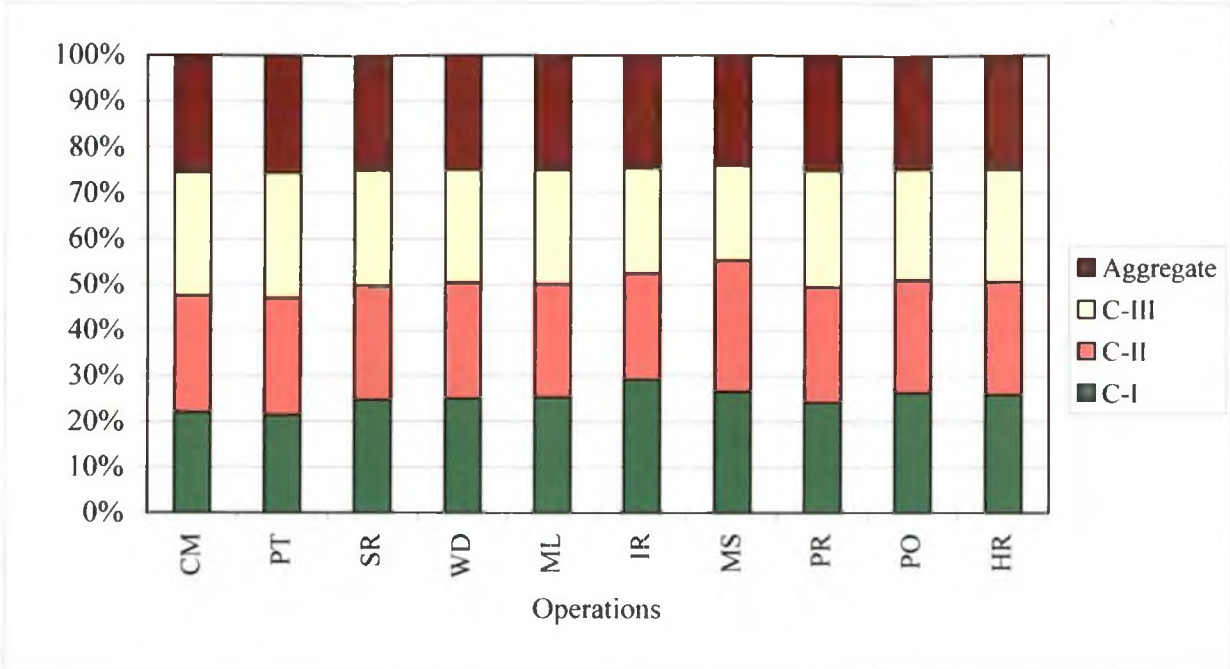


Fig.4.2 Comparison of operation wise costs during the steady yield stage

IR- Irrigation
ML- Mulching
PT- Plant protection chemicals and application
CM- Cost of manures and manuring
SR- Shade regulation
MS-Miscellaneous
PR-Pruning
PO-Pollination
HR-Harvesting
WD-Weeding

irrigation as 40 per cent of them resorted to manual irrigation as shown in Table 4.10. There was a general increase in the cost incurred towards cultural operations like shade regulation, weeding and mulching during the maintenance stage when compared to establishment stage. The vines were young and actively growing during this stage necessitating frequent trailing and coiling followed by shading and mulching. Cost incurred for pollination and harvesting had also increased.

The above results were in line with the findings of Madan (2004), where a total maintenance cost of Rs.21084 per acre was reported with the highest share of cost for compost. The study by Madan *et al.* (2003) also supported the results of the present study. Sethi (2002) estimated the maintenance cost from fifth year onwards as Rs 15,000 per hectare in Tripura state. The lower cost reported here could be attributed to the difference in the region, cultural practices, wage rates and input costs.

4.3.1.3 Cost of maintenance during the declining yield stage

The annual maintenance cost during the declining yield period as presented in Table 4.14 worked out to Rs.57313 at the aggregate level and it was Rs. 56042, Rs. 58158, and Rs. 58507 for C-I, C-II, and C-III respectively.

Manures contributed the major share (24.53 per cent) of the total cost followed by plant protection (18.72 per cent) and pollination (15.01 per cent). Class wise analysis also revealed a similar pattern, with manures contributing 21.55 per cent, 24.98 per cent and 27.07 per cent respectively in C-I, C-II and C-III. While the share of plant protection varied from 17.45 per cent in C-II to 20.19 per cent in C-III, along with 18.13 per cent in C-I.

Table 4.14 Cost of maintenance during declining yield stage (Rs /ha /year)

Particulars	C-I	C-II	C-III	Aggregate
Manures	12078 (21.55)	14533 (24.98)	15841 (27.07)	14059 (24.53)
Plant protection	10162 (18.13)	10149 (17.45)	11813 (20.19)	10727 (18.72)
Shade regulation	6207 (11.08)	6277 (10.79)	6180 (10.56)	6147 (10.73)
Weeding	2909 (5.19)	2829 (4.86)	2101 (3.59)	2584 (4.51)
Mulching	2982 (5.32)	2998 (5.15)	3041 (5.2)	2998 (5.23)
Irrigation	4158 (7.42)	3251 (5.59)	2467 (4.22)	3287 (5.73)
Pruning	3006 (5.36)	3200 (5.5)	3298 (5.64)	3154 (5.5)
Pollination	8504 (15.17)	8684 (14.66)	8721 (14.9)	8602 (15.01)
Harvesting	2885 (5.15)	2998 (5.15)	3005 (5.14)	2949 (5.14)
Miscellaneous	3152 (5.63)	3419 (5.87)	2040 (2.49)	2806 (4.9)
Total	56042 (100)	58158 (100)	58507 (100)	57313 (100)

(Figures in parentheses indicate per cent to total)

The total maintenance cost during the declining yield stage was lower than the steady yield stage and there was not much variations among the three classes. It may be mentioned that small plantations recorded the lowest cost on account of the low cost incurred towards plant protection and manures. There was a higher contribution towards plant protection in the declining yield stage when compared to other two stages of growth. Incidence of diseases associated with the vines during the declining stages of the growth period induced the farmers to adopt more plant protection methods. There was a general increase in the costs incurred towards shade regulation during this stage. The cost towards pollination, and harvesting showed a declining trend during this stage while cost towards pruning

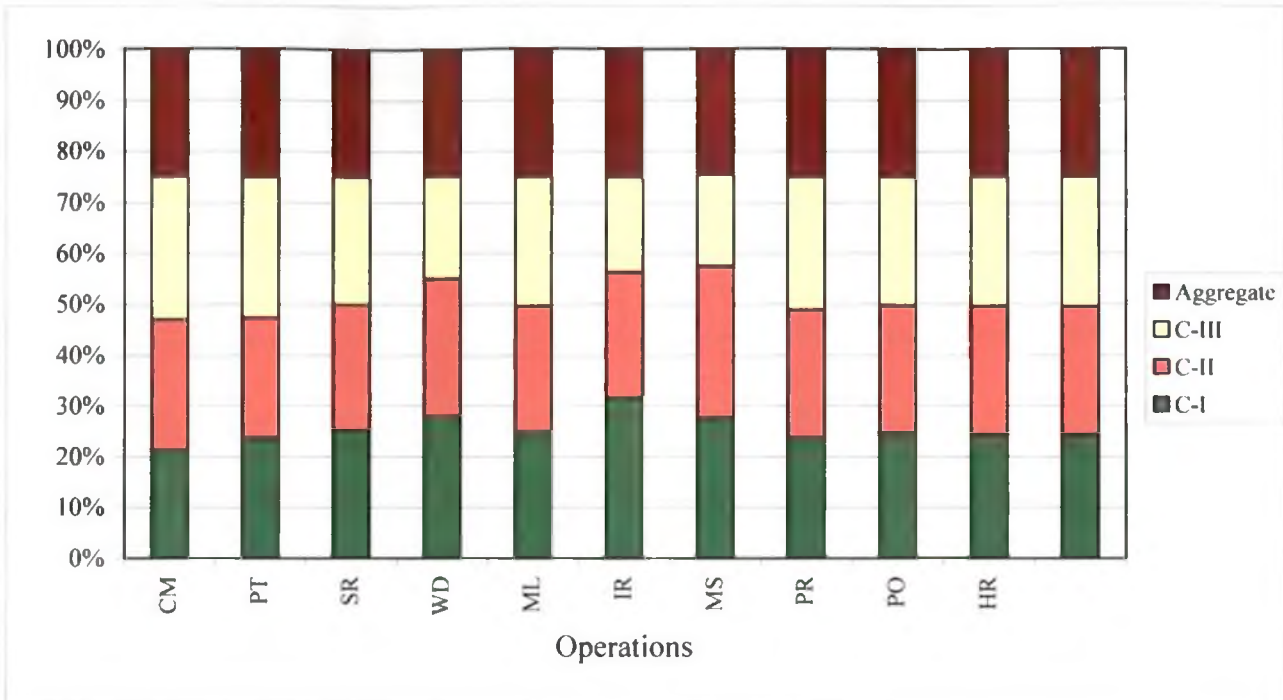


Fig.4.3 Comparison of operation wise costs during the declining yield stage

IR - Irrigation
ML- Mulching
PT - Plant protection chemicals and application
CM- Cost of manures and manuring
SR - Shade regulation
MS-Miscellaneous
PR- Pruning
PO- Pollination
HR-Harvesting
WD-Weeding

had increased because the farmers tried to earn additional profit by selling the vine cuttings as fresh planting material.

Contrary to the above results, Sethi (2002) estimated the maintenance cost during the declining yield stage to be Rs 15,000 per hectare. The lower cost reported here could be attributed to the regional variations, difference in cultural practices, wage rates and input costs.

Based on the results of operation wise cost of cultivation of vanilla in the different stages an attempt has been made to explain the break up of explicit and implicit costs by employing the ABC costs concepts.

4.3.2 Input wise cost of cultivation

The input wise cost of cultivation was estimated for the three classes belonging to the three stages of growth, viz, establishment stage, steady yield stage and declining yield stage and are presented in the following section.

4.3.2.1 Input wise cost during establishment stage

The total paid out cost during the establishment stage comprised of expenditure on major items like planting materials, living and non living support, irrigation system, manures and plant protection, hired labour, land revenue and depreciation. In addition to these, interests on working capital and fixed capital, rental value of own land and imputed value of family labour were also accounted.

The break up of establishment cost as shown in Table 4.15 pointed out that the cost C_3 at the aggregate level worked out to Rs.193205 and it varied from Rs.180049 in C-I to Rs.205658 in C-II. The major share of the total paid out cost was contributed by non living support (16.05 per cent) followed by irrigation (14.52 per cent), planting materials (9.71 per cent) and hired labour (9.56 per

cent). Class wise analysis also showed a similar trend. It was observed that the family labour contributed 12.53 per cent to Cost C_3 in C-I, 10.33 per cent in C-II and 10.10 per cent in C-III.

Table 4.15 Input wise cost during the establishment stage (Rs/ ha)

Particulars	C-I	C-II	C-III	Aggregate
Planting materials	20800 (11.55)	19084 (9.28)	17600 (9.41)	18762 (9.71)
Live support	9600 (5.33)	6813 (3.31)	3065 (1.64)	5645 (2.92)
Non living support	26167 (14.53)	36264 (17.63)	30160 (16.12)	31015 (16.05)
Manures	10713 (5.95)	13151 (6.39)	14792 (7.91)	13384 (6.93)
Plant protection	8869 (4.93)	8970 (4.36)	8959 (4.79)	8942 (4.63)
Irrigation	21433 (11.9)	31433 (15.28)	29148 (15.58)	28045 (14.52)
Miscellaneous	458 (0.25)	389 (0.19)	452 (0.24)	435 (0.23)
Land revenue	100 (0.06)	100 (0.05)	100 (0.05)	100 (0.05)
Depreciation	3367 (1.87)	4718 (2.29)	4634 (2.48)	3804 (1.97)
Hired labour	16848 (9.36)	18969 (9.22)	19128 (10.22)	18471 (9.56)
Interest on working capital	700 (0.39)	777 (0.38)	790 (0.42)	764 (0.4)
Cost A1/A2	119055	140668	128828	129367
Interest on own fixed capital	17068 (9.48)	20051 (9.75)	17358 (9.28)	20863 (10.8)
Cost B1	136123	160719	146186	150230
Rental value of own land	5000 (2.78)	5000 (2.43)	5000 (2.67)	5000 (2.59)
Cost B2	141123	165719	151186	155230
Imputed value of family labour	22558 (12.53)	21243 (10.33)	18891 (10.1)	20411 (10.56)
Cost C1	158681	181962	165077	170641
Cost C2	163681	186962	170077	175641
Cost C3	180049	205658	187085	193205

(Figures in parentheses indicate per cent to total)

As pointed out in the earlier observations the medium sized holdings incurred higher total cost during the establishment stage on account of high cost towards irrigation system and non living support. The cost incurred for manures was low in small holdings when compared to medium and large sized holdings. The maximum utilization of family labour was by small farmers and minimum by large farmers. As explained earlier the findings of Madan (2004) and Madan *et al* (2003) were in line with the above findings.

The total establishment cost estimated by Suryanarayana (2004) was Rs. 1,72,000 for one hectare. The high cost here is due to the higher expenses incurred for planting materials

The item wise maintenance cost worked out for the three classes during the steady yield stage as given in Table 4.16 revealed that cost C3 worked out to Rs. 81057 at the aggregate level and it was Rs. 77508, Rs. 83444 and Rs. 83466 for C-I, C-II and C-III respectively. Cost towards hired labour formed the major component (20.07 per cent) of the total paid out cost followed by manures (14.60 per cent) and plant protection (9.35 per cent). Class wise analysis also showed identical results, with hired labour contributing 22.07, 19.43 and 22.48 per cent respectively in C-I, C-II and C-III.

4.3.2.2 Input wise maintenance cost during the steady yield stage

The cost incurred for plant protection was lower compared to the establishment yield stage. The labour cost has increased during the steady yield stage compared to the establishment stage. The involvement of family labour was highest in small holdings while it was lowest in medium sized holdings along with a higher utilization of hired labour.

Similar findings were reported by Madan *et al.* (2003) and Madan (2004) as explained earlier in the operation wise analysis of costs.

Table 4.16 Input wise cost during steady yield stage (Rs/ha/year)

Particulars	C-I	C-II	C-III	Aggregate
Manures	9460 (12.21)	12557 (15.05)	12494 (14.97)	11835 (14.6)
Plant protection	6941 (8.96)	7243 (8.68)	7986 (9.57)	7580 (9.35)
Irrigation	2757 (3.56)	2527 (3.03)	2518 (3.02)	2573 (3.17)
Miscellaneous	221 (0.29)	724 (0.87)	751 (0.9)	627 (0.77)
Land revenue	100 (0.13)	100 (0.12)	100 (0.12)	100 (0.12)
Depreciation	3367 (4.34)	4718 (5.65)	4634 (5.5)	3804 (4.69)
Hired labour	14986 (19.33)	17179 (20.59)	16403 (19.65)	16271 (20.07)
Interest on working capital	601 (0.78)	704 (0.84)	703 (0.84)	681 (0.84)
Cost A1/A2	38433	45752	45589	43471
Interest on own fixed capital	5940 (7.66)	6994 (8.38)	6865 (8.22)	6275 (7.74)
Cost B1	44373	52746	52454	49746
Rental value of own land	5000 (6.45)	5000 (5.99)	5000 (5.99)	5000 (6.17)
Cost B2	49373	57746	57454	54746
Imputed value of family labour	21089 (27.21)	18112 (21.7)	18424 (22.07)	18943 (23.37)
Cost C1	65462	70858	70878	68689
Cost C2	70462	75858	75878	73689
Cost C3	77508	83444	83466	81057

(Figures in parentheses indicate per cent to total)

4.3.2.3 Input wise cost of cultivation during the declining yield stage

The break up of the maintenance cost during the declining yield stage as shown in Table 4.17 revealed that the cost C3 at the aggregate level was Rs.79407, and it worked out to be Rs.77320, Rs. 81917 and Rs.81354 for C-I, C-II and C-III respectively. Cost towards hired labour formed the major component of the paid out costs (23.72 per cent) followed by manures (13.38 per cent) and

plant protection chemicals (10.81per cent). Class wise analysis also revealed similar pattern.

Table 4.17 Input wise cost during the declining yield stage

Particulars	C-I	C-II	C-III	Aggregate
Manures	9023 (11.67)	10895 (13.3)	12140 (14.92)	10625 (13.38)
Plant protection	7981 (10.32)	7892 (9.63)	9761 (12))	8580 (10.81)
Irrigation	2485 (3.21)	2644 (3.23)	2027 (2.49)	2352 (2.96)
Miscellaneous	242 (0.31)	691 (0.84)	721 (0.89)	535 (0.67)
Land revenue	100 (0.13)	100 (0.12)	100 (0.12)	100 (0.13)
Depreciation	3367 (4.35)	4718 (5.76)	4634 (5.7)	3804 (4.79)
Hired labour	17065 (22.07)	15920 (19.43)	18292 (22.48)	18836 (23.72)
Interest on working capital	644 (0.83)	666 (0.81)	751 (0.92)	716 (0.90)
Cost A1/A2	40907	43526	48426	45548
Interest on own fixed capital	5139 (6.65)	5828 (7.11)	4966 (6.1)	5255 (6.62)
Cost B1	46046	49354	53392	50803
Rental value of own land	5000 (6.47)	5000 (6.1)	5000 (6.15)	5000 (6.3)
Cost B2	51046	54354	58392	55803
Imputed value of family labour	19245 (24.89)	20116 (24.56)	15566 (19.13)	16385 (20.63)
Cost C1	65291	69470	68958	67188
Cost C2	70291	74470	73958	72188
Cost C3	77320	81917	81354	79407

(Figures in parentheses indicate per cent to total)

It was noted that there was a tendency for higher use of plant protection methods during the replanting period due to the higher incidence of diseases associated with the vines. A decrease in the use of manures during the declining

yield stage compared to the steady yield stage was also observed and utilization of family labour was more than hired labour during the declining yield stage.

Sethi (2002) estimated the maintenance cost during declining yield stage as Rs.15,000 per hectare in Tripura state. The lower cost reported here could be attributed to the difference in the region, cultural practices, wage rates and input costs.

4.4 COST OF PRODUCTION.

Based on the discussions on the cost of cultivation for vanilla (both operation wise and input wise) the yield and returns obtained were examined along with the cost of production and is presented in the following sections.

4.4.1 Yield and returns

Considering the productive crop cycle of vanilla to be 15 years, the average yield and returns per hectare in the different classes belonging to the three stages of growth period were analysed and presented in Table 4.18,4.19 and 4.20. The total returns from vanilla was obtained by selling both main product (green beans) as well as the by product (one metre long planting material).

The returns from green beans started from third year and it remained stable from fourth to ninth year and declined during tenth to fifteenth year. The returns from green beans for the different classes during the three stages of growth showed that at the aggregate level, the yield increased from 278 kg per hectare during the establishment stage to 1289 kg per hectare during the steady yield stage followed by a decline in yield (480 kg per hectare) from tenth year onwards. Class wise analysis also showed similar pattern with an average yield of 1312 kg per hectare, 1287 kg per hectare and 1280 kg per hectare in C-I, C-II and C-III respectively during the stabilized yield stage. The average yield declined during

Table 4.18 Yield and returns during establishment stage

Establishment stage					
Classes	Total quantity of by product (one metre vine)	Returns from by product (Rs)	Total quantity of green beans (Kg)	Returns from green beans (Rs)	Total benefit (Rs)
C-I	68	879	286	71484	72363
C-II	86	1118	280	70000	71118
C-III	87	1131	272	68000	69131
Aggregate	82	1066	278	69500	70566

Table 4.19 Yield and returns during steady stage

Classes	Total quantity of by product (one metre vine)	Returns from by product (Rs)	Total quantity of green beans (Kg)	Returns from green beans (Rs)	Total benefit (Rs)
C-I	90	1168	1312	328000	329168
C-II	101	1318	1287	321811	323129
C-III	107	1391	1280	320000	321391
Aggregate	102	1326	1289	322250	323576

Table 4.20 Yield and returns during establishment stage

Classes	Total quantity of by product (one metre vine)	Returns from by product (Rs)	Total quantity of green beans (Kg)	Returns from green beans (Rs)	Total benefit (Rs)
C-I	145	1891	560	140000	141891
C-II	182	2365	480	120000	122365
C-III	194	2522	400	100000	102522
Aggregate	173	2249	480	120000	122249

tenth year and it was 560 kg per hectare in C-I, 480 kg per hectare in C-II and 400 kg per hectare in C-III.

The returns from the by product at the aggregate level worked out to be Rs. 1066 during the establishment period and it increased to Rs. 1326 during the steady yield stage and Rs. 2249 during the declining yield stage. A similar trend was observed in all the three classes during the three stages of growth period. The maximum returns from by product in all the three classes was obtained during the declining yield stage with Rs. 2522 in C-III, Rs. 2365 in C-II and Rs. 1891 in C-I. It was observed that the returns from the by product commenced from the third year onwards and increased during the steady yield stage and declining yield stage.

It may be noted that the most productive phase of vanilla cultivation ended by tenth year of cultivation, and thereafter replanting could be thought of in appropriate time. The results also emphasised on the unproductive phase of vanilla cultivation after 12 years. The findings of Suryanarayana (2004) were in line with the above results. He reported an average yield of 168 kg of green beans from one acre during the stabilized yield stage. In contrast to the above findings Madan (2004) reported an average yield of 82.25 kg of green beans per hectare during stabilised yield stage in Karnataka state. The low yield could be attributed to the differences in the cultivation practices and overall maintenance of the vanilla crop in addition to the regional difference. Sethi (2002) reported an annual yield of 300 kg per hectare in Tripura state which was contrary to the results of the present study. The low returns reported here could be attributed to the difference in the region and the cultural practices adopted in maintaining the vanilla.

On the basis of the estimated establishment cost and maintenance cost, the cost of production was worked out and is presented in what follows.

4.4.2 Cost of production

Cost of production was worked out in terms of the cost involved in producing one kilogram of green beans. It included the variable costs on various cultural practices during the maintenance of vanilla crop and the fixed costs. The establishment period was considered as three years and the total investment for the initial three years was totaled to get the establishment cost. The establishment cost and the compound interest there on were reduced to an annuity bearing 11 per cent interest. The cost of production worked out for the three classes during the establishment stage, steady yield stage and the declining yield stage as shown in Table 4.21, 4.22 and 4.23 pointed out an aggregate cost of production of Rs. 309 per kg of green beans during the establishment stage, Rs.72 per kg during the steady yield stage and Rs.177 per kg of green beans during the declining yield stage. Class wise analysis also revealed similar pattern with the lowest cost of production during the steady yield stage and highest during the establishment stage. The cost of production was minimum in C-I (Rs.65 per kg of green beans) while it was Rs.71 per kg in C-II and Rs.70 per kg in C-III.

It was observed that cost of production was more during the later stages of growth than the beginning stages of vanilla production. From this it can be inferred that the most productive phase of vanilla cultivation ended by the tenth year of cultivation and thereafter replanting could be thought of in appropriate time.

In contrast to the above results Madan (2004) worked out the cost of production during the steady yield stage as Rs.334 per kg of green beans in Karnataka. The high cost of production was due to the low average yield of 82 kg per hectare recorded during the stabilized yield stage.

Table 4.21 Cost of production during establishment stage

Particulars	C-I	C-II	C-III	Aggregate
Total Establishment cost (establishment cost +Compound interest @ 11 per cent) (Rs/ha)	199853	228280	507664	214458
Annualised value	27757	31706	28842	29786
Annual maintenance cost (Rs/ha)	51375	53537	54766	54075
Interest on annual maintenance cost	2826	2945	3012	2974
Total cost (Rs/ha)	81958	88187	86620	86835
Income from by products	879	1118	1131	1066
Net cost (Rs/ha) (Total cost –Income from by products)	81079	87069	85489	85769
Average production (Kg/ha)	286	280	272	278
Cost of production (Rs/Kg)	283	311	314	309

Table 4.22 Cost of production during steady yield stage

Particulars	C-I	C-II	C-III	Aggregate
Establishment cost (Rs/ha)	199853	228280	207664	214458
Annualised value	27757	31706	28842	29786
Annual maintenance cost	55456	58343	58577	57829
Interest on annual maintenance cost (Rs/ha/yr)	3050	3209	3222	3181
Total cost (Rs/ha/yr)	88295	95873	93164	92736
Income from by products	1168	1318	1391	1326
Net cost (Rs/ha) (Total cost –Income from by products)	87127	94555	91773	91410
Average production (Kg /ha)	1581	1545	1555	1289
Cost of production (Rs/kg)	55	61	59	71

Table 4.23 Cost of production during declining yield stage

Particulars	C-I	C-II	C-III	Aggregate
Establishment cost (Rs/ha)	199853	228280	207664	214458
Annualised value	27757	31706	28842	29786
Annual maintenance cost	56042	58158	58507	57313
Interest on annual maintenance cost (Rs/ha/yr)	3082	3199	3218	3152
Total cost (Rs/ha/yr)	86880	93062	90567	87251
Income from by products	1891	2365	2522	2249
Net cost (Rs/ha) (Total cost –Income from by products)	84989	90697	88045	85002
Average production (Kg /ha)	560	480	400	480
Cost of production (Rs/kg)	152	189	220	177

Vanilla is a perennial crop with considerable initial investments and returns spread over a long period and an attempt has been made to find out the financial viability of the crop using capital productivity analysis

4.5 Capital productivity analysis

Capital productivity analysis was resorted to for bringing out the efficiency in capital use in vanilla production. As vanilla has a gestation period with considerable investments during the establishment period and with returns remaining spread over a long period, economics of investments and returns were attempted to evaluate through capital productivity analyses, viz. (a) Pay back period (b) Benefit –cost ratio (c) Net present value (d) Internal rate of return. The estimated costs of cultivation and returns obtained were used for these computations. Average price received by the farmers were taken into account to arrive at the returns from the sale of green beans. Capital productivity analysis done at the aggregate level as well as the three size groups is presented in Annexure I, II, III and IV and the results are presented in Table 4.24

Table 4.24 Capital productivity analysis

Particulars	C-I	C-II	C-III	Aggregate
NPV	839023	762165	744558	778357
BCR	3.2	2.8	2.9	2.9
PBP	3years	3years	3years	3 years
IRR	>50 per cent	>50 per cent	>50 per cent	>50 per cent

4.5.1 Pay –back period

Pay back period is the length of time required from the beginning of the project before the net benefits paid back the cost of the capital investment in the project. The pay back period worked out for the three classes as well as the aggregate level was found to be three years indicating that the total investment on vanilla would be covered by the returns obtained after three years. A very short pay back period pointed out the financial viability of the crop.

4.5.2 Benefit cost ratio

Benefit cost ratio indicated the returns on a rupee of investment. It is the ratio of the present worth of benefits to that of present worth of costs. The project with BC ratio greater than unity is found to be financially viable. Benefits and costs for every year were discounted @ 11 per cent. The benefit cost ratio at the aggregate level was found to be 2.9 while for C-I it was 3.2, 2.8 for C-II and 2.9 for C-III. A higher benefit cost ratio in all the classes indicated the economic and financial viability of the vanilla. A higher benefit cost ratio in C-I as compared to the other classes pointed out a higher profitability of small sized vanilla holdings.

4.5.3 Net present Worth

Net present worth (NPW) is the straight method of discounting cash flows in the project. It is other wise the difference between present worth of benefits

and present worth of costs. The NPW at the aggregate level worked out to be Rs.778357 and among the classes it worked out to be Rs.839023, Rs.762165, Rs.744558 for C-I, C-II and C-III respectively. The higher NPW in small sized holdings indicated a higher profitability as compared to the other classes.

4.5.4 Internal rate of return

Internal rate of return is that discount rate which made the net present worth of cash flow zero. It represents the average earning power of the capital employed in the project. The formal selection criterion for Internal rate of return measure of worth is to accept a project having an internal rate of return above the opportunity cost of capital. The results revealed that that the internal rate of returns was above 50 per cent at the aggregate level as well as in the three size groups emphasizing the financial viability of vanilla and confirming the findings of other productivity measures.

The results of the capital productivity analysis of vanilla crop as given above has confirmed the results obtained with respect to the economics of vanilla cultivation. These findings are found to be in line with the results obtained by Madan *et al.* (2003) and Madan (2004) where a benefit cost ratio of 3.28 was reported. John (2003) estimated a pay back period of two years, benefit cost ratio of 1.5 and internal rate of return of above 50 per cent for a vanilla project to be bankable.

The most important variable that can alter the income from vanilla cultivation is the price for the vanilla beans. Under the present circumstances of a steep reduction in vanilla price it has become essential to find out the price at which the vanilla cultivation would be economically feasible.

4.5.5 Sensitivity analysis

The sensitivity analysis was done to find out how sensitive the returns from vanilla cultivation would be to a decline in the prices and is presented in Annexure V and VI. It was found that if the price falls below Rs. 91 the NPW was negative and BCR was less than one. Hence vanilla cultivation would be financially viable if the price for the green beans was above Rs.91/-

4.6 MARKETING OF VANILLA

Development of an efficient marketing system is important in ensuring the scarce and essential commodities reach different classes of consumers. Unless the product is efficiently marketed efforts to increase production may go waste. Marketing should therefore be rightly considered as an essential aspect like good seeds and fertilizers in modern agriculture. Marketing system as a whole is divided into three broad segments viz, producers, consumers and middleman, each with apparently conflicting interest. The producer wants the marketing system to purchase the product without loss of time and provide the highest possible price. Consumer's interest is to get required quantity of quality goods at lowest possible price while middlemen aim at realizing maximum profit from the deal. An efficient marketing system ought to aim at balancing this conflicting interest in such a way that each segment gets a fair deal.

Spices are high value crops and an efficient marketing system is essential to ensure good price to the farmer producer. In this section marketing system and marketing channel of vanilla was analysed based on the information collected from 120 farmers belonging to four panchayaths in Pambakkuda block namely Koothattukulam, Elengi, Thirumaradi and Ramamangalam. The details on processing were collected from the farmers who perform on farm processing as well as the exporters who sell processed beans.

4.6.1 Classification of farmers based on form of the product sold

Vanilla beans could be marketed as both green beans as well as cured beans. Vanilla green beans are ready for harvest during October-November in the study area. The farmers sell these green beans as and when they are harvested without going for on farm processing. The second season starts when the cured beans are ready for sale during the month of March. It was observed that only a few farmers possessed the fool proof technology for processing the vanilla beans. Classification of the farmers based on the form of the final product as presented in Table 4.25 revealed that 79.17 per cent of the farmers sold their product as green beans while 20.83 per cent of the farmers went for on farm processing. Around 9.16 per cent farmers processed only a part of their produce while 11.67 per cent of the total farmers processed the entire beans harvested.

Table 4.25 Classification of farmers based on form product sold

Product	C-I	C-II	C-III	Total
Green beans	49 (92.45)	23 (69.69)	23 (67.65)	95 (79.17)
Processed beans	4 (7.55)	4 (12.12)	6 (17.65)	14 (11.67)
Green beans and processed beans	0 (0.00)	6 (18.18)	5 (14.71)	11 (9.16)
Total	53	33	34	120

(Figures in parentheses indicate percent to total)

The fall in the price of vanilla lead to the collapse of the marketing system which existed in the study area, with the result that the major exporters of cured beans failed to procure the green beans from the farmers. This initiated the farmers to organize themselves and establish the producer company in order to undertake the processing of the green beans and the share holdings would be restricted to vanilla growers. It was seen that majority of the farmers sold their

green beans to this processing unit with the assurance of a better profit when a stabilised price for vanilla was attained in the market. During 2004 crop season which commenced towards the end of October, the company pooled 45.68 metric tones of green beans and processed them. The green beans were pooled at a floor price of Rs.250 per kg on the understanding that after deducting processing charges at Rs.55 per kg and all overheads, all surpluses will be apportioned among those who have pooled the material once it was sold and losses if any would not be passed on to growers.

4.6.2 Marketing channels

The sequence of stages involved in moving the produce from the producers farm to the consumer is generally referred to as marketing Channel. From the study it was observed that there existed three channels for marketing of vanilla.

Producer → Local agent → Exporter

Producer → Exporter

Producer → Vanilla growers association → Exporter

In the first channel the farmer sold the green beans as and when harvested to the local agent who had developed contact with the major exporting companies. The local agents inturn sold the produce to these companies without making any value addition to product. The local agent generally collects the produce from the farmer's field and delivers the product to the company and obtains a commission from the exporting firm. . The exporting firm processed the green beans and exported the cured bens after value addition.

In channel II of the marketing system the exporting companies opened marketing counters at a common place. Harvested beans were directly procured from the farmers at these counters with immediate payment based on the quality of the green beans. The assembled lots were immediately taken to the company's processing unit.

In the third channel, the vanilla growers association procured the green beans from the farmers and processed. The cured beans were then sold to the exporting company. The Vanilla growers association directly marketed the cured beans to the exporter. They were developing methods to undertake direct export of cured vanilla beans in the absence of an assured marketing system from the government. The vanilla crisis resulting from a sharp fall in the price of green beans during the year 2004 resulted in the total jeopardisation of the marketing systems and channels that prevailed in the study area. Channel II of the marketing system was widely prevalent in the region. But after the drastic fall in prices the farmers resorted to channel III as the major exporting companies failed to procure the green beans from the farmers.

4.6.3 Marketing costs

Vanilla being a new export oriented crop there was no organized marketing system like other spices. Marketing costs incurred by the farmers as presented in Table 4.26 showed that the farmers has to spend only Rs. 5.12 for marketing the green beans. The farmers incurred maximum cost for grading and packing the harvested green beans (Rs. 3.5/kg of green beans), while cost towards transportation was only Rs. 0.12 per kg of green beans.

Table 4.26 Marketing costs of farmers

Sl.No	Item	Cost/Kg
1	Grading and packing	3.5 (69)
2	Loading and Unloading	1.5 (29)
3	Transportation	.12 (2)
	Total	5.12 (100)

(Figures in parentheses indicate per cent to total)

Based on the observations in the study area it was found that only 20 per cent of the farmers went for on farm processing of vanilla beans. An attempt has been made to work out the cost of processing one quintal of green beans based on the data collected from the farmers.

4.6.4 Curing of Vanilla beans

The fresh vanilla beans do not have any flavour or aroma because vanillin and other chemical substances responsible for imparting the peculiar fragrance and flavour are not present in free form at the time of harvesting. During the process of curing free vanillin is developed in the beans as a result of a series of enymatic reactions which gives the fragrance of natural vanillin well distinguishable from synthetic vanillin.

4.6.4.1 Method of curing

Many curing processes have been developed in various vanilla growing countries to meet the quality requirements of the vanilla market. The curing procedures of vanilla is characterized by five phases which was adopted by the farmers in the study area.

- Washing

- Killing of the bean
- Sweating
- Slow drying
- Conditioning

Washing

This operation was done on the first day after harvesting the green beans. The harvested beans were washed thoroughly to remove unwanted adhering materials.

Killing

Killing stopped furthur vegetative development in the fresh bean and initiates the onset of enzymatic reactions responsible for the production of aroma and flavour. Killing is indicated by the development of brown colouration on the bean. In this process approximately 10 kilograms of beans were bundled in a jute bag and dipped in hot water at 65 ^{0}C for three minutes.

Sweating

This involved raising the temperature of the killed beans to promote the desired enzymatic reactions and to provoke at first, fairly rapid drying, to prevent harmful fermentations. During this operation, the beans acquired a deeper brown colouration and become quite supple, and the development of an aroma becomes perceptible. Nearly four kilo grams of killed beans were wrapped in a blanket, which was arranged in to wooden boxes. For nearly eight days the beans were taken out and sun dried for two hours a day. This was continued till the weight of the beans decreases below 60 per cent.

Slow drying

The third stage entails slow drying at ambient temperature, usually in the shade, until the beans reached about one-third of their original weight. During this stage, production of different fragrances takes place. After sweating the beans are then spread on the wooden stand under shade, to allow complete drying. This process lasts for nearly two months. The cured beans are then graded according to the international standards and packed in self stickable polythene covers.

Conditioning

Conditioning is an ageing process necessary for flavour development. The beans are conditioned after the moisture level is brought down to desired level by slow drying process. Normally, after the slow drying process, the beans are bundled (50 to 100 beans in each bundle) according to their size or into bundles of known weight. They are then wrapped in butter paper and stored in airtight containers under ambient temperature for two to three months.

4.6.4.2 Processing cost for vanilla beans

The cost for processing one quintal of green vanilla beans was worked out and presented in Table 4.27. The life of the blanket is taken as two years while the life of wooden box and stand as five years. Investments on blankets, wooden box and stands were amortised at 11 per cent over the entire life span of each material. The cost for processing one quintal of green beams worked out to be Rs. 8849.It could be seen that maximum costs was incurred during the process of sweating (61.85 per cent), followed by slow drying (17.70 per cent). The process of washing incurred only 3.39 per cent of the total cost while conditioning accounted for 4.41 per cent.

Based on the above results the returns from on farm processing of beans have been worked out and presented in Table 4.28 which revealed that the farmer could earn a net extra income of Rs 29151 per quintal of green beans for his extra effort on farm processing.

Table 4.27 Processing cost per quintal of vanilla beans

Particulars	Total cost/quintal
Washing the beans	
Women labour	300 (3.39)
Total	300 (3.39)
Killing process	
Container	270 (3.05)
Thermometer	50 (0.57)
Jute bags	450 (5.09)
Women labour	200 (2.26)
Male	150 (1.70)
Total	1120 (10.96)
Sweating	
Wooden box	973 (11.00)
Blanket	2500 (28.25)
Women labour	2000 (22.60)
Total	5473 (61.85)
Slow drying	
Stand	1216 (13.74)
Men	150 (1.70)
Women labour	200 (2.26)
Total	1566 (17.70)
Conditioning	
Polythene self stickable bags	90 (1.020)
Women labour	300 (3.39)
Total	390 (4.41)
Grand total	8849 (100)

(Figures in parentheses indicate per cent to total)

It was found that it was highly beneficial for the vanilla grower to go for on farm processing of the beans instead of selling as raw beans, if they could maintain the required international quality of the beans. Madan (2004) worked out the

processing cost per quintal of green beans to be Rs.5175 per kg. The low cost could be attributed to the difference in the method of curing as well as the difference in the wage rate. Madan *et al.* (2003) also ascertained the need for the farmers to adopt on farm processing methods vanilla beans.

Table 4.28 Cost and returns from on farming processing of vanilla beans

Particulars	Total value
Returns from selling 1 quintal of green beans	25000
Processing cost per quintal of green beans	8849
Income earned by selling of 20 kg (1:5 ratio) 3150	63000
Income earned through selling processed beans	54151
Net extra income earned by the farmer	29151

4.7 CONSTRAINTS IN THE PRODUCTION AND MARKETING OF VANILLA

The vanilla growers faced large number of constraints during production and marketing of vanilla. The major constraints experienced by the respondents were identified during the survey. The constraints were price fluctuations, lack of marketing facilities, lack of knowledge on processing, lack of adequate storage facilities, high intensity of labour, and lack of Government support. The response of the vanilla growers regarding these problems were gathered in order of their importance as classified as most important, important, somewhat important, less important and least important. The scores assigned to these classes were 5,4,3,2,1 in order of their rank. The cumulative score for each constraint was estimated and the results are presented in Table 4.29

It was found that price fluctuation was the most important constraint felt by the farmers in the study area with a score of 592. Instability in the prices of vanilla was pointed out as the major problem faced by the vanilla growers. It was the high price for the vanilla beans that increased the growth of vanilla crop

during recent years. After years of record world market prices, which reached an all time high of Rs 3500- 4000 per kg of green beans during 2002-2003,the prices has plunged to Rs 250 during the current season. Majority of the farmers who under took intensive cultivation practices expecting a high profit could not attain a reasonable price for their produce.

The next important constraint was the lack of marketing facilities with a total score of 505. Lack of assured market either for the raw beans or for the processed beans was a major deterrent in vanilla development. There is no recognized agency for marketing of the beans in the country. The wide fluctuations in price were reflected in the marketing behaviour of the crop with the lack of adequate and reliable marketing channels. The Indian vanilla market is an oligopsonic market, where a few multinational companies like the AVT-Mcornick, M/s.Bush-Boak Allen (India) Ltd, and M/s. Cadilla Pharmaceuticals dominates the trade.

With a drastic fall in prices these companies refused to procure vanilla from the farmers during the last harvesting season and the farmers had no proper marketing facilities.

Lack of knowledge on processing was also found out to be an important problem with a score of 485. The method of curing plays a major role in determining the quality of vanilla beans. As vanilla is being cultivated by a large number of small growers, in varied agro climatic conditions, the quality of the end product varies very much even if they follow common curing process. Majority of the farmers do not have the foolproof technology of curing. So they do not resort to the practice of processing beans for fear of loosing the quality.

Many farmers faced the problem of lack of adequate storage facilities with a score of 447. Vanilla beans during curing and after curing have to be stored properly otherwise the quality will be affected. Growth of moulds during slow

drying and conditioning is a major problem faced by the farmers. The farmers lack adequate knowledge on storage material and packing material.

Vanilla is generally a labour intensive crop requiring skilled labour for pollination and harvesting. Unskilled means of pollination resulted in the loss of the flower there by reducing the yield. In the harvesting techniques, if unskilled labour was used there was the possibility of getting more immature beans during each harvest. Harvesting at proper time by skilled labour was very important for obtaining quality product. It was found that unscientific way of harvesting resulted in avoidable loss of product.

Table 4.29 Major constraints perceived by the respondents in the study area

Constraints	5 Most important	4 Important	3 Some what important	2 Less important	1 Least important	Cumulative score
a)Price fluctuations	112	8				592
b) Lack of marketing facilities	25	95				505
c) Lack of knowledge on processing	56	33	11	20		485
d) Lack of adequate storage facilities	36	25	49	10		447
e) High intensity of labour	30	32	26	32		362
f) Competition from imperfect substitutes			36	38	42	226
g) Lack of Government support			5	26	89	156

Vanilla is the spice subjected to competition from imperfect substitutes (low cost artificial flavourings). The industrial users of vanillin had resorted to synthetic substitutes in response to the unprecedented prices that resulted after adverse climatic conditions wiped out about 25 % of Madagascar crop in 2000. In

spite of the major set back faced by the vanilla industry it was observed that there had been no efforts from the government to ensure adequate protection to the products. Competition from imperfect substitutes, and lack of Government support were also major problems with a score of 226 and 156 respectively.

4.8 TRADE COMPETITIVENESS AND PRICE BEHAVIOUR

The competitive advantage of vanilla as well as the trend in the price behavoiur in both international and domestic markets was examined under the following sections.

4.8.1 Trade competitiveness

Competitiveness of countries in individual commodities played a major role in the international trade. In this study trade competitiveness of vanilla is measured by adopting the standard approach of measuring competitive advantage through the estimation of Nominal Protection Coefficient (NPC). NPC is the ratio of domestic price to international price and the divergence between these two measures the level of protection. If the NPC is greater than one then that commodity is protected compared to the situation that would prevail under free trade and if NPC is less than one then that commodity is less protected and it is having competitive advantage in the international market.

Table 4.30 Nominal protection coefficient of vanilla

Year	Nominal protection coefficient
1996	0.64
1997	0.67
1998	0.63
1999	0.57
2000	0.39
2001	0.84
2002	0.85
2003	0.63
2004	0.43
Average	0.63

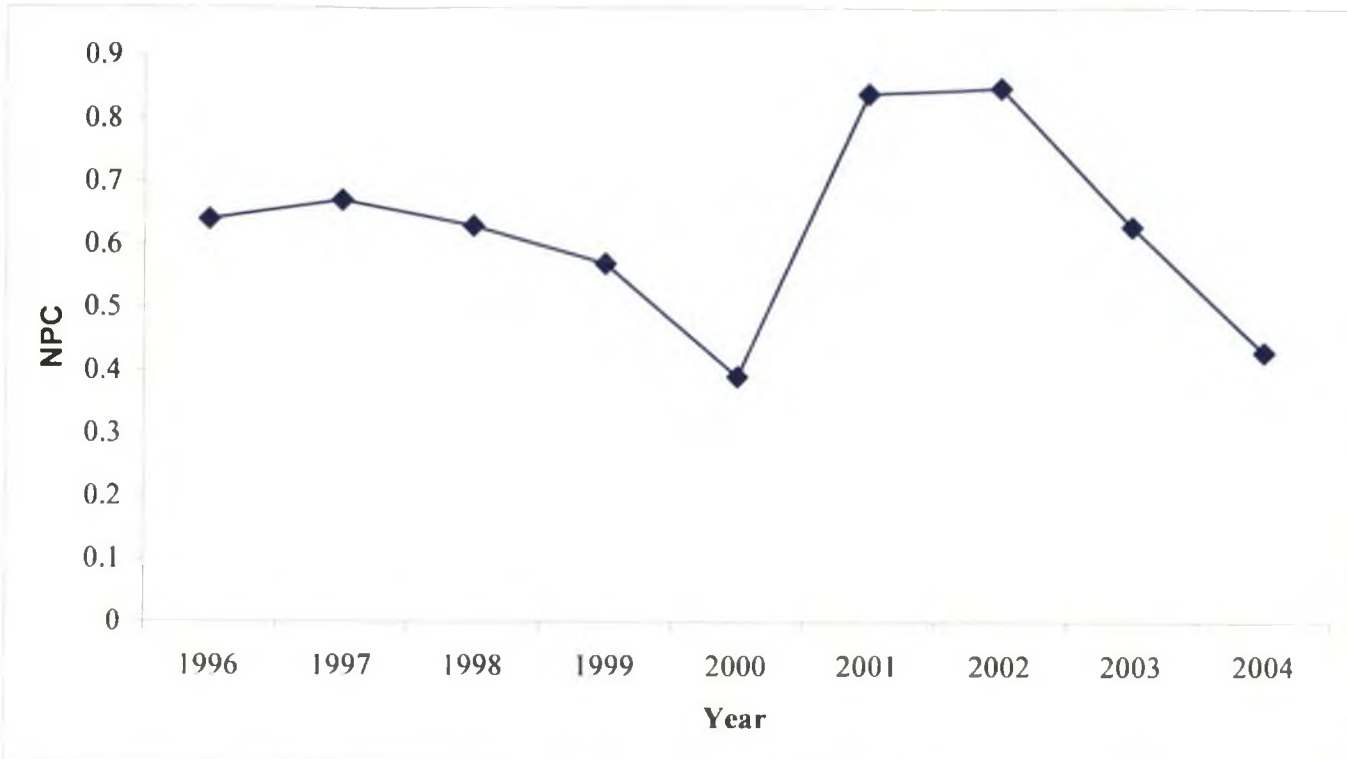


Fig 4.4 Nominal Protection Coefficient of vanilla (1996-2004)

Nominal protection coefficient of vanilla was estimated during the period 1996-2004 and presented in Table 4.30.The NPC was found to be less than one in all the years indicating the competitiveness of vanilla. The average value of NPC was 0.63, which showed that vanilla was highly competitive in the international market during the period under study.

As NPC values are influenced by fluctuations in prices, which was related to the quantity of production, the measure of competitiveness of vanilla based on this alone might be questionable. The scope for increasing the competitiveness of vanilla, by increasing productivity and use of low cost production technology would be highly relevant. Even though NPC values were less than one it may be noted that it may change according to fluctuations in international market since vanilla is an export oriented crop and any set backs in markets in major exporting countries will affect the farmers in Kerala and upset our economy. Therefore there is need to increase productivity and also maintain the marketability of the produce through improved quality.

The above results on the NPC values of less than one was in conformity with the findings of Babu *et al.* (2004) who reported that Indian vanilla was highly competitive in the international market with an NPC of less than unity. Naik (2001) observed that the competitiveness of countries in individual commodities was expected to play a major role in the international trade. India would have to increase productivity and improve quality to compete effectively in the International market.

The competitive behaviour of commodities in the international market depends crucially upon prices. Fluctuations in price tend to affect the decisions of producer, buyer, consumer and the economy as a whole. Hence it was found worthwhile to examine the price behaviour of vanilla both in the international as well as domestic market .

4.8.3 Price behaviour

Vanilla prices witnessed wide fluctuations during the last decade and an analysis of the price behaviour of both international and domestic prices have attempted here. The International price for cured vanilla beans (US $) during the period 1992-2004 was examined graphically during the period 1992-2004 and is presented in Fig 4.4. The international price for cured vanilla beans showed a continuous decline from $ 52 in 1992 to $ 19 during 1998.followed by a sharp increase during 1999 ($ 36), 2000 ($ 82), and 2001 ($ 153). The price shot to a historic high level of $ 490 during 2003,followed by a drastic decline to $119 during 2004.

Based on the reports by Spices Board (2003) the following observations regarding international prices were made. In the past vanilla market prices were effectively controlled by the Madagascar based Vanilla Alliance, a cartel which stockpiled and released vanilla beans in the world market, depending on supply and price considerations. The dissolution of the vanilla marketing agreement among the four major suppliers from Madagascar, Comoros and Reunion and the major American and European importers increased production and exports from other countries (principally Indonesia) and smuggling of vanilla out of Madagascar at below official prices resulted in a decline in prices in the world market during 1992-1998. World prices of vanilla hit an all time high price of US $ 490 during 2003 due to a dearth in global supply, resulting from political instability in Madagascar and the poor quality of Indonesian vanilla. As the production from the major vanilla producing countries increased during 2003 –04 there was an increase in supply resulting in a sharp decline in prices. More over the high world prices had encouraged the industrial users of vanillin to shift towards synthetic vanilla thereby resulting in a decline in demand for natural vanilla. This wide fluctuation in the price has jeopardized ten years of positive development in the vanilla industry.

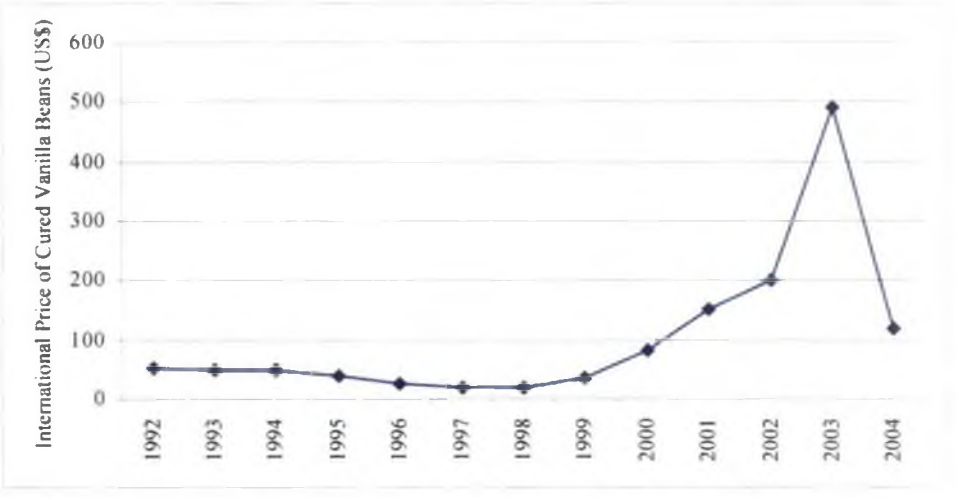


Fig 4.5 International price of cured vanilla

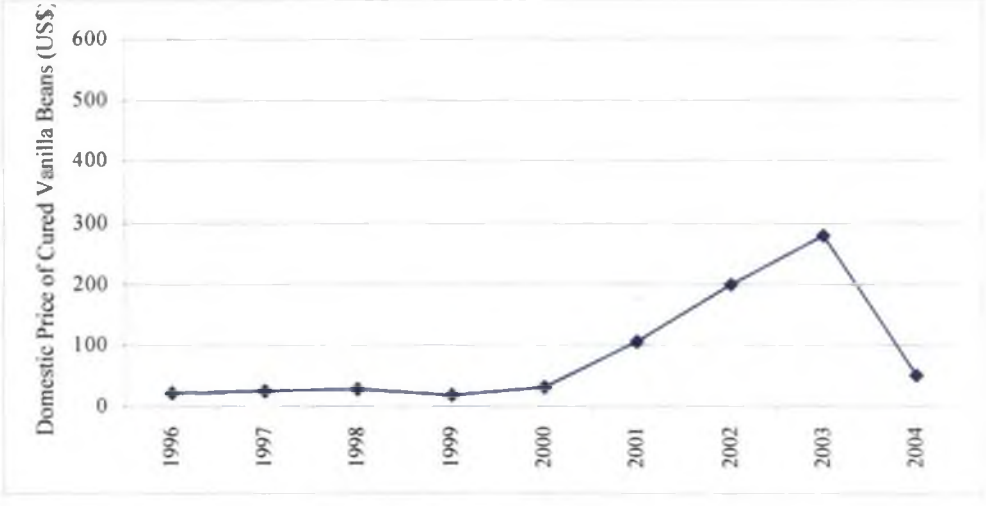


Fig 4.6 Domestic market price for cured vanilla

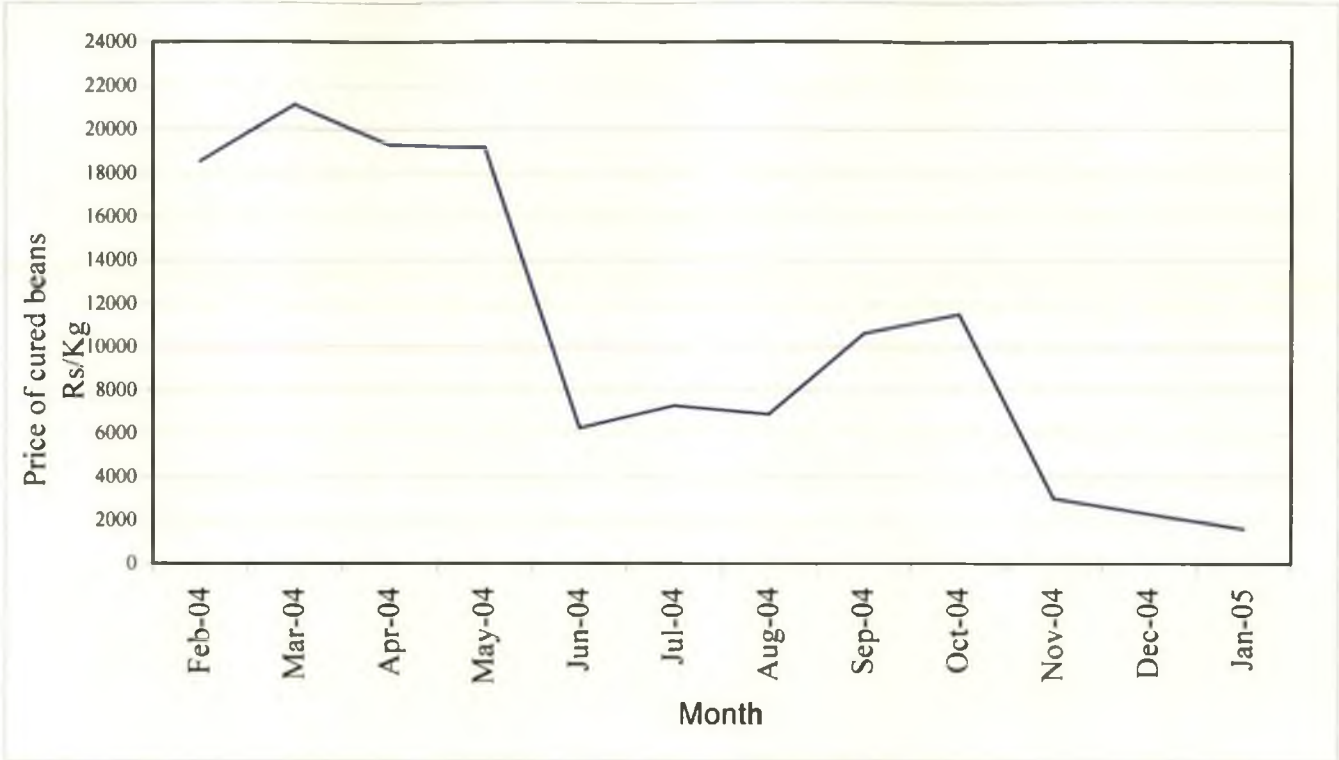


Fig 4.7 Monthly domestic price of cured vanilla (February 2004-January 2005)

The vanilla harvesting season commences during April in Indonesia and June in Madagascar while in India the harvesting season commences during late October in the plains and stretches to end December to early January in higher elevations. Therefore before the harvesting season begins in India international prices for the season are thus set depending on demand and availability. As India provides less than 2 per cent of the world vanilla output and cannot expect to play a role in international price setting.

However, vanilla being an export oriented crop, the international prices obviously influences the domestic market price. The fluctuations in the domestic market price of vanilla was analyzed graphically from the period 1996 to 2004 using the procurement price of cured vanilla beans (US $). The domestic prices as presented in fig 4.5 showed an increasing trend during 1996 to 1998 followed by narrow decline during the year 1999. Later the prices increased drastically during 2003 to US $270 followed by a sharp decline during 2003-2004.

In order to get a clear picture of the declining trend of prices during the year 2004 month wise domestic price of cured vanilla beans were graphically examined and is presented in Fig 4.6. It was observed that the vanilla prices which showed a gradual increase during February 2004- March 2004 witnessed a sharp decline until June. Later there was a stagnant phase till August followed by a gradual rise in prices during the months of September and October. October 2004-january 2005 witnessed a steep decrease in the price. The above results indicated that the decline in prices world wide had affected the domestic price for cured beans. The parallel movement of Indian and International price for cured vanilla beans as reported by Madan *et al.* (2003) indicated that Indian vanilla was gaining importance and is on par with international requirements.

The observed parallel movement of Indian and International price for cured beans indicated that Indian vanilla was gaining importance and is on par with the international requirements (Madan *et al.* 2003).

Summary and conclusion

SUMMARY AND CONCLUSION

India, known as the spice bowl of the world, possesses a wide range of agroclimatic regions specially suited for the cultivation of superior quality spices. The market trend is moving away from synthetic to natural products due to the growing awareness on the nutritional aspects of spices. Hence there is need for promoting spices like vanilla which has a strong demand in the developed countries as the crop has a direct bearing on the health and flavour industry.

Ernakulam district was purposively selected for the study and from this district Pambakkuda block having the largest area under vanilla cultivation was selected. Four panchayaths namely Koothattukulam, Elengi, Thirumaradi and Ramamangalam were selected from this block. The total 120 farmers were stratified into three groups based on the age of vanilla vines viz, establishment stage (1-3 year old vines), steady yield stage (5-9 year old vines) and declining yield stage (10-15 year old vines). These farmers were post stratified into three classes on the basis of the number of vines under vanilla, viz farmers having 300-499 vines (Class-I), 500-699 vines (Class-II), and more than 700 vines (Class-III). Primary data collected were analysed using averages and percentages. The cost of cultivation was worked out using operation wise approach and input wise approach by employing the ABC cost concepts in farm management. Capital productivity analysis was done using the measures of pay back period, benefit cost ratio, net present worth and internal rate of returns. Sensitivity analysis was employed to examine how sensitive the returns from vanilla cultivation is to a fall in prices. The export competitiveness of vanilla has been assessed by using Nominal Protection Coefficient (NPC). Graphical method was employed to analyse the variations in international and domestic price of vanilla.

Vanilla is a perennial crop where the flow of income and expenditure is spread over a long period. The first three years represent the establishment stage while the steady yield stage is represented by five to nine years and the declining

yield stage is represented by ten to fifteen years. Small sized, medium sized and large sized vanilla gardens behaved differently in incurring costs during the establishment, steady yield and declining yield periods. The total cost of establishment at the aggregate level was Rs.1, 45,102 per hectare and it ranged from Rs.1,37,445 per hectare in small holdings to Rs.1,54,776 per hectare in medium sized holdings. Cost towards non living support formed the major component of the expenses followed by costs towards irrigation. The lowest cost was incurred by medium sized farms.

The annual maintenance cost during the stabilized yield period worked out to Rs.57829 per hectare at the aggregate level and it was Rs.55456, Rs.58343 and Rs.58577 per hectare for small, medium and large holdings respectively. During the steady yield stage, there was not much variation among the classes with respect to the total maintenance cost. Small vanilla gardens recorded the lowest cost on account of low cost for manures, and plant protection. There was a general increase in the cost incurred towards cultural operations like shade regulation, weeding and mulching during the maintenance stage when compared to establishment stage. Cost incurred for pollination and harvesting also showed an increasing trend.

The annual maintenance cost during the declining yield period worked out to Rs.57313 at the aggregate level and it was Rs. 56042, Rs. 58158, and Rs. 58507 for small, medium and large holdings. The total maintenance cost during the declining yield stage was lower than the steady yield stage. Small plantations recorded the lowest cost on account of the low cost incurred towards plant protection and manures. There was a higher contribution towards plant protection in the declining yield stage when compared to other two stages of growth. A general increase in the costs incurred towards shade regulation was observed during this stage. The cost towards pollination, and harvesting had shown a declining trend in this period while cost towards pruning had increased.

Input wise analysis of costs for establishment stage showed that cost C3 at the aggregate level worked out to Rs.193205 and it varied from Rs.180049 in small holdings to Rs.205658 in medium sized holdings. The medium sized holdings incurred higher total cost during the establishment stage on account of high cost towards irrigation system and non living support. The cost incurred for manures was low in small holdings when compared medium and large sized holdings. The maximum utilization of family labour was observed in small holdings .

The total Cost C3 for steady yield stage worked out to Rs.81057 at the aggregate level and it was Rs.77508, Rs.83444 and Rs.83466 for small, medium and large holdings respectively. The cost incurred for plant protection was lower compared to the establishment yield stage. The labour cost had increased during the steady yield stage compared to the establishment stage. Small farmers employed more of family labour , while the medium sized farmers used hired labour to a large extend.

During the declining yield stage cost C3 at the aggregate level worked out to Rs.79407, and it was Rs.77320, Rs.819175 and Rs.81354 for small, medium and large farmers respectively. Cost towards hired labour formed the major component of the paid out costs. It was noted that there was a tendency for higher use of plant protection chemicals during the replanting period due to the higher incidence of diseases associated with the vines. A decrease in the use of manures during the declining yield stage compared to the steady yield stage was also observed and utilization of family labour was more than hired labour during the declining yield stage.

The total returns from vanilla was obtained by selling both main product (green beans) as well as the by product (one metre long planting material). The returns from green beans started from third year and it remained stable from fourth to ninth year and declined during tenth to fifteenth year. The returns from

the by product commenced from the third year onwards and increased during the steady yield stage and declining yield stage.

The results also emphasised on the unproductive phase of vanilla cultivation after 12 years. It was observed that cost of production was more during the later stages of growth than the beginning stages of vanilla production. From this it was inferred that the most productive phase of vanilla cultivation ended by the tenth year of cultivation, and thereafter replanting could be thought of in appropriate time. The cost of production worked out to Rs. 309 per kg of green beans during the establishment stage, Rs.72 per kg during the steady yield stage and Rs.177 per kg of green beans during the declining yield stage. As vanilla has a gestation period with considerable investments during the establishment period and with returns remaining spread over a long period, economics of investments and returns were attempted to evaluate through capital productivity analyses.

The pay back period worked out for the three classes as well as the aggregate level was found to be three years indicating that the total investment on vanilla would be covered by the returns obtained after three years. A higher benefit cost ratio in
C-I as compared to the other classes pointed out a higher profitability of small sized vanilla holdings. The higher NPW in small sized holdings indicated a higher profitability as compared to the other classes. Internal rate of returns was above 50 per cent at the aggregate level as well as in the three size groups emphasizing the financial viability of vanilla.

Vanilla beans could be marketed as both green beans as well as cured beans. Vanilla green beans are ready for harvest during October-November in the study area. The farmers sold these green beans as and when they were harvested without going for on farm processing. The second season started when the cured beans were ready for sale during the month of March. The fall in the price of

vanilla lead to the collapse of the marketing system which existed in the study area, with the result that the major exporters of cured beans failed to procure the green beans from the farmers. This initiated the farmers to organize themselves and establish the Vanilla growers association in order to undertake the processing of the green beans. It was seen that majority of the farmers sold their green beans to these cooperative processing units with the assurance of a better profit when a stabilised price for vanilla was attained in the market.

There existed three channels for marketing of vanilla. Producer - Local agent - Exporter, Producer – Exporter, Produce-Vanilla growers association – Exporter. Under the current situation, the third channel was widely adopted by the farmers as there was lack of proper marketing facilities.

Vanilla being a new export oriented crop there was no organized marketing system like other spices. During the survey in the study area it was observed that only 20 per cent of the farmers went for on farm processing of vanilla beans. The farmers could earn a net extra income of Rs. 29151 per quintal of green beans for the extra effort on farm processing. It was found that it was highly beneficial for the vanilla grower to go for on farm processing of the beans instead of selling as raw beans, if they could maintain the required international quality of the beans.

The major constraints faced by the farmers were price fluctuations, lack of marketing facilities, lack of knowledge on processing, lack of adequate storage facilities, high intensity of labour, and lack of Government support. Instability in the prices of vanilla was pointed out as the major problem faced by the vanilla growers. It was the high price for the vanilla beans that increased the growth of vanilla crop during recent years. Lack of assured market either for the raw beans or for the processed beans was a major deterrent in vanilla development. The wide fluctuations in price were reflected in the marketing behaviour of the crop.

Majority of the farmers did not have the fool proof technology of curing. So they did not resort to the practice of processing beans for fear of loosing the quality.

Nominal protection coefficient of vanilla were analysed during the period 1996-2003 and it was found to be less than one in all the years. The scope for increasing the competitiveness of vanilla, by increasing productivity and use of low cost production technology would be highly relevant. Even though NPC values were less than one it may be noted that it may change according to fluctuations in international market since vanilla is an export oriented crop and any set backs in markets in major exporting countries will affect the farmers in Kerala and upset our economy. Therefore there is the need to increase productivity and also maintain the marketability of the produce through improved quality.

The very attractive prices during recent years encouraged many countries to invest in this crop. As the production from the major vanilla producing countries increased during 2003 –2004 there was an increase in supply resulting in a sharp decline in prices. More over the high world prices had encouraged the industrial users of vanillin to shift towards synthetic vanilla thereby resulting in a decline in demand for natural vanilla. This wide fluctuation in the price has jeopardized ten years of positive development in the vanilla industry. The analysis of the price behaviour of cured vanilla beans both at international as well as national markets showed parallel movement of Indian and International price indicating that Indian vanilla was gaining importance and is on par with the international requirements.

The main findings of the study are:

- Small, medium and large sized vanilla gardens behaved differently in incurring costs during the establishment, steady yield and declining yield period of the crop.

- Family labour was effectively utilized by the small farmers compared to medium and large farmers

- The yield from vanilla commenced from third year and remained stable from fifth to ninth year.

- Small holdings were found to have higher profitability compared to medium and large sized holdings.

- Cost of production of vanilla worked out to Rs.72 per kg of green vanilla beans during the steady yield stage.

- The pay back period of vanilla was three years with a BC ratio of 2.9, NPW of Rs.778357 and IRR greater than the cost of capital.

- Cultivation of vanilla would be financially viable if the price for the green beans remained above Rs.91/-
- The vanilla growers were benefited by resorting to on farm processing of green beans.

- Lack of assured market either for raw beans or cured beans and wide fluctutations in the prices were the major constraints faced by vanilla growers.

- The NPC was found to be less than one during 1996-2004 indicating the competitiveness of vanilla in international market

- The decline in prices world wide had affected the domestic price for cured beans. The parallel movement of Indian and International price for cured vanilla beans indicated that Indian vanilla was gaining importance and is on par with international requirements.

Based on the above findings the above suggestions were put forth.

- ✓ Even though India is not a major player in the international vanilla market there exists a highly conducive climate for vanilla production in the country and the organically produced Indian vanilla has distinct market appeal. Hence apart from the efforts being taken to increase the area under the crop, technologies need to be developed to increase the marketable yield.

- ✓ Except for a few exporting firms, there is no established marketing system for vanilla. So auction centers for vanilla can be set up at the major production centres.

- ✓ Quality is the key to vanilla export. We have to harmonies the quality of our product to internationally accepted standards so as to compete and establish a significant position in the world vanilla market. Therefore both processing and value addition should be done scientifically, under close supervision and according to proven technologies.

- ✓ Post harvest processing and quality maintenance training programmes need to be organized in order to increase the awareness of the vanilla farmers. Government sponsored central processing facilities must be established so as to ensure the quality of the Indian vanilla beans

- ✓ Organic vanilla is likely to have a growing demand in the coming years. Hence the farmers must lay greater emphasis on organic methods of cultivation. Organic certification of production and processing must be ensured .

The key to capturing the potential market is a price that will encourage users of synthetic vanillin to shift to natural vanillin. To achieve this end and to be competitive vanilla cultivation should be a low cost and low risk operation. Intercropping and organic production are ways to such a goal. India needs to move to the position of a substantial producer to be able to influence international prices. The identity of Indian vanilla would then be fully established. Hence both processing and value addition should be done scientifically, under close supervision and according to proven technologies.

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ANNEXURE -I

CASH FLOW STATEMENT- Class I

YEAR	Cash Out flow	Cash Inflow	Cash flow	Discount factor(11%)	Discounted cash outflow	Discounted cash infow	Discounted cash flow
1	86673	0	-86672.78	0.9009	78083.59	0.00	-78083.59
2	56606	0	-56606.30	0.8116	45942.95	0.00	-45942.95
3	54570	72,363	17793.37	0.7312	39900.84	52911.20	13010.36
4	55456	329,168	273711.81	0.6587	36530.71	216833.16	180302.45
5	55456	329,168	273711.81	0.5935	32910.55	195345.19	162434.64
6	55456	329,168	273711.81	0.5346	29649.14	175986.65	146337.51
7	56041	329,168	273127.24	0.4817	26992.50	158546.54	131554.03
8	56041	329,168	273127.24	0.4339	24317.57	142834.72	118517.15
9	56041	329,168	273127.24	0.3909	21907.72	128679.93	106772.20
10	56041	141,891	85850.24	0.3522	19736.68	49971.81	30235.12
11	56041	141,891	85850.24	0.3173	17780.80	45019.65	27238.85
12	56041	141,891	85850.24	0.2858	16018.74	40558.24	24539.50
13	56041	141,891	85850.24	0.2575	14431.29	36538.96	22107.66
14	56041	141,891	85850.24	0.2320	13001.17	32917.98	19916.81
15	56041	141,891	85850.24	0.2090	11712.76	29655.84	17943.07
Total	756502.6	2614935			389771.79	1243226.03	
						NPV	839022.95
						IRR	>50%
						BCR	3.2
						PBP	3 YEARS

ANNEXURE -II

CASH FLOW STATEMENT -Class II

YEAR	Cash Out flow	Cash Inflow	Cash flow	Discount factor(11%)	Discounted cash outflow	Discounted cash infow	Discounted cash flow
1	97318	0	-97317.91	0.9009	87673.79	0.00	-87673.79
2	70721	0	-70720.54	0.8116	57398.38	0.00	-57398.38
3	57372	71,118	13746.39	0.7312	41949.62	52000.87	10051.24
4	58343	323,129	264786.34	0.6587	38432.11	212855.08	174422.97
5	58343	323,129	264786.34	0.5935	34623.53	191761.33	157137.81
6	58343	323,129	264786.34	0.5346	31192.37	172757.96	141565.59
7	58507	323,129	264621.98	0.4817	28180.40	155637.80	127457.40
8	58507	323,129	264621.98	0.4339	25387.75	140214.23	114826.49
9	58507	323,129	264621.98	0.3909	22871.84	126319.13	103447.29
10	58507	122,365	63857.98	0.3522	20605.27	43095.05	22489.79
11	58507	122,365	63857.98	0.3173	18563.30	38824.37	20261.07
12	58507	122,365	63857.98	0.2858	16723.70	34976.91	18253.22
13	58507	122,365	63857.98	0.2575	15066.39	31510.73	16444.34
14	58507	122,365	63857.98	0.2320	13573.33	28388.05	14814.72
15	58507	122,365	63857.98	0.2090	12228.22	25574.82	13346.59
	809987.2	2499352			423602.06	1199953.48	
						NPV	761285.03
						IRR	>50%
						BCR	2.8
						PBP	3 YEARS

ANNEXURE -III

CASH FLOW STATEMENT -Class III

YEAR	Cash Out flow	Cash Inflow	Cash flow	Discount factor(11%)	Discounted cash outflow	Discounted cash infow	Discounted cash flow
1	87247	0	-87247	0.9009	78601.21	0.00	-78601.21
2	64982	0	-64982	0.8116	52740.66	0.00	-52740.66
3	56199	69,131	12932	0.7312	41092.01	50547.99	9455.98
4	58577	321,391	262814	0.6587	38586.74	211710.21	173123.46
5	58577	321,391	262814	0.5935	34762.83	190729.92	155967.09
6	58577	321,391	262814	0.5346	31317.87	171828.75	140510.89
7	0	321,391	321391	0.4817	0.00	154800.68	154800.68
8	0	321,391	321391	0.4339	0.00	139460.07	139460.07
9	0	321,391	321391	0.3909	0.00	125639.70	125639.70
10	0	102,522	102522	0.3522	0.00	36106.66	36106.66
11	0	102,522	102522	0.3173	0.00	32528.52	32528.52
12	0	102,522	102522	0.2858	0.00	29304.97	29304.97
13	0	102,522	102522	0.2575	0.00	26400.88	26400.88
14	0	102,522	102522	0.2320	0.00	23784.57	23784.57
15	0	102,522	102522	0.2090	0.00	21427.54	21427.54
	384160	2407565			277101.32	1169058.35	0.00
						NPV	891957.02
						IRR	>50%
						BCR	4.2
						PBP	3 YEARS

ANNEXURE -IV

CASH FLOW STATEMENT -Aggregate

YEAR	Cash Out flow	Cash Inflow	Cash flow	Discount factor(11%)	Discounted cash outflow	Discounted cash infow	Discounted cash flow
1	90033	0	-90033	0.9009	81110.67	0.00	-81110.67
2	64728	0	-64728	0.8116	52535.10	0.00	-52535.10
3	56166	70,566	14400	0.7312	41067.99	51597.25	10529.26
4	57829	323,576	265747	0.6587	38093.75	213149.53	175055.78
5	57829	323,576	265747	0.5935	34318.70	192026.61	157707.91
6	57829	323,576	265747	0.5346	30917.74	172996.94	142079.20
7	57313	323,576	266263	0.4817	27605.29	155853.10	128247.81
8	57313	323,576	266263	0.4339	24869.63	140408.20	115538.57
9	57313	323,576	266263	0.3909	22405.07	126493.87	104088.80
10	57313	122,249	64936	0.3522	20184.75	43054.20	22869.45
11	57313	122,249	64936	0.3173	18184.46	38787.57	20603.11
12	57313	122,249	64936	0.2858	16382.40	34943.75	18561.36
13	57313	122,249	64936	0.2575	14758.91	31480.86	16721.95
14	57313	122,249	64936	0.2320	13296.32	28361.14	15064.82
15	57313	122,249	64936	0.2090	11978.67	25550.57	13571.91
	785605.2	2501018			407675.54	1200791.89	
						NPV	778357.44
						IRR	>50%
						BCR	2.9
						PBP	3 YEARS

Annexure V

SENSITIVITY ANALYSIS

YEAR	COF	QTY	RATE (91/kg)	CIF	CF	DF	DCF	DCIF	DCOF
1	90033	0	0	0	-90033	0.8929	-80386.47	0.00	80386.47
2	64728	0	0	0	-64728	0.7972	-51601.16	0.00	51601.16
3	56166	278	91	25298	-30868	0.7118	-21971.13	18006.62	39977.75
4	57829	1289	91	117299	59470	0.6355	37794.26	74545.64	36751.37
5	57829	1289	91	117299	59470	0.5674	33744.88	66558.60	32813.73
6	57829	1289	91	117299	59470	0.5066	30129.35	59427.32	29297.97
7	57313	1289	91	117299	59986	0.4523	27134.62	53060.11	25925.49
8	57313	1289	91	117299	59986	0.4039	24227.34	47375.10	23147.76
9	57313	1289	91	117299	59986	0.3606	21631.55	42299.20	20667.64
10	57313	480	91	43680	-13633	0.3220	-4389.46	14063.79	18453.25
11	57313	480	91	43680	-13633	0.2875	-3919.16	12556.96	16476.12
12	57313	480	91	43680	-13633	0.2567	-3499.25	11211.57	14710.82
13	57313	480	91	43680	-13633	0.2292	-3124.33	10010.33	13134.66
14	57313	480	91	43680	-13633	0.2046	-2789.58	8937.79	11727.3753
15	57313	480	91	43680	-13633	0.1827	-2490.70	7980.17	10470.8708
	900231						490.7586343	426033.1931	425542.434
		NPV	490.76						
		BCR	1.00						

Annexure VI

SENSITIVITY ANALYSIS

YEAR	CI	O&M	COF	QTY	RATE (90/kg)	CIF	CF	DF	DCF	DCIF	DCOF
1	77270	18200	90033	0	0	0	-90033	0.8929	-80386.47	0.00	80386.47
2	700	19100	64728	0	0	0	-64728	0.7972	-51601.16	0.00	51601.16
3	0	29350	56166	278	90	25020	-31146	0.7118	-22169.01	17808.74	39977.75
4	0	32350	57829	1289	90	116010	58181	0.6355	36975.08	73726.45	36751.37
5	0	32350	57829	1289	90	116010	58181	0.5674	33013.46	65827.19	32813.73
6	0	32350	57829	1289	90	116010	58181	0.5066	29476.31	58774.28	29297.97
7	0	32350	57313	1289	90	116010	58697	0.4523	26551.54	52477.03	25925.49
8	0	32350	57313	1289	90	116010	58697	0.4039	23706.73	46854.49	23147.76
9	0	32350	57313	1289	90	116010	58697	0.3606	21166.73	41834.37	20667.64
10	0	32350	57313	480	90	43200	-14113	0.3220	-4544.01	13909.24	18453.25
11	0	32350	57313	480	90	43200	-14113	0.2875	-4057.15	12418.97	16476.12
12	0	32350	57313	480	90	43200	-14113	0.2567	-3622.46	11088.36	14710.82
13	0	32350	57313	480	90	43200	-14113	0.2292	-3234.34	9900.33	13134.66
14	0	32350	57313	480	90	43200	-14113	0.2046	-2887.80	8839.58	11727.3753
15	0	32350	57313	480	90	43200	-14113	0.1827	-2578.39	7892.48	10470.8708
		454850	900231						-4190.924806	421351.5097	425542.434
				NPV	-4190.92						
				BCR	0.99						

PRODUCTION AND MARKETING OF VANILLA

By
DEEPA. U. V.

ABSTRACT OF THE THESIS

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ABSTRACT

The present study on the economics of production and marketing of vanilla aims to estimate the costs and returns in vanilla cultivation, identify the marketing channels and marketing costs along with the analysis of the price behaviour and trade competitiveness of vanilla in Kerala.

The cost of cultivation was worked out using operation wise approach and input wise approach by employing the ABC cost concepts in farm management. Small, medium and large sized vanilla gardens behaved differently in incurring costs during the establishment, steady yield and declining yield period of the crop. The total cost of establishment at the aggregate level was Rs.1, 45,102 per hectare and it ranged from Rs.1,37,445 per hectare in small holdings to Rs.1,54,776 per hectare in medium sized holdings. The annual maintenance cost during the stabilized yield period worked out to Rs.57829 per hectare at the aggregate level and it was Rs.55456, Rs.58343 and Rs.58577 per hectare for small, medium and large holdings respectively. The annual maintenance cost during the declining yield period worked out to Rs.57313 at the aggregate level and it was Rs. 56042, Rs. 58158, and Rs. 58507 for small, medium and large holdings.

Input wise analysis of costs for establishment stage showed that cost C3 at the aggregate level worked out to Rs.193205 and it varied from Rs.180049 in small holdings to Rs.205658 in medium sized holdings. The total Cost C3 for steady yield stage worked out to Rs.81057 at the aggregate level and it was Rs.77508, Rs.83444 and Rs.83466 for small, medium and large holdings respectively. During the declining yield stage cost C3 at the aggregate level worked out to Rs.79407, and it was Rs.77320, Rs.819175 and Rs.81354 for small, medium and large farmers respectively. The returns from green beans started from third year and it remained stable from fourth to ninth year and declined during tenth to fifteenth year. Cost of production was more during the later stages of growth than the beginning stages of vanilla production. The cost of production

worked out to Rs. 309 per kg of green beans during the establishment stage, Rs.72 per kg during the steady yield stage and Rs.177 per kg of green beans during the declining yield stage.

The pay back period of vanilla was three years with a BC ratio of 2.9, NPW of Rs. 778357 and IRR greater than the cost of capital. There existed three channels for marketing of vanilla. Producer - Local agent - Exporter, Producer – Exporter, Produce-Vanilla growers association – Exporter. Under the current situation, the third channel was widely adopted by the farmers. It was highly beneficial for the vanilla grower to go for on farm processing of the beans instead of selling as raw beans. The major constraints faced by the farmers were price fluctuations, lack of marketing facilities and lack of knowledge on processing.

The NPC was found to be less than one during 1996-2004 indicating the competitiveness of vanilla in international market during the period. The parallel movement of Indian and International price for cured vanilla beans indicated that Indian vanilla was gaining importance and is on par with international requirements.