POST LIBERALIZATION SCENARIO OF COFFEE INDUSTRY – A CASE STUDY OF COORG DISTRICT

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I. INTRODUCTION

Coffee occupies a place of pride among plantation crops grown in India. It is the most important cash crop that is grown in the tropics. Generally Coffee is the second largest traded commodity next to petroleum products. Coffee is grown in the tropical belt of the world where there is good sunshine, heavy rains and rich organic soil. It cannot be grown in places where there is frost or snow. Coffee trees are evergreens and grow to a height of 20 feet. But to simplify harvesting the trees are pruned to around eight feet. The tree takes 4-5 years to produce the first crop.

Cultivation of this stimulating beverage crop is mainly confined to the southern states of Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. It is also grown to a small extent in Arunachal Pradesh, Assam, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Sikkim, Tripura and West Bengal forming the non- traditional belt. It is also grown in areas which receive predominant north-east monsoon as in Tamil Nadu, Andhra Pradesh and Orissa. Summer showers are important for flowering in coffee and are received during March-April.

Initially, the coffee beverage was prepared from green, un-roasted beans boiled in water, in the late 13th century, the Arabians improved upon this tea- like beverage by roasting and grinding of coffee beans before and adding them to boiling water. A cup of coffee is prepared from the extract of ground coffee beans after they have roasted. The extract is made by adding hot water to the ground beans. Soluble (instant) and decaffeinated coffee is also available. Soluble coffee is made by evaporating the extract without the loss of essential flavour. And to make decaffeinated coffee, the caffeine is removed by treating the green coffee beans with a permitted solvent, which washes out the caffeine almost selectively.

Botanically, Coffee belongs to the genus coffea of the family Rubiaceae. There are more than 70 species under the genus Coffea, most of which are native of Africa including the two species viz., *Coffea Arabica* and *Coffea canephora* are commercially cultivated in India. Another species, *Coffea liberica* is grown to small extent. Coffee in India is grown as a silvi-horticucultural crop under a tree cover for optimal performance. Cultivation of orange, pepper and cardamom in the middle of the coffee plantation serves as a source of additional income. Annual crops could be grown as inter crops amidst young coffee in new clearings to get some additional revenue in the initial years. Intercrop also suppresses the weed growth in young clearings, but may compete with coffee for moisture and nutrients. Some of the intercrops like ginger and turmeric are very commonly grown. Other annual crops like cowpea, horsegram, beans, chillies, brinjal, pineapple *etc*., could also be grown for releasing subsidiary income during early non-bearing stage of coffee.

During the year 2003-04 the area under coffee in India was around 3,54,840 hectares, of which Arabica and Robusta account for 48 and 52 per cent each and the annual average production is around 2,70,500 metric tonnes. Being an export oriented commodity, it contributed nearly Rs. 1,134.23 crores of foreign exchange to the national exchequer during the year 2004. The coffee area is distributed in a total of 1,78,308 holdings of which only 2,833 belongs to large grower sector. In Karnataka, area under coffee accounts for 56,113 ha area under Kodagu accounts for nearly 82,554 ha of which 25,904 ha is of Arabica and 56,650 is of Robusta and the annual average production around 92,900 metric tonnes during the year 2003-04 (Anonymous, 2005).

As an agro based rural enterprise primarily this industry is a source of direct employment for 527431 people in the area of cultivation apart from providing indirect employment to many in processing and trade sectors. Coffee cultivation is also instrumental in preserving the precious forest ecosystem in traditional areas whereas in non- traditional areas coffee was introduced to check the Podu or shift cultivation and thus to control denudation of forest and also soil erosion.

The province of Kaffa in Ethiopia is considered to be the original habitat of Arabica. Central Africa is reckoned to be the home of Robusta. According to legend, Arabica coffee was introduced to India sometime during 1600 A.D. by a muslim pilgrim; Baba Budan. He is reported to have brought seven seeds from Yemen, presumably Mokka coffee and raised seedlings on his hermitage on the hills near Chickmagalur. Coffee seedlings gradually came to be popular in the backyards and gardens of most of neighbouring villages especially in

Attigundi. It is from these gardens the seedlings were introduced to Nalakand in Coorg, which subsequently gave rise to the luxuriant Coorg plantations of today. The total area under coffee in Coorg alone had gone up to 13,331 ha in 1856. In 1857 there was as many as 200 British planters in Coorg. The Karnataka Coffee Company Limited (1870) appears to be the earliest company cultivating over 1200 ha in Coorg. However, it was not until the late 1820 that commercial plantations were opened in South India with British enterprise and investment. The cultivation of coffee rapidly progressed during the next forty years. Indian coffee soon established as outstanding in quality and became a commodity second to more in the world market. Coffee growing was later popularized by British and this led to the Indian coffee industry. Kodagu district of Karnataka occupies a pride of place in the cultivation of coffee when coffee cultivation dates as back as 1820 with British enterprise and investment.

In India, Coffee was the only commodity marketed through a statutory organization *viz*, the coffee board. The coffee board was constituted under the coffee act(Act VII of 1942) of government of India. Coffee Board is a statutory organization working under the ministry of commerce for the betterment of the coffee industry. In the beginning it was referred to as Indian Coffee Market Expansion Board(1940) concentrating only on the marketing of coffee produced in India. The Coffee Board fixed a minimum release price for each grade of Coffee sold internally and this was based on the cost of production incurred by the planters. The Coffee allotted for the external market were sold throughout the year in an outlay manner to keep the prices stable. The internal releases were made in four ways:(a) Open auction pool sales (b) Local sales (c) allotment to Co-operative societies and (d) Through the propaganda department of the board.

The initiative for the pooled marketing system came from the coffee growers due to the unstable conditions in the international market during the second world war. The growers felt they can share and absorb the stocks in a better way if they pool their produce and sell. During that time, there used to be a lot of variation in the receipts and large growers who were capable of exporting were able to receive higher prices for their produce. There was a lot of wastage in the form of charges for sampling, regabling, grading and polishing because of no standard grades. Later on the Coffee Board (1944) was made the sole custodian of the marketing of coffee both in the internal and international markets. Under various departments it was taking care of the interests of the producers and consumers and also the research needs for the improvement in the quality and the output of coffee. Under this system , it was obligatory on the part of the coffee grower to surrender all his produce to the pool and he used to receive his returns on the basis of the quantity and quality of the produce he pooled.

The complete pooled system which worked for over 50 years gave way to partial pooling system with the announcement of ISQ/FSQ. There was constant demand from the growers for partial depooling and this resulted in the allotment of 30 per cent Internal Sale Quota (ISQ) in the year 1992-93. According to this, the grower was given the option of either pooling or selling on his own the 30 per cent of his total produce. Following this FSQ (Free Sale Quota) was announced in the place of ISQ, Through an ordinance to effect suitable amendments to the Coffee Act. This announcement gave the producer the choice of selling 50 per cent of his produce on his own either in the Internal market or outside the country. In the year 1996, 100 per cent FSQ was allowed to the coffee growers (Ravindranath, 1999). Now most part of coffee is sold directly to roasters, companies and exporters either directly or through purchase agents. A small portion is sold through auctions, out of which 60 per cent find its way to the export market and remaining 40 per cent is absorbed in the Internal market.

Under the pooled marketing system, individual estates lost their identity, as coffee delivered to the pool by producers, got bulked together and formed into convenient lots, according to certain parameters set by the board. The separate auctions for domestic and export markets were held. Whereas, in the free market combined auctions were introduced not only by the private sector but also by the board in respect of the coffee pooled. Thus domestic dealers and exporters started participating and competing with each other in the common auction. The monopoly of the board as a sole suppliers of coffee to the entire trade came to an end. Producers became the sole masters of their destiny. They were free to sell their coffee either in uncured or cured form to the domestic dealers or exporters or if they so desired enter the domestic market as retailers or register themselves as exporters and supply coffee to the world market. The free market saw the birth of commission agents and procurers of coffee for both external and internal traders. International prices as ruling in New York and

London terminals became the benchmark for determining the level of prices at which all sales transactions were finalized.

The Coffee Board fully diverted its marketing function, it is now for the Indian Coffee Board to play the role of a promoter to ensure supply of good quality coffee both for domestic consumption as well as exports. This is possible only by the full participation of the growers.

A major part of coffee produced in India comes from small growers who cultivate 65 per cent of the total area and produce 60 per cent of total production. Therefore, the livelihoods of a large population of coffee growers depend on the income from producing and marketing of this commodity.

There are presently 68 licenced privately owned curing/ processing factories. One of the main objectives in coffee processing or curing process is to ensure that the inherent quality of coffee both visual and cup quality will be preserved. Coffee Board has devised well established procedures and systems in the curing industry. Obtaining ISO 9002 certification for quality and ISO 14000 series certification for environmental issues is not difficult and this will ensure that good curing practices are implemented on a continuous basis. The quality standards instituted by the board are used by all processors for exports and domestic consumption.

Coffee is one of the major export driven commodity in the country. Nearly 70 per cent of the production is exported consequent to market reforms, coffee exports have shown a remarkable growth. The share of India's export to global trade was only 1.09 per cent during 1990-91, which peaked to 4.77 per cent during 1997-98 and has been around the level since then (Radhakrishnan, 2004). When International prices rallied following supply shocks due to frosts in Brazil, export earnings for India doubled. India exports both arabica and robusta coffees besides speciality and value added coffees. On an average 80 per cent of coffee exported is in given form while 20 per cent is in the value added soluble form.

Collapse of the ICO's (International Coffee Organization) global market regulation mechanism (economic clause) in 1989, and the market reforms initiated by India (from 1993-96) leading to dismantling of pool marketing system in 1996 were the two structural changes that has significantly affected the global and Indian markets respectively. Removal of quantitative restrictions and substantial reduction of import duty on green coffee by majority of the importing countries under the aegis of WTO has added dimension to the competitiveness. This has also brought in new issues as non-tariff barriers to trade.

Increased output will depend, to a very large extent, on the prices received by growers. There was a general decline in prices received by growers until 1991-92. Prices then moderately recovered before rising sharply following the Brazilian frost and drought of 1994-96. Grower prices were comparatively higher during 1994-95 to 1997-98 seasons but from 1998/99 onwards again there is a steep and continued decline in prices received by growers (Radhakrishnan, 2002). Coffee prices are highly volatile. No one knows with high degree of accuracy what coffee prices will be in few months or year from now. Until the harvest, the growers are not certain of the price they will receive for their coffee. This uncertainty makes every investment decision a grower makes before the harvest a difficult one. A grower never knows whether the price at the time of harvest will cover his cost of production.

After the coffee trade liberalization there have been fundamental changes regarding the prices, exports and also on the producers. On the face of the given background and as the problem is serious to the producers and others who are engaged in dealing with coffee, these are the days to look at the ways of the problem and find a long term solution by knowing the nature and prospect of these emerging issues. In this context, the present study was taken up with the following specific objectives.

Objectives

1. To study the secular trend in price of coffee beans
2. To study the impact of price of coffee beans on the producers after liberalization
3. To study the cost of processing of coffee by the processors
4. To study the growth and composition of export of Indian coffee bean.

Presentation of the study

Apart from the introductory chapter the study is presented in another five chapters.

Chapter II presents about related review of literature

Chapter III details the description of the study area, nature and source of data, the tools and techniques of analysis adopted for evaluating the objectives.

Chapter IV summarises the results under appropriate heads in consistent with the objectives of the study

Chapter V seeks to interpret the results of the study and explains the casual relationships between certain variables and outcome, which they produced. It also discusses a frame of inference for drawing policy measures.

The Chapter VI summarises the results and suggests policies.

The Chapter VII gives the references.

II. REVIEW OF LITERATURE

Review of literature gives the guidelines from the past researchers and provides a foundation to the theoretical framework for the present investigation. The review of past literature makes the investigator to get an insight into the methods and procedures to be followed. The available literature relevant to the objectives of the present study were reviewed. The literature directly related to the current research is rather limited. So, the studies related to other crops or technologies were reviewed and highlighted under the following headings.

2.1 Trend analysis

2.2 Impact of Price

2.3 Cost of processing

2.4 Growth rates

2.1 TREND ANALYSIS

Parikh (1971) with the help of spectral techniques analysed short term fluctuations in coffee prices. The occurrence of 24 month cycles study revealed that various price series were coincident. He observed that through the broad features of the coffee cycle could be interpreted fairly easily a full understanding would require a simultaneous equation of econometric model considering the response of production, consumption and stock to price changes. He used the original series, trend eliminated series and fitted series for coffee prices recorded in New York market for various grades of coffee. The maximum lag he used was n/5.

Jairth and Kansal (1981) studied the price behaviour of Himachal and Kashmir apples in Delhi market. They found that in general, the wholesale prices of both the varieties showed a rising trend and seasonal variation was more in case of arrivals when compared to that in prices.

Hosamani *et al.* (1985) examined the structure and movement of market arrivals and price behaviour of cotton in Belgaum district. The pattern of market arrivals of cotton indicated a seasonal character in both the markets, a major proportion of the total annual market arrivals coming to the markets during the peak months of the harvest. They reported that the seasonal pattern of arrivals was due to the high post-harvest sales which in turn was due financial pressures, inadequacy of warehousing facilities, inability to withhold stocks and incur not only additional costs on storage but also bear the consequences of price fluctuations. They mentioned the need for developing storage facilities and linking them up with credit and marketing functions to prevent the farmers from exploitation.

Bogahawatte (1988) employed the Box-Jenkins Auto Regressive Integrated Moving Average (ARIMA) approach to study the seasonal variations in retail and wholesale prices of rice in markets of Colombo and found that seasonally, retail prices was more prominent than wholesale prices. He also reported that the interaction between retail and wholesale prices and the influence of current retail price on wholesale prices of periods T + 1, T + 2, T + 3 were significant. Findings of the study which in turn implied that any increase in the supply of rice due to retail price in period 't' will arrive in the market at period t + 3 thus preventing any further increase in prices.

Sangwan (1989) in his study on seasonal variations in potato prices in important markets of the country for the period 1963-1985 reported that the level of seasonal variations in the prices of potato was considerably lower in Delhi market than that of Furrukhabad, Meerut, Patna and Kanpur markets. This was largely due to lower harvest season prices in the producing areas than in the consumption center like Delhi.

Sudish (1991) in his study on temporal and spatial variations in arrivals and prices of jowar and ragi in Karnataka for the period 1976-77 to 1988-89 found that the trend in arrivals of jowar was more or less constant in Belgaum and Gulbarga markets, while, Bellary market recorded a rapid increase in arrivals. The price trends in all the three markets were found to be positive. The seasonal variation in arrivals of jowar was more when compared to that in

prices of jowar for all the three markets. While in case of ragi, all the three markets viz., Channagiri, Davanagere and Tumkur recorded continuous increase in arrivals over the years. The price trends in all the three markets were more or less constant but positive. The seasonal variation in arrivals or ragi was more when compared to that in prices of ragi for Davanagere and Tumkur markets while in Channagiri market, the seasonal variation in prices was more than the variation in arrivals of ragi.

Nawadkar *et al.* (1992) studied the trend in arrivals and prices of selected commodities in Gultckadi regulated market, Pune of Maharashtra state for the period 1983-84 to 1990-91. There was a wide fluctuation in the arrivals of tur in the market which may be attributed to the decline in the area under the crop which resulted in low production. There was no specific trend in the arrivals of gram. The increasing trend of average price was observed in both the pulses (gram and tur). More over the price of tur had slightly declined during the year 1984-85. The remarkable positive change was observed in the arrivals of tur, gram, tomato and onion and in the prices of tur, gram, tomato, brinjal and onion.

Mundinamani (1993) employed orthogonal polynomial regression technique to study the trend in arrivals and prices of oilseeds in Karnataka. In Bijapur and Talikoti markets, the mild fluctuations of the initial years in groundnut arrivals developed into a tremendous growth in later years. A continuous decline in safflower arrivals was observed in all the markets. Similarly sesamum arrivals showed a declining trend in all the markets except Gadag and Gangavati. In the case of sunflower, with a few exceptions in initial years a continuous steep rise in arrivals and price was noticed in Gangavati and Raichur markets. As far as price trend was concerned a continuous upward movement was observed in all the markets for all the crops.

Singh *et al.* (1993) analysed the behaviour of market arrivals and prices of potato in Punjab. They reported a rising trend and the trend coefficients of potato arrivals were significant. During the post-harvest period, the prices ruled very low whereas during the lean period, the indices of prices remained high and ranged widely mainly due to the seasonal and perishable nature of the crop. They further indicated that the potato prices depicted a cycle of three years.

Sharma *et al.* (2000) studied the trends in area, revenue and expenditure on forests. It revealed that there has been a sharp reduction in the forest area in 1991 over 1979-80 in all the states. The results have further shown that timber, fuel wood and bamboo were major forest products produced. The growth in revenue is increased in all the states. In 1993-94 although both revenue and expenditure increased, the later growth rate was much higher than the former.

Ansari and Ahmed (2001) applied ARIMA modeling for trend series analysis of world tea prices and industrialized countries export prices. The results of the estimated ARIMA equations imply that the information on the current periods tea price is sufficient to forecast the next periods and the industrialized countries export prices can be forecasted from information in the prices of the previous two periods. They concluded from the fitted ARIMA models, autoregressive processes generate both price series and there is no influence of external factors.

Guledgudda *et al.* (2002) studied the trend in world tea production and export. India's share in the world tea production has slipped gradually from 38.12 per cent in 1960-61 to 28.83 per cent in 1990-91 and further marginally came down to 27.45 per cent in 1999-2000. Whereas, its share in world tea exports has been similarly decreased gradually from 36.41 per cent in 1960-61 to 18.83 per cent in 1990-91 and further decreased to 17.86 per cent in 1998-98.

Namasivayam and Paul (2004) estimated the trend in area, production and productivity of coconut in India. The entire analysis was done separately in three phases for the overall period under the study period 1977-78 to 1986-87 is I phase, 1987-86 to 1996-97 is II phase, 1997-98 to 001-2002 is III Phase. The trend in growth rate analysis reveals that the growth in area, production and productivity over the years were there in the first two periods while in the third period productivity was negative.

Shibu *et al.* (2004) studied the trend analysis of cashew nuts in Kerala. In general, trend analysis based on index number and growth rates gave comparable results. Results

revealed that growth rate in area was positive for the entire period with stagnant production and declining productivity.

2.2 IMPACT OF PRICE

Muir (1997) in the paper commences by observing that, although coffee farmers in very poor countries are usually relatively better off, such farmers have small income and thus have no surplus for investment or to counteract a run of poor prices or crop failure. It recommends a producer organization is having the benefits of liberalization without a danger of stifling rural development. It argues that producers who can provide quality will be able to drive a wedge between the terminal market for commodities and the price for their produce.

Naik and Singh (2002) examined the effect of price changes of groundnut and mustard in Orissa on its area and productivity The efforts of lagged post-harvest price and lagged area/productivity on area/productivity of oilseeds price for a particular year have been studied with the help of the Merlovian's price expectation model. Lagged oilseed prices do not have significant effect on area and productivity of oilseed Growth of oilseed productivity has become non-significant in the state.

Gokarn (2002) studied that the prevailing low prices are providing no incentives to the growers to invest further and more dangerously, inducing the growers to cut back on farm operations. A cut back on farm operations affected the productivity of the farms not just for the short term but perhaps also for the long term which may hamper higher returns to the growers during the born time.

Nagarajaiah *et al.* (2003) studied the impact of low price on cultivation and production of small Robusta coffee plantations in South Coorg. They observed that the low price situation for coffee experienced since late 90's resulting in low returns in general and negative returns in some cases forced the small coffee growers to curtail the investment on the farm and to resort to all possible measures to reduce cost of cultivation.

Wilson *et al.* (2003) the impact of cereal prices on rotational decisions and farm level and industry level supply is considered. It is argued that with the voluntary 50 per cent set aside option for cereal producers, then is a large financial incentive to adopt a 50 per cent set aside cropping plan as cereal price fell below an individual producers in difference price.

Krivonos (2004) evaluates the impact of coffee sector reforms during late 1980 and early 1990 on coffee growers in the main coffee producing countries. In most countries the long term producer price share has indeed increased substantially after the liberalization. Results suggested that the reforms induced a closer co-integrating relationship between growers prices and world market prices.

2.3 COST OF PROCESSING OF COFFEE BEAN

Singh and Sidhu (1974) studied the economics of scale in groundnut processing industries in Punjab. It was found that the per quintal fixed cost in large, medium and small groundnut mills were Rs. 0.50, Rs. 1.14 and Rs. 0.58 respectively. The variable costs per quintal of groundnut oil were Rs. 118.72, Rs. 119.74 and Rs. 118.27 in large, medium and small mills respectively. The per quintal total cost in these mills were Rs. 119.23, Rs. 120.87 and Rs. 118.85 respectively.

Hasan and Raghuram (1985) indicated the details of cashewnut processing based on the data obtained from the medium and small processing units located in Prakasam district of Andhra Pradesh. The processor's cost and margin were estimated at 12 and 16 per cent respectively of the consumer rupee.

Bawa and Kainth (1989) while analyzing the cost and returns of rice milling industry in Amritsar district of Punjab, found that dehusking of one tonne of paddy yielded a net profit of Rs. 45-67. Expenses on raw material (86%) constituted the major of them. Remaining expenditure on machinery and repairs and maintenance costs constituted 1.96 per cent and 1.10 per cent, respectively. Net returns of the enterprise was 2.31 per cent of gross output.

Hemchand Jain (1989) in a study on economics of processing unit of arhar pulse in Narasinghpur district (Madhya Pradesh) revealed that the fixed and variable costs accounted for 45 per cent and 55 per cent respetively. The cost of processing arhar dal worked out to Rs. 61.62 per quintal.

Yadav *et al.* (1989) studied the economics of processing and marketing of sugarcane products and found that the manufacturing of gur was not profitable to the sugarcane growers as the total net profit earned by converting 100 quintals of sugarcane into gur was significantly lower (Rs. 394) as compared to that earned from sale of 100 quintals of sugarcane itself (Rs. 716).

Azad *et al.* (1990) studied the cost of processing of sugar factories. The variable cost per quintal of crystal sugar was observed to be significantly lower being Rs. 380.23 in the sugar factories of private sector as compared to the respective figures in public and co-operative sectors.

Mruthyunjaya and Jha (1993) studied the economics of processing of neem seeds and reported that processing of neem seeds to neem oil was beneficial as it provides a net income of Rs. 281/tonne.

Ravishankar (1993) while studying the economics of production and processing of Davana in the eastern dry zone of Karnataka observed that, from among the various items included under variable costs, the cost of the raw material stood at Rs. 7.2 lakh accounting for 92 per cent of the total variable costs. The wages accounted for 4.60 per cent, followed by the cost of fuelwood which accounted for 1.84 per cent.

Apparao and Krishnaiah (1995) worked out the economics of cashewnut processing in Srirakulam district of Andhra Pradesh. The results revealed that an amount of Rs. 366.12 was incurred by the processor towards the processing cost per bag of 80 kg rawnuts. It was fond that material costs accounted for 65.35 per cent and labour cost accounted for 34.10 per cent of the total processing cost. The cost of raw nuts, taxes and costs incurred in processing is Rs. 366.12 leaving considerable margin of about 21 per cent to the processors which can welcome more entrepreneurs towards the industry.

Hedigeri *et al.* (1996) studied the economics of safflower processing indicated that the total cost of processing including fixed cost and variable cost was Rs. 643.10 and Rs. 633.10 in bullock ghani and power ghani respectively. The raw material cost was having the major share in total cost. Per quintal cost of processing was higher in bullock ghani by Rs. 9.70 over power ghani.

Srinivas *et al.* (1996) in their study on economics of processing of cashewnuts in Andhra Pradesh indicated that the processors have to bear the processing cost of Rs. 124.22 per 70 kg of raw nuts. Out of this total cost, raw material cost of Rs. 50.77 was incurred which formed 40.89 per cent and labour cost was Rs. 72.81 which accounted to 58.61 per cent of the total processing cost.

Chinappa (2002) studied the cost of processing of arecanut at farm level. It is found that total cost of processing on per acre basis worked out to Rs. 5156.27. this was deducted from the gross value of produce to arrive at the net value of processed product (Rs.94,273.73). This implied that a grower can obtain an additional income of Rs. 22,963.73 per acre by processing of arecanut. The opportunity cost of not processing arecanut at the farm level is Rs. 22,963/acre.

Vitonde *et al.* (2002) revealed that cost of processing for cotton seed was Rs. 49.62, Rs. 49.45 and Rs. 45.72 per quintal for small, medium and large sized oil mills. In safflower it was Rs. 48 to Rs. 52 and in groundnut it was Rs. 57 to Rs. 54. The economics of processing per quintal of oilseeds was also found out. Gross return from cotton seed varied from Rs. 843 to Rs. 869 for all sized groups and net return per quintal were Rs. 38, Rs. 49 and Rs. 68 for small, medium and large oil mills. Gross returns from safflower varied from Rs. 1,098 to Rs. 1137/quintal for all sized mills and net return per quintal were Rs. 66, Rs.90, Rs. 108/quintal for small, medium and large mills, gross returns from groundnut was Rs. 2107/quintal and net returns was Rs. 2127/quintal. They concluded net returns in groundnut processing was higher.

Gupta and Prasant (2004) studied the marketing and processing of cashewnut in Goa state. The total processing cost was divided into variable cost and fixed cost. The variable cost is estimated as 31.30 per cent and 29.57 per cent of total cost of processing at small and large processing units respectively. The fixed cost includes the expenditure incurred on taxes, insurances, licensing, interest on working capital and depreciation on buildings and plant. It

constitutes about 61.61 per cent and 62.53 per cent of total marketing and processing cost at small and large categories of plants respectively showing the importance to influence the economy of the plant.

2.4 GROWTH RATES

Rath (1980) examined the growth rates of agricultural production in India for the period 1955-1978. He observed that the total agricultural production grew at an average rate of 2.48 per cent per year during this period. Growth rate for cereal production was 3.22 per cent and that for non-food grains was 2.70 per cent per annum.

Chengappa (1981) studied the growth rates of area, production and productivity of coffee in India. Linear model of the type $Y_{(t)} = a + bt$ and exponential model of the type $Y_{(t)} = ab^t$ were used to work out the growth rates. The exponential function indicated a good fit of the annual compound growth rate of production with 5.68 per cent for Arabica and 7.4 per cent for Robusta, their combined growth rate being 6.1 per cent.

Bandopadyaya (1982) analysed the growth rate of India's share in world tea exports using the simple linear trend equation. The results showed that India's share in total world export of tea has been consistently declining during the study period 1964 to 1978. One of the causes that contributed to this trend was spurt in demand for tea in domestic market due to population boom. Other associated problems were how productivity, high cost production and scarcity of suitable land and capital.

Raveendran and Aiyaswamy (1982) analysed the export growth and export prices of turmeric in India. They observed cyclic pattern of variation in prices with a length of three to seven years. The export prices were studied for their relation with the domestic prices and found that there was a very high correlation between export price and domestic price of turmeric. Obviously it was confirmed the vulnerability of the latter to the international price fluctuations.

Dass *et al.* (1985) analysed the trends in coffee export in relation to general exports from India for the period 1956-57 to 1982-83. The annual compound growth rate of export in general had fallen during the period 1972-73 to 1982-83 inspite of buoyant world demand and high domestic production. The share of coffee exports in total exports, in value terms, had increased in the periods 1956-57 to 1971-72 and 1972-73 to 1982-83. However unit values, quantity and export value recorded chronic instability during the same period.

Fialor (1985) studied the growth rates of area, production and export of world cocoa. He found a declining trend in acerage under cocoa for the world as a whole. But the total production had increased by 1.4 per cent and productivity by 2.3 per cent per annum. The low growth rate of export of the world as a whole showed that the international trade in cocoa was declining.

George and Mukherjee (1986) analysed the changes in the growth pattern of rice in Kerala over and across time period (Prior to the mid 1970's and since) across seasons (autumn, winter and summer) and across space (a major rice growing district). The growth rates of area, yield and production indicated considerable variations across districts, over season and over time. The fall in growth rate of production was the maximum during summer.

Prakash (1986) evaluated the rates of production, consumption and export of Indian coffee using a modified exponential growth function of the form $\log Y_t = a + bt + et_2$. The production of coffee in India increased by 4.51 per cent per annum during 1962-63 to 1981-82. The growth rate of consumption during the same period worked out to be 1.69 per cent per annum. However, export registered a significant increase during the study period recoding a compound growth rate of 6.94 per cent per annum.

Achoth *et al.* (1988) analysed the available data to document the changes that has occurred in pulse production in Karnataka and also to identify the important components of variability during and after the green revolution. The study revealed that production of pulses in Karnataka had registered significant increase during the decade following the green revolution period. This increase was contributed by the increase in production in Gulbarga district. The instability for the state as a whole had increased in the decade after the green revolution. Most of this instability was contributed by minor pulse growing districts. The

instability induced by change in the area variances was the single largest component which increased instability of pulse production in the state.

Indira (1988) studied the growth in internal releases of Indian coffee in comparison to the growth rate in production and exports. The compound growth rates were calculated for two time periods. Period-I ranges from 1953 to 1969 and period-II for 1969-81. Between 1953-69, when production increased at an annual rate of 6.16 per cent, consumption increased at 3.13 per cent per annum, while exports increased at the rate of 9.8 per cent. The annual rate of increase in production, internal releases and exports for the second period was much smaller relative to the first period. Production increased at an annual rate of 4.32 per cent while internal releases and exports recorded a growth rate of 2.44 per cent and 5.79 per cent respectively. For the entire period, these rates were 4.38 per cent, 2.34 per cent and 7.3 per cent in the order.

Thakur *et al.* (1988) estimated the growth rates of area, production and productivity of oil seeds in Bihar over two periods. The first period covered ten years (1961-62 to 1970-71) proceeding the green revolution and the second period thirteen years after the green revolution. The production and productivity of oil in general increased substantially in the post-green revolution period. The area under oilseeds registered a negative growth rate in both the periods with the exception of linseed in the post-green revolution period.

Gemtessa (1991) compared the performance of Ethiopian coffee exports during the pre-revolution and post-revolution periods. The exponential growth model of the form $Yt = ab^te^u$ was employed. The results showed that export growth in the pre-revolution period was lower (1.51%) when compared to the post-revolution period (1.77%).

Naik and Mohanty (1991) studied the trends in area, production and productivity of groundnut in different districts of Orissa. The growth rates of area and production of groundnut during the period 1970-71 to 1987-88 were statistically highly significant in all districts except Korapet. Eventhough groundnut yield in Orissa was the highest in India during 1985-86 to 1987-88 the growth rate of yield over the years was negative and non-significant.

Veena (1992) analysed the growth of Indian coffee exports for the period 1965-1990 using exponential function of the form $y = ab^t$. She found that exports of plantation type coffee exhibited a compound growth of 3.6 per cent per annum, while Arabica grew at a growth rate of 3.0 per cent. Robusta exports registered a marked compound growth of 10 per cent.

Jeromi and Ramanathan (1993) examined the growth and instability in world pepper market for the period 1975 to 1990. An exponential model of the type $Y_t = ae^{bt}$ ($\lambda ny_t = \lambda na + bt$) was fitted to estimate the growth rate of pepper trade and the instability index was calculated using the residuals of the exponential trend equation. Among the exporting countries, Sri Lanka recorded the highest annual compound growth rate of 24.59 per cent with a high degree of instability. This was mainly due to its low base in the initial year. Positive and statistically significant growth rate and stable index was recorded in the case of India. In contrast, the growth rate in total exports from the other producing countries was statistically non-significant. The growth rates of pepper imports ranged from a negative level of 2.56 per cent for Argentina to a high and positive level of 11.64 per cent for Saudi Arabia. The instability indices varied between 0.07 (Japan) to 0.55 (Egypt).

Lal *et al.* (1994) analysed the growth rates of area, production and productivity of rice, wheat and maize in Bihar state, over the period 1951-52 to 1987-88, which encompassed the pre and post-green revolution periods. The growth rate of production was significant for all crops due to the significant growth in productivity. The contribution of area was not significant for rice.

Jalajakshi (1994) analysed the growth of export of shrimps from India for the period 1966-91. Exponential model of the type $Y = ab^t$ was used to workout the growth rates. Foreign shrimp exports recorded a positive growth rate due to high demand in the importing countries. The negative growth rate observed for dried and canned shrimps were attributed to declining demand in the importing countries and increased cost of production in India.

Mamatha (1995) estimated the growth rates of production and export of selected spices for the period from 1970-71 to 1991-92. The spices considered were pepper, chillies,

turmeric and ginger. She found that positive growth rate in respect of production and export of the selected spices was due to the increased domestic production and demand for these species in the international market. The increased domestic production and exports were attributed to the several measures taken by the spice board such as improved methods of production, assistance for the export of spices by setting up facilities for upgrading quality and technical advice on scientific post-harvest operation and processing.

Maheshwari (1996) examined the growth in area, production and yield of food grains, rice, sorghum, milk, pigeon pea and groundnut in Karnataka state since 1955. The study period was divided into three sub periods. The pre-green revolution period (1955 to 1966-67). The early green revolution period (1967-68 to 1979-80) and the later phase of Green Revolution (1980-81 to 1989-90). By using the Kinned exponent estimates of rates of growth to arrive at a more complete picture of trends. It was found that the yield increases brought out by high yielding varieties (HYV) seeds were not fully revolutionary. In period-I, irrigation was responsible for growth, while in period-II, it was mainly due to HYV seeds and chemical fertilizers. In period-III, there was a stagnation in the growth rate of food grains, mainly due to the continuous rainfall in that period.

Shende *et al.* (1999) studied the export performance of India in tea, coffee and tobacco. The growth rates for tea and tobacco were negative for India that is –0.28 per cent per annum and –1.09 per cent per annum respectively, which shows drastic fall in export from India. Coffee noted very high growth rate that is 6.08% per annum for India's value of export and tobacco was 2.18% per annum. Thus the coffee and tea show significant growth in India's value of export as compared to tobacco.

Ananthi (2000) analysed the growth of area, production, productivity and export of Indian non-basmati and basmati rice. The growth rates were calculated by sub-dividing the study period into 1949-50 to 1969-70 as first period and 1970-71 and 1997-98 as second period. The area, production and productivity showed positive trend. For the export the study period considered was 1980-81 to 1998-99 for Basmati and non-Basmati rice. The growth rate was also positive and significant.

Ashalatha (2000) analyzed the growth rate of area, production, productivity and export of cashew kernel, cashew nut shell liquid, imports of raw cashew nuts and unit value of exports of cashew. The study covered the period of 1956-57 to 1998-99. The growth rate was studied in 2 periods, period-1 covering 1956-57 to 1970-71 and period 2 covering 1970-71 to 1998-99. It was observed that the growth rate of area, production, productivity, kernel export, raw cashew import, cashew nut shell liquid value and cashew nut shell liquid- unit value of exports were showing positive trend but the cashew nut shell liquid quantity exported showed negative growth and non- significant.

Sujatha *et al.* (2003) indicated that the rate of growth in quantity and value of exports (7.92% and 12.26% respectively) was more during post-WTO period in case of fresh mangoes compared to pre-WTO period (6.81% and 11.62% respectively). At an overall level, India's mango exports increased by 7.71 per cent and 9.35 per cent per annum with respect to quantity and export earnings. Thus the impact of WTO on mango exports was non-significant.

Hyma Jyothi (2003) studied that the quantity of onion and potato exports from India registered a positive and significant growth rate of 6.27 per cent and 4.38 per cent per annum. Export earnings and unit value realization exhibited significant positive growth rates of 16.70 per cent, 2.28 per cent and 9.74 per cent and 7.45 per cent for onion and potato respectively.

Velavan (2004) studied the growth rate of export and import of cashew in India and world. It was observed that import growth rate was 10.10 per cent per annum and the export growth rate was 8.88 per cent per annum. The import and export growth rate was lower in post liberalization period than the pre-liberalization period. This trend might be due to the composition from the other nuts and reduction in the yield of cashew in the major exporting countries. The import growth rate (20.89%) of raw nuts in India was higher than the export growth rate of processed nuts (6.31%). This is due to large scale dependence of raw materials to meet the domestic and export demand by India.

III. METHODOLOGY

This chapter deals with description of the study area, sampling procedure, nature and sources of data and the various analytical techniques that are employed to quantify and evaluate the objectives.

The methodology that followed has been presented under following major heads:

3.1 Description of the study area

3.2 Selection of the study area

3.3 Method of data collection

3.4 Analytical tools employed

3.1 A BRIEF DESCRIPTION OF THE STUDY AREA

Location

Coorg district lies on the summits of the eastern and western slopes of the western ghats. It is situated on the south west of Karnataka state and lies between north latitudes 11°56' and 12°50' and east longitudes 75° 22' and 76°11'. Its greatest length from Hemavathi river in the north to the Brahmagiri range in the south is 96 kilometers and its greatest breadth from Sampaje in the west to Kushalnagar in the east is about 64 Kilometers.

Coorg is the smallest district in Karnataka state. The district now consists of three taluks- Mercara, Somwarpet and Virajpet The evergreen forests of Kodagu are the "green gold" of the Kodagu. Salient features of Kodagu are given in Table 3.1.

Table 3.1. Salient features of Coorg

Total geographical area	410775 hectares
Total area under forest	134,597 hectares
Population	548400
Male	273210
Female	272112
Average rainfall	1000 to 5000 mm
Sea level	830-1750 meters
Temperature	18°C to 30°C
Ecology	Plants belong to 160 families with more than 1300 varieties

Climate

The climate of this district, a good portion of which lies on western ghats and the rest in the plateau region to the east of the western ghat, is characterized by high humidity, heavy rainfall, particularly on the ghats of the neighbourhood a cool, equable and pleasant climate. The year may be divided into four seasons. The summer extending from March to May, followed by south west monsoon season from June to September, October and November constitute the post-monsoon season, and the period from December to February is the winter season, with clear bright weather with the onset of South-west monsoon and is the beginning of the cropping season of the district.

Rainfall

The average annual rainfall of the district is 1000 to 5000 mm. The rainfall decreases from the west to the east on account of the nature of the terrain, which consists of hills and valleys, the variation is considerable. The scattered showers favouring plantations are received during March and April and coffee blossom depends on these rains.

Humidity

In general the air is highly humid all through the year and particularly during the monsoon months. The period from January to March is the driest part of the year, when the afternoon relative humidity average at about 55 percent.

Soil

The district can be broadly divided into three major soil zones as follows:

1. Eastern zone: Soil is mostly dark clayey becoming water logged in monsoons and cracking in summer.
2. Central Zone: Soil is light brown in colour and loamy to clay-loamy in texture.
3. Western Zone: Soil is highly leached and tends to be lateritic deficient in lime and with Iron and Manganese concentrations. Soil is shallow as a result of leaching.

In the valley portions red loam soils are also found. These soils are suitable for raising coffee plantations. The lateritic soils are acidic in nature and deficient in lime and other nutrients. Paddy is the main crop grown in these areas of soil. The dark brown clayey soils are found in the eastern parts of Coorg, which are rich in forests.

Economic wealth

Coffee, cardamom, pepper, paddy, orange, timber, and honey known as Coorg honey are major products of the district. Tea, rubber, arecanut, coconut, citrus fruits, pineapple, papaya are also available. Coffee holdings.

3.2 SELECTION OF THE STUDY AREA

The study was conducted in Coorg district of Karnataka, which is the highest producer of coffee which accounts for 92,900 MT of total production of coffee in Karnataka (Anonymous, 2005). Data was collected from Madikeri, Somwarpet and Gonikoppal.

To accomplish the objectives of the research, survey had been carried with the questionnaires for the various stakeholders in the industry such as coffee growers, curers. Random sampling was used to select the respondents. Sample size selected for the survey was 60 coffee growers and 10 curers. Out of 60 coffee growers 30 were Arabica growers and the other 30 were Robusta growers of the category <4 ha, 4-10 ha and >10 ha.

3.3 NATURE AND SOURCES OF DATA

3.3.1 Primary Data

The required data had been collected from both the primary and secondary sources. The primary data were collected from the coffee growers and processors. The secondary data were collected from the coffee board, foreign trade review, journals, etc. The details of the data collected from different sources are given below.

Data pertaining to impact of coffee prices on the producers was collected from the coffee growers using structured and pre-tested schedule. The data relating to the size of holding, general information of the farmers, cropping pattern, price aspects, marketing aspects were collected from farmers. Similarly data pertaining cost of processing, returns from processing were collected from the processors. The growers and processors were personally interviewed to ensure that the data made available by them were appropriate, comprehensive and reasonably correct.

Secondary Data

The time series data relating to domestic price and international prices were collected from coffee board. Annual time series data for a period of 25 years from 1980-2004 were considered. This was done to analyse the fluctuation of the prices of coffee.

To study the secular trend in terms of price of coffee bean annual time series data for a period of 24 years from 1980-2004 were considered. The variable considered was Indian and international prices for coffee. The entire analysis was done separately in two phases for the overall period under study form. This is done to analyse the fluctuation of the prices.

To analyse the impact of price of coffee on producers, data regarding price received by the farmers, method of marketing, changes in practices due to price change were collected from the coffee growers. 60 respondents were selected randomly. Survey was carried with the help of questionnaires. The total cost of cultivation was directly collected from the respondents.

To study the cost of processing of coffee, the information on item such as the total quantity of coffee purchased, the source of mode of purchase were obtained directly from the processors. In order to estimate the different costs incurred on building and machineries were recorded. The expected life period of the asset was also ascertained for the respondents. The depreciation on building and machineries were computed by the straight line method.

$$\text{Annual Depreciation} = \frac{\text{Purchase Value-Junk Value}}{\text{Useful life of the asset}}$$

The interest on the capital invested on buildings and machineries was computed at 13 per cent per annum.

The variable costs such as the purchase cost of coffee, cost incurred on transportation, loading and unloading at the market yard and at the processing unit was recorded. The other items of costs such as labour, maintenances of buildings and machineries lubricants, electricity and other miscellaneous expenses were also collected. In case of processing units using the installed capacities of the processing units the data was collected.

The average price of coffee was ascertained to estimate the returns. The total cost (fixed + Variable) were deducted from the total sale value to arrive at gains or losses to the processors.

To assess the growth rate of Indian coffee exports, separate growth rates were computed type wise for both quantity exported and unit price realized for the period 1997-2004.

3.4 ANALYTICAL TOOLS AND TECHNIQUES

The data collected from primary and secondary sources were subjected to appropriate analytical techniques in order to arrive at a meaningful conclusion. The different analytical techniques used in the study are as follows.

3.4.1 Trend analysis

3.4.2 Tabular presentation

3.4.3 Growth rate analysis

3.4.4 Break even volume analysis

3.4.1 Trend analysis

The trend in domestic prices and international prices for coffee were computed considering the time series data from 1980-2004. This was divided into three phases i.e. from 1980-87, 1988-96 and 1997-2004. The cubical equations were fitted due to its superiority over others in terms of coefficient of multiple determination.

$Y_t = a + bT + cT^2 + dT^3 + et$ …… (1)

Y_t = Price

a = intercept indicating Y in the base period

Ti = Time period (i = 1 to 7)

b, c, d = Coefficient of Ti.

et = Error term.

3.4.2 Tabular Presentation

The data collected were presented in tabular form to facilitate easy comparison. This technique of tabular presentation was employed for estimating the impact of price on the growers and for estimating the impact of price on the growers and for estimating the costs of processing, returns and profits in the case of market intermediaries. The primary data regarding the cost of cultivation for the year 2002-03 and 2003-04 was directly ascertained from the coffee growers to estimate the cost of processing the data was collected from 10 processing units and they were Kodagu coffee curing works, Travancore Coffee Pvt. Ltd., Astra Processors, Associated Coffee Curers, CHIMCO International Coffee Curing and Exports, Subramanya Coffee Curing Works, United Coffee Curing Works, Anugraha Coffee Cring Works, LMJ Coffee Curing Works, Kuttappa Coffee Curing Works and Exports. Tabular presentation was made by computing the averages and percentages.

3.4.3 Growth rate analysis

In order to assess growth in type wise exports and unit prices are worked out. The growth rates are computed by using the cubical function form

$Y_t = a + bT + cT^2 + dT^3$ ..... (1)

Y_t = Price

a = intercept indicating Y in the base period

Ti = Time period (i = 1 to 7)

b, c, d = co efficient of Ti.

Further analysis was carried out as follows,

$Y_t = a + bT + cT^2 + dT^3$

The above equation was differentiated with respect to T.

$$\frac{dy}{dT} = \frac{d(a + bT + cT^2 + dT^3)}{dT}$$

$$= b + 2cT + 3dT^2$$

To work out growth rate following formula was used.

$$g = \frac{dy/dT}{\overline{Y_p}} \times 100$$

$$g = \frac{b + 2cT + 3dT^2}{\overline{Y_p}} \times 100$$

g = average cubic growth rate.

$\overline{Yp}$ = Mean of the price for 7 years

3.4.4 Break even volume analysis

Break even volume analysis was used to know the minimum level of production required to recover the total fixed capital employed in coffee processing units. This concept is important in any business as it indicated minimum amount of business necessary for operating the enterprise in the short run without loss. The formula which was used in this study was as follows :

$$Q = \frac{FC}{P - VC}$$

Q = quantity

FC = Total annual fixed cost

P = Price per unit

VC = Variable cost per unit

IV. RESULTS

In consistence with the objectives of the study, the data collected from different sources were analysed. The results are presented under the following heads.

4.1 Trends in domestic prices and international prices

4.1.1 Trends in domestic prices

4.1.2 Trends in international prices

4.2 The impact of price on the coffee growers after liberalization

4.2.1 Perception and effect of liberalization on the coffee growers

4.2.2 Costs and returns of coffee

4.2.3 Cost reduction measures adopted by the growers of different size of holdings

4.2.4 Pattern of number of growers who have reduced the cost by reducing the practices

4.2.5 Effect of reduction of cost of cultivation on yield on Robusta and Arabica growers

4.3 Cost and return pattern of coffee processing unit

4.3.1 Composition of coffee processing cost

4.3.2 Pattern of returns

4.3.3 Break even point in coffee processing units

4.4 Growth in total exports, type wise exports and unit prices of Indian coffee exports

4.4.1 Growth in total quantity of exports and unit prices of Indian coffee

4.4.2 Type wise export growth rate of Indian coffee

4.4.3 Growth in unit price of Indian coffee by type wise

4.1 TRENDS IN DOMESTIC PRICES AND INTERNATIONAL PRICES

Trend equations were fitted to assess the domestic and international prices. The different trend equations were fitted depending upon its better fit to assess the trends and the results presented under categories namely, trends in domestic prices and trends in international prices.

4.1.1 Trends in domestic prices

To assess the trends in domestic prices and international prices the data over the period from 1980 to 2004 was considered. This was divided into three phases, i.e., from 1980-87, 1988-96 and 1997-2004. The data collected was domestic auction prices. The cubic function was fitted for the data due to its superiority over others in terms of coefficient of multiple determination.

It could be seen from the Table 4.1 that in the initial year (1980-87) of the study period the domestic prices of both Arabica and Robusta were decreasing significantly and in the mid period (1988-1996) it started increasing while in the later period (1997-2004) the prices was again decreasing significantly and it was found to be significant at one per cent level.

In the case of Robusta coffee trend in prices was found to be decreasing in the initial years and was significant at 5 per cent level. But later period it was increasing significantly at 1 per cent level, while in the later period the prices started decreasing significantly at 1 per cent level.

Table 4.1. Trends in domestic prices of coffee

(Rs./kg)

Sl. No.	Name of the variety	Intercept	T	T^2	T^3	R^2	F
1.	Arabica	19.47	-6.585^{NS}	1.130**	-0.03282**	0.76	22.50
2.	Robusta	13.37	-2.397*	0.498**	-0.015**	0.74	20.32

* Significant at 5% level
** Significant at 1% level
NS – non significant
Source : Data collected from various issues of data base on coffee, Indian Coffee Published by Coffee Board.

Table 4.2. Trends in international prices of coffee

(US cents/lb)

Sl. No.	Name of the variety	Intercept	T	T^2	T^3	R^2	F
1.	Arabica	168.2202	-11.40^{NS}	0.93^{NS}	-0.026^{NS}	0.32	3.30
2.	Robusta	150.22	-10.49^{NS}	0.61^{NS}	-0.015^{NS}	0.57	9.63

NS – non significant
Prices referred to the prices on the New York Market.
Source : Data collected from various issues of data base on coffee, Indian Coffee Published by Coffee Board.

4.1.2 Trends in international prices

From the Table 4.2 it was found that the international prices of Arabica coffee decreased during 1980-87, then it started increasing and later decreased. It was found non-significant, whereas the international prices of Robusta coffee decreased during 1980-87 and increased during 1988-96, while during 1997-2004 the prices started decreasing non-significantly.

Table 4.3. Perception and effect of liberalization on the coffee growers

(n = No. of respondents)

Sl. No.	Particulars	Arabica								Robusta							
		< 4 ha (n = 10)		4-10 ha (n = 10)		>10 ha (n = 10)		Total (n = 30)		< 4 ha (n = 10)		4-10 ha (n = 10)		>10 ha (n = 10)		Total (n = 30)	
		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1.	Aware of liberalization	10 (100)	-	10 (100)	-	10 (100)	-	30 (100)	-	10 (100)	-	10 (100)	-	10 (100)	-	30 (100)	-
2.	Fluctuation of price due to liberalization	10 (100)	-	10 (100)	-	10 (100)	-	30 (100)	-	10 (100)	-	10 (100)	-	10 (100)	-	30 (100)	-
3.	Interested to continue under liberalization	2 (20)	8 (80)	5 (50)	5 (50)	8 (80)	2 (20)	15 (50)	15 (50)	3 (30)	7 (70)	6 (60)	4 (40)	9 (90)	1 (10)	18 (60)	12 (40)
4.	Interested to continue under coffee board	8 (80)	2 (20)	5 (50)	5 (50)	2 (20)	8 (80)	16 (53)	14 (47)	7 (70)	3 (30)	4 (40)	6 (60)	1 (10)	9 (90)	12 (40)	18 (60)
5.	Reduction of area due to																
A.	Fluctuation of price	-	10 (100)	-	10 (100)	-	10 (100)	-	30 (100)	-	10 (100)	-	10 (100)	-	10 (100)	-	30 (100)
B.	Other reasons pests and diseases	2 (20)	8 (80)	3 (30)	7 (70)	2 (20)	8 (80)	7 (23)	23 (77)	3 (30)	7 (70)	5 (50)	5 (50)	6 (60)	4 (40)	14 (97)	16 (53)
6.	Practicising additional intercrop																
A.	Vanilla	8 (80)	2 (20)	9 (90)	1 (10)	10 (100)	-	27 (90)	3 (10)	1 (10)	9 (90)	2 (20)	8 (80)	1 (10)	9 (90)	4 (13)	26 (87)
B.	Ginger	3 (30)	7 (70)	5 (50)	5 (50)	5 (50)	5 (50)	13 (43)	22 (57)	2 (20)	8 (80)	4 (40)	6 (60)	5 (50)	5 (50)	11 (37)	19 (63)

Note : Figures in parentheses indicate the percentages. Y - Yes, N – No.

4.2 THE IMPACT OF PRICE ON THE COFFEE GROWERS AFTER LIBERALIZATION

The impact of price on the coffee growers after liberalization is presented in Tables.

To study the impact of price on the coffee growers after liberalization, the primary data was collected from 60 growers of which 30 were Arabica growers and 30 were Robusta growers. The data collected was subjected to averages.

4.2.1 Perception and effect of liberalization on the coffee growers

It could be seen from the Table 4.3 that both Arabica and Robusta growers (100%) of all categories that is less than 4 hectares, 4-10 hectares, more than 10 hectares were aware of liberalization and were of the opinion that the fluctuation of prices was due to liberalization.

It was found that more than 80 per cent of both Arabica and Robusta growers of the category more than 10 hectares were interested to continue under liberalization. More than 70 per cent of both Arabica and Robusta growers of the category less than 4 hectares were interested to continue under coffee board. In the category of 4-10 hectares 50 per cent were interested to continue under coffee board and other 50 per cent were interested to continue under liberalization.

It was observed that none (100%) of both the Arabica and Robusta growers reduced their area under the coffee plantation due to fluctuation of prices. About 30 per cent of the category of 4-10 hectares of Robusta growers reduced the area due to pests and diseases. And in Arabica under the category of more than 10 ha about 60 per cent of the growers reduced the area due to attack of pest and diseases.

Under all the categories of both Arabica and Robusta growers 80 per cent of them have taken up vanilla as the additional intercrop and about 50 per cent belonging to the category of 4-10 hectares and more than 10 hectares of both Arabica and Robusta growers have taken up ginger as the intercrop.

4.2.2 Costs and returns of coffee

From the Table 4.4 it could be seen that all the categories (less than 4 hectares, 4-10 hectares and more than 10 hectares) of both Arabica and Robusta growers have reduced their cost of cultivation during the year 2003-04 when compared to 2002-03, under the category of less than 4 hectares of both Arabica and Robusta growers have got negative returns in 2003 and 2004. Whereas under the category of 4-10 ha and more than 10 hectares the net returns were low in 2003 and it has been increased in 2004.

4.2.3 Cost reduction measures adopted by the growers of different size of holdings

From the Table 4.5 it could be seen that growers of both Arabica and Robusta of all the categories have reduced the cost of cultivation in 2003-04 by reducing the regular practices that were followed in 2002-03.

In Robusta the practices that were reduced by the growers of all the category were rounds of weeding, shade lopping, Bush management, irrigation, fertilizer management. In the same manner growers of Arabica of all categories have also reduced the cost by taking reduced number of practices, such as reduction in number of rounds of weeding, shade lopping, swabbing, bush management, fertilizer application.

4.2.4 Pattern of number of growers who have reduced the cost by reducing the practices

It was found from the Table 4.5 that under the category of less than 4 hectares (80%) of both Arabica and Robusta growers have reduced their cost by reducing the rounds or quantity of fertilizer application and 70 per cent of Robusta growers have reduced the irrigation costs. Under the category of more than 10 hectares 70 per cent of the growers have reduced the cost by taking up less number of shade lopping.

Table 4.4. Costs and returns of coffee

Sl. No.	Particulars	Cost of cultivation (Rs./ha)		Yield (kg/ha)		Price (Rs./50 kg)		Gross returns (Rs./ha)		Net returns (Rs./ha)	
		2002-03	2003-04	2003	2004	2003	2004	2003	2004	2003	2004
1.	ROBUSTA										
a.	<4 ha	26405	20005	1500	1250	741	790	22230	19750	-4175	-255
b.	4-10 ha	29730	23730	2075	2050	741	790	31208	32390	1478	8650
c.	>10 ha	31020	27020	2515	2512	780	797	41045	40041	10025	13021
2.	ARABICA										
a.	<4 ha	33000	29000	1490	1215	852	1143	25389	27774	-7610	-1225
b.	4-10 ha	40050	33550	2500	2400	856	1147	42800	55056	2750	15006
c.	>10 ha	41000	37500	2750	2700	854	1210	46970	65340	5970	27840

Table 4.5. Cost reduction measures adopted by the growers of different size of holdings

Particulars	Growers who have reduced the cost														
	<4 ha					4-10 ha					>10 ha				
	No. of practices		Cost of cultivation of 2003 (A)	Cost of cultivation of 2004 (B)	Net savings (A – B)	No. of practices		Cost of cultivation of 2003 (A)	Cost of cultivation of 2004 (B)	Net savings (A – B)	No. of practices		Cost of cultivation of 2003 (A)	Cost of cultivation of 2004 (B)	Net savings (A – B)
	2003	2004				2003	2004				2003	2004			
1. ROBUSTA															
a. Rounds of weeding	3	1	2030	1280	750	3	1	2500	1660	840	3	1	2740	1840	900
b. Shade lopping	2	1	2100	600	1500	2	1	2100	600	1500	2	1	2500	700	1800
c. Bush management	2	1	2000	1100	900	2	1	2000	1200	800	2	1	2200	1300	900
d. Irrigation	1	1	2500	-	2500	1	1	2800	2000	800	1	1	3000	2700	300
e. fertilizer management	2	1	8900	5900	3000	2	1	10200	8000	2200	2	1	11800	10800	1000
2. ARABICA															
a. Rounds of weeding	3	1	1800	1200	600	3	1	2400	1620	780	3	1	2700	1800	900
b. Shade lopping	2	1	1900	550	1350	2	1	2250	750	1500	2	1	2400	750	1650
c. Swabbing	2	1	3000	1375	1625	2	1	3400	2200	1200	2	1	3900	2900	1000
d. Bush management	2	1	1350	550	800	2	1	1500	750	750	2	1	1790	1140	650
e. fertilizer management	2	1	9445	4460	4985	2	1	10650	8850	1800	2	1	11950	11050	900

4.2.5 Effect of reduction of cost of cultivation on yield on Robusta and Arabica growers

The results indicates that majority of the Robusta and arabica growers (60 to 70%) under the category of less than 4 hectares who reduced the cost of cultivation in the range of 21-30 per cent (Rs. 6001, 8700 Rs.) observed that there was an reduction of yield to the extent of 5-15 per cent (450 kgs, 447 kg) respectively (Table 4.7).

The Arabica and Robusta growers under the category of 4-10 hectares (50-60%) reduced the cost of cultivation by 10-20 per cent (Rs. 4745, Rs. 6710) and realized reduction of yield by 2-5 per cent (415 kg, 380 kg) respectively.

Under the category of Arabica and Robusta under the category of more than 10 hectares (60-70%) who reduced the cost of cultivation in the range of more than 10 per cent (50%) realized reduction of yield by less than 2 per cent (251 kgs, 275 kg) respectively.

Table 4.6. Pattern of number of growers who have reduced the costs by reducing the practices

Particulars	Growers who have reduced the cost			
	<4 ha (n = 10)	4-10 ha (n=10)	>10 (n = 10)	Total
1. ROBUSTA				
a. Rounds of weeding	6 (60)	5 (50)	4 (40)	15 (50)
b. Shade lopping	5 (50)	6 (60)	7 (70)	18 (60)
c. Bush management	5 (50)	5 (50)	6 (60)	16 (53)
d. Irrigation	7 (70)	4 (40)	3 (30)	14 (47)
e. fertilizer management	8 (80)	6 (60)	2 (20)	16 (53)
2. ARABICA				
a. Rounds of weeding	5 (50)	6 (60)	5 (50)	16 (53)
b. Shade lopping	7 (70)	6 (60)	8 (80)	21 (70)
c. Swabbing	7 (70)	4 (40)	2 (20)	13 (43)
d. Bush management	6 (60)	5 (50)	6 (60)	17 (57)
e. fertilizer management	9 (90)	5 (50)	2 (20)	16 (53)

Note : Figures in parentheses indicate percentages.

Table 4.7. Effect of reduction of cost of cultivation on yield on Robusta and Arabica growers

Cost of cultivation (Rs./ha)							Yield reduction (kg/ha)						
Per cent reduction of cost of cultivation	< 4 ha (n = 10)		4-10 ha (n = 10)		> 10 ha (n = 10)		Per cent reduction in yield	<4 ha		4-10 ha		>10 ha	
	No. of growers	Cost of cultivation in 2003-04	No. of growers	Cost of cultivation in 2003-04	No. of growers	Cost of cultivation in 2003-04		No. of growers	Yield of 2004	No. of growers	Yield of 2004	No. of growers	Yield of 2004
Robusta													
< 10%	1 (10.0)	2000	3 (30.0)	2373	7 (70.0)	2702	<2	1 (10.0)	150	3 (30.0)	207	5 (50.0)	251
10-20	2 (20.0)	4001	6 (60.0)	4746	2 (20.0)	5404	2-5	2 (20.0)	300	5 (50.0)	415	2 (20.0)	503
21-30	7 (70.0)	6001	2 (20.0)	7119	1 (10.0)	8106	5-15	7 (70.0)	450	3 (30.0)	622	1 (10.0)	754
Arabica													
< 10%	2 (20.0)	2900	3 (30.0)	3355	6 (60.0)	3750	<2	1 (10.0)	149	2 (20.0)	250	5 (50.0)	275
10-20	2 (20.0)	5800	5 (50.0)	6710	3 (30.0)	7500	2-5	1 (10.0)	298	4 (40.0)	380	3 (30.0)	550
21-30	6 (60.0)	8700	2 (20.0)	10065	1 (10.0)	11250	5-15	6 (60.0)	450	2 (20.0)	750	1 (10.0)	825

4.3 COST AND RETURN PATTERN OF COFFEE PROCESSING UNIT

4.3.1 Composition of coffee processing costs

The per unit cost of processing of coffee is presented in Table 4.8.

In the year 2004, on an average, the quantity of coffee processed at processing units worked out to be 2500 tonnes. It ranged from 2000 to 2500 tonnes depending upon the capacity of the processing units.

It is worth noting that the total variable cost (Rs. 30038/tonne), in general formed a substantial component (97%) of the total cost of processing in coffee. The total fixed cost being Rs. 1039 per tonne accounted only (3%) of the total cost of processing.

Of the total variable cost, the cost of raw material (Rs. 27756) accounted for 89 per cent followed by power charges (3.2%). The commission, office maintenance, weighing, loading, transportation and unloading, repairs and maintenance, cost of gunny bags, wages for labour were the other minor components of the total variable cost incurred in the processing of coffee.

In general, the interest for the value of the asset (Rs.449) formed the major component (1.4%) of the total cost followed by depreciation on buildings, machineries and their establishment (1.3%), salaries for permanent staff (0.4%), local taxes (0.04%), pollution control licenses (0.02%), insurance premium (0.03%), license fee (0.003%).

4.3.2 Pattern of returns

The pattern of coffee processed and the returns obtained is presented in Table 4.9.

In general, the total quantity of output (main product) obtained was found to be 2125 tonnes out of 2500 tonnes of total coffee processed, indicating 85 per cent of recovery. The total cost per tonne of coffee was found to be Rs. 31,076.

The gross returns per tonne of output was found to be Rs. 32,300 and for byproduct it was Rs. 1000/t. However, the net returns per tonne of output (main product) found to be Rs. 1373 per tonne.

4.3.3 Break even point in coffee processing units

It is evident from the Table 4.10 that on an average, minimum quantity of 1148 tonnes of coffee should be produced so as to continue the production process without sustaining losses.

4.4 GROWTH IN TOTAL EXPORTS TYPE WISE EXPORTS AND UNIT PRICES OF INDIAN COFFEE EXPORTS

This study attempts to analyse the performance of Indian coffee with respect to quantity exported and unit price realized through the exports. The types of coffee considered for analysis were plantation A, robusta, value added coffee, speciality coffee apart from the total coffee exports.

The cubic functional form was employed to arrive at the growth rates as it was found better than other functional forms. The adequacy of the model for the respective series was indicated by the coefficients of multiple determination. The R^2 value varied between 0.27 to 0.98.

Table 4.8. Composition of coffee processing costs

Sl. No.	Particulars	Processing cost per unit (Rs. in lakhs)	Cost per tonne (Rs.)
1.	Fixed costs		
a.	Depreciation	10.45375	418.15 (1.3)
b.	Interest at 13% on borrowed capital	11.232	449 (1.4)
c.	Salaries for permanent staff	3.515	147 (0.4)
d.	License fee	0.024	1 (0.003)
e.	Local taxes	0.30	12 (0.04)
f.	Pollution control licenses	0.20	8 (0.02)
g.	Insurance premium	0.24142	10 (0.03)
A.	Total of fixed costs	25.96617	1039 (3.00)
2.	Variable costs		
a.	Cost of raw materials	693.9	27756 (89.0)
b.	Power charges	25.059	1002 (3.2)
c.	Weighing, loading, transportation and unloading	2.475	99 (0.3)
d.	Repairs and maintenance	0.40845	16 (0.05)
e.	Wages to casual labour	4.78285	19 (0.06)
f.	Cost of gunny bags	0.35759	14 (0.09)
g.	Commission	12.285	491 (1.6)
h.	Office maintenance	5.98695	239 (0.7)
i.	Sales tax	10.00	400 (1.3)
B.	Total of variable costs	750.95484	30038 (97.0)
3.	Total cost of coffee processed (A + B)	776.92101	31076

Note : Figures in parentheses indicate the percentages.

Table 4.9. Pattern of returns to coffee processing units

(unit = Rs./tonne)

Sl. No.	Particulars	Returns per unit	Returns per tonne
1.	Total quantity of coffee processed (tonnes)	2500	
2.	Total quantity of main product obtained (tonnes)	2125	
3.	Total quantity of byproduct obtained (tonnes)	375	
4.	Total value of main product obtained		32300
	a. 790 tonnes of plantation A	27650000	
	b. 360 tonnes of arabica cherry	18000000	
	c. 975 tonnes of Robusta cherry	35100000	
	d. Total value	80750000	
5.	Total value of husk obtained @ 1000 Rs. for 375 tonnes	375000	1000
6.	Gross returns (4 + 5)	81125000	32450
7.	Net returns	3432899	1373

Note : 790 tonnes of plantation A – Rs. 35,000 per tonne
360 tonnes of Arabica cherry – Rs. 50,000 per tonne
975 tonnes of Robusta cherry – Rs. 36,000 per tonne.

Table 4.10. Break-even point of production in coffee processing units

Size of the processing unit	Fixed cost per year (Rs. lakhs)	Average variable cost per unit of output (Rs.)	Average price per unit of output (Rs.)	Break even point (tonnes)
Small	25.96	30038	32300	1148

Table 4.11. Growth rate in total quantity of exports and unit prices of Indian coffee

Particulars	Intercept	Slope	R^2	Growth rate (%)
Quantity	146257	b_1 = 17234.781 b_2 = - 826.33 b_3 = 207.88	0.62	4.1
Price	67.66	b_1 = 23.72 b_2 = -6.83 b_3 = 0.44	0.90	-5.8

Notes : 1. Quantity exported in metric tonnes
Unit price realized in Rs. /kg.

Source: Data collected from various issues of data base on coffee, Indian Coffee Published by Coffee Board.

4.4.1 Growth in total quantity of exports and unit prices of Indian coffee

From the Table 4.11 it could b seen that total quantity of coffee exported exhibited a growth rate of 4.1 per cent per annum with the unit prices registering a negative growth rate of 5.8 per cent.

4.4.2 Type wise export growth rate of Indian coffee

It could be seen from the Table 4.12 exports of plantation type exhibited a growth rate of 8.29 per cent per annum. Arabica cherry registered negative growth rate of 8.50 per cent. Robusta exports registered a growth rate of 13.22 per cent. The robusta parchment registered at a growth rate of 9.00 per cent. The growth in exports of value added coffee increased by 14 per cent and the speciality coffee registered a growth of 21.7 per cent.

4.4.3 Growth in unit price of Indian coffee by type wise

It is evident from the Table 4.13 that unit price for the exports of plantation. A registered a negative growth of 13.7 per cent per annum. Arabica cherry registered a negative growth rate of 13.6 per cent. Unit price of exports of Robusta declined at a growth rate of 2.79. It was found that there was a negative growth of 2.3 per cent in case of Robusta parchment. The growth in unit price in case of value added coffee was found to be negative i.e., 7.54 per cent and the speciality coffee recorded a negative growth of 1.85 per cent.

Table 4.12. Type-wise export growth rate of Indian coffee

Quantity = MT

Type	Intercept	Slope	R^2	Growth rate (%)
Plantation A	12009.7	b_1 = 30684.90 b_2 = - 6837.00 b_3 = 470.278	0.426	8.29
Arabica cherry	20270.3	b_1 = -2511 b_2 = 742.786 b_3 = -80.083	0.271	-8.5
Robusta	-24682	b_1 = 12409.00** b_2 = -33252.00 b_3 = 2576.83	0.929	13.32
Robusta parchement	11921	b_1 = -691.552 b_2 = 226.548 b_3 = -15.361	0.839	9.00
Value added coffee	29834.5	b_1 = -17977 b_2 = 2715.24 b_3 = -468.57	0.771	14.00
Specialty coffee	1612.56	b_1 = 540.481 b_2 = -9.0405 b_3 =6.9806	0.954	21.70

Note: ** denotes significance at 1% level
* denotes significance at 5% level
MT – Metric tonnes
Source: Data collected from various issues of data base on coffee, Indian Coffee Published by Coffee Board.

Table 4.13. Growth rate in unit price of Indian coffee by type wise

(Price = Rs./kg)

Type	Intercept	Slope	R^2	Growth rate (%)
Plantation A	156.85	b_1 = -27.167 b_2 = 0.1548 b_3 = -0.25	0.982	-13.7
Arabica cherry	123.286	b_1 = -21.369 b_2 = 0.9286 b_3 = -0.0833	0.981	-13.60
Robusta	39.28	B_1 = 38.0437 b_2 = -13.833 b_3 = 1.1944	0.915	-2.79
Robusta parchement	56.8571	b_1 = 30.5397 b_2 = -12.536 b_3 =1.1389	0.958	-2.30
Value added	12.14	b_1 = -0.9643 b_2 = 0.0357 b_3 = -5.E –17	0.944	-7.54
Specialty	57.71	b_1 = 53.94 b_2 = -18.68* b_3 = 1.52*	0.944	-1.85

Note: * denotes significance at 5% level
Source: Data collected from various issues of data base on coffee, Indian Coffee Published by Coffee Board.

V. DISCUSSION

The results of the investigation are discussed with reasons in this chapter under the following heads.

5.1 Trends in domestic prices and international prices of coffee

5.2 Impact of price on the coffee growers after liberalization

5.3 Costs and returns structure in coffee processing of coffee

5.4 Growth in domestic and international prices of coffee

5.1 TRENDS IN DOMESTIC PRICES AND INTERNATIONAL PRICES OF COFFEE

Trends in domestic prices and international prices of coffee was worked out by fitting appropriate trend equations and presented in the Tables.

5.1.1 Trends in domestic prices

In the earlier period the domestic prices of both Arabica and Robusta decreased. However, before liberalization the domestic prices was dependent on the coffee Board. Since coffee board depended on exports, its payments to growers were lower. Coffee board held two separate auctions, one for domestic market and other for exports. Nearly 30 per cent of the production were sold in India under minimum release price, based on cost of production plus basis. The price was generally lower than what prevailed overseas. The growers would receive average of the two auctions. The average domestic price therefore would be lower than the international price. As a result the prices showed a declining trend.

Later internal sale quota (ISQ) was introduced in 1992-93. Fortunately when ISQ was introduced the prices in domestic market ruled higher. Then FSQ (Free sale quota) was introduced during 1993-94. The reasons for remunerative prices to Indian growers were devaluation of rupee, integration of domestic and international market and shifting of tax from purchase point to sale point. The subsequent frost in Brazil pushed the prices through the roof. These were the reasons which showed an increasing trend to domestic prices.

The price received by the growers reflects any quality differentials below or above the International price of coffee, as well as the costs associated with marketing in the value chain. Since, the domestic prices of coffee mainly depends on international price of coffee, any changes in international price of coffee will change the domestic price as well. The prices of coffee are determined by market forces of supply and demand in global and Indian market. Due to the supply outstripping demand globally, the domestic prices have decreased.

5.1.2 Trends in international prices

The international prices for both Arabica and Robusta coffee showed a decreasing trend in the beginning, but in the middle year it increased and again started decreasing in the later period.

Prior to Liberalization International Coffee Organization (ICO) used to regulate the supply. It allocated export quota for each producing country. If prices crossed the upper trigger point, ICO allocated bigger quota. If prices slipped below the lower trigger point, lower quota was allotted. As a result there was no increase in prices and was found to be low. The supply constraint caused by the frost in Brazil in the mid nineties was followed by a period of sky high prices. This was the reason for the increase in the coffee prices.

The situation of decreased trend in prices was caused by the imbalance between supply and demand for coffee. The increase in production capacity globally due to the emergence of Vietnam and resurgence of Brazil have lowered the cost structure for coffee. The average production of the three top producers viz., Brazil, Vietnam and Colombia constitute around 62 per cent of global production. Due to global oversupply the average ICO indicater prices have fallen to historic low level.

As such Robusta is concerned, Vietnam is the biggest producer in the world today. As the over supply of Robusta to the world market by the Vietnam is also the reason for a declining trend of price in robusta.

Brazil In order to offset their crumbling economy, devalued its currency during 1999 with the devaluation of currency and fantastic production of coffee during 1998-99, the international price of coffee collapsed.

5.2 IMPACT OF PRICE ON THE COFFEE GROWERS AFTER LIBERALIZATION

5.2.1 Perception and effect of liberalization on the coffee growers

Table 4.3 indicated that both Arabica and Robusta growers (100%) of all the categories were aware of liberalization and were of the opinion that the fluctuation of prices was due to liberalization. The fluctuation of prices was due to over supply in the international market and also due to competition in international market. It was found that most (80%) of Arabica and Robusta growers of the category >10 ha were interested to continue under liberalization. It is because growers were getting higher prices than the prices received during the pooled system. After liberalization they could sell their produce on their own depending on the prevailing market prices.

But the growers of both Arabica and Robusta under the category less than 4 hectares preferred the pooled system practiced by coffee board. In the pooled system coffee board fixed a margin whereas in open market traders are the one who played a major role in fluctuating the prices. There is no stability in prices and also no security, cheating could also seen by the traders whereas under the category of 4-10 hectares 50 per cent were interested to continue under coffee board and the remaining 50 per cent were interested to continue under liberalization.

The Arabica and Robusta growers (100%) did not reduce their area under coffee plantation due to fluctuation of prices. Under the category of 4-10 hectares of Robusta growers 30 per cent of them reduced the area due to attack of pests such as Berry borer and disease coffee rust. It was observed that 60 per cent of the Arabica growers reduced the area due to attack of severe pest white stem borer.

As Vanilla and Ginger were fetching higher prices in the market, these crops were taken as intercrop by all the categories of both Arabica and Robusta growers due to the fall in the coffee prices.

5.2.2 Costs and returns of coffee

The cost of cultivation was reduced by all the categories less than 4 hectares, 4-10 hectares and more than 10 hectares) of both Arabica and Robusta growers during the year 2004 as compared to 2003. Table depicts that yield has been reduced in 2004 than observed in 2003. The growers under the category of less than 4 hectares of both Arabica and Robusta have also got negative returns due to lower prices prevailing in the market. The current low prices in the market has resulted in extremely low and in some cases negative returns. Low returns in general and negative returns in some cases forced the coffee growers to curtail the investment in the farm to reduce the cost of cultivation.

5.2.3 Cost reduction measures adopted by the growers of different size of holdings

Both Arabica and Robusta growers of all categories (4 hectares, 4-10 hectares and more than 10 hectares) have reduced the cost of cultivation by reducing the regular practices. The Table 4.5 indicated the various practices that were responsible to reduce the cost of cultivation. The Robusta growers and Arabica growers under the category of less than 4 hectares (more than 80%) have reduced the cost by reducing the fertilizer application (rounds and quantity). Cost of manure which is the major input cost for the coffee plantation has been reduced either by skipping the fertilizer round or reducing the quantity of fertilizer per round or by both means. Considering the importance of providing timely irrigation for blossom and backing to sustain robusta yield, nearly 70 per cent of the growers under the category of less than 4 hectares have reduced the irrigation costs by skipping or reducing the

number of round. The Arabica growers under the category of less than 4 hectares have reduced the costs by regular reduction in swabbing. It could be observed from the Table 4.6 that most of the growers of both Arabica and Robusta of the category of 4-10 hectares and more than 10 hectares have reduced the cost by reducing the practices such as round of weeding, shade lopping and bush management, which were mainly accounted labour oriented practices. Since the labour cost which accounted a major lion share of total cost of cultivation of coffee the respondents resorted to direct cost cutting measures by way of reducing the amount of wages paid to the labourers during the low price situation. The labour cost have been reduced by reducing the frequency of operation or skipping/postponing the operation involving labour.

Permanent shade regulation work which was regular practice involving considerable labour cost has been reduced by the growers, wherein they resorted to removal of lower hanging branches and light shade dressing and hence saving considerable amount of expenditure. Most of the growers have also reduced the weeding operation, instead of 3 rounds of weeding only 2 rounds were taken up.

Reduction in handling and pruning of bushes restricted to light handling to remove dead and die back affected twigs along with desuckering.

5.2.4 Effect of reduction of cost of cultivation on yield on Robusta and Arabica growers

The results about the impact of cost reduction measures pointed out that the majority of the growers of the category reduced the cost of cultivation and experienced reduction in coffee production. The results indicates that majority of the Robusta and arabica growers (60 to 70%) under the category of <4 ha who reduced the cost of cultivation in the range of 21-30 per cent (Rs. 6001, 8700 Rs.) observed that there was an reduction of yield to the extent of 5-15 per cent (450 kgs, 447 kg) respectively. To reduce the cost of cultivation critical inputs like fertilizer and irrigation were reduced which in turn was the main cause for the low yield.

The Arabica and Robusta growers under the category of 4-10 hectares (50-60%) reduced the cost of cultivation by 10-20 per cent (Rs. 4745, Rs. 6710) and realized reduction of yield by 2-5 per cent (415 kg, 380 kg) respectively. Under the category of Arabica and Robusta under the category of more than 10 hectares (60-70%) who reduced the cost of cultivation in the range of <10 per cent (50%) realized reduction of yield by less than 2 per cent (251 kgs, 275 kg) respectively. There was lesser reduction of yield under the category of 4-10 hectares and more than 10 hectares due to proper management of inputs like manuring and irrigation. Nagarajaiah *et al.* (2003) have also observed similar results for impact of low price on cultivation and production of small Robusta coffee plantation in South Coorg. It was found that the low price situation forced majority of the small growers (less than 4 hectares) of both Arabica and Robusta to adopt cost reduction measures in order to reduce the farm expenditure without any other alternatives. The extent of reduction in cost of cultivation found to be directly related to the extent of reduction in yield which was greatly depended on the reduction in critical inputs/practices like manuring, irrigation and others.

5.3 COSTS AND RETURNS STRUCTURE IN COFFEE PROCESSING

5.3.1 Composition of coffee processing costs

For processing of coffee, different activities need to be performed which needs capital investment.

The structure of the processing cost clearly indicated that the variable cost (Rs. 30038) was the significant component (97%) of the total processing cost. Table 4.9 indicates that average raw material cost was the major component of variable cost (89%). The processors procured the raw materials by the commission agents. The commission charged by the agents are high. It would be better if the processors would directly purchase the raw materials from the producers rather than commission agents. The fixed cost was only 3 per cent of the total cost of processing. Interest charged on the borrowed capital was major component among the fixed cost. The interest charged on the borrowed capital was 13 per cent which was high. The processor should invest more of their capital than going for borrowed capital.

In general, the cost per tonne of output (main product) of coffee was found to be 31,076 Rs. The net returns was found to be Rs. 1,373 per tonne.

5.3.2 Break even point in coffee processing units

It was found that quantity of output required to reach level of break even point was 1148 tonnes of output. However the processing units had produced (2125 tonnes) more than the break even volume of output, indicating that processing units were running under profitable lines.

5.4 GROWTH IN DOMESTIC AND INTERNATIONAL PRICES OF COFFEE

Coffee is one of the major exports driven commodity. Nearly 70 per cent of the production is exported. Though India is a small producer of coffee in the global context, she is one of the major exporters of the commodity and accounts for a fair share of the world market (4.38%). Indian coffee is exported to over 40 countries. The top ten markets are Italy, Russian Federation, Germany, Belgium, USA, Spain, Japan, Slovenia, Netherlands, Poland which accounts for nearly 75 per cent of Indian coffee exports. Export of coffee showed increase growth in quantity wise and declined in terms of unit price. It is in this background that the growth in quantity exported and unit prices of coffee was analysed.

The growth rate of different types of coffee *viz*., plantation A, Robusta, value added coffee and speciality coffee and total coffee form India were worked out separately.

5.4.1 Growth in total quantity of exports and in unit prices of Indian coffee

Total coffee exports registered a growth of 4.1 per cent with the unit value declining by 5.8 per cent per annum. Radhakrishnan (2004) has also observed similar results for Indian Coffee exports. Consequent to market reforms, coffee exports have shown a remarkable growth. This can be attributed to higher level of production. Exports to various destinations are not always without ups and downs. Some markets prefer high volume and high quality and while others prefer high volume and low quality. The declining global prices lead to a declining export earnings.

5.4.2 Growth in quantity and unit prices of type-wise exports of Indian coffee

The growth of plantation A coffee export realized were 8.29 per cent. It is due to most of the countries prefer washed coffee. Plantation A are used as good blenders. But the unit price of plantation A coffee showed a declining growth rate of 13.7 per cent. Owning to falling international prices the export value is declining. Arabica cherry had a negative growth rate of 8.5 per cent in quantity because of less production due to severe attack of pests and diseases and higher cost of cultivation. In the qualitywise Indian Arabica falls in the second category and not at the top. The Indian Arabica prices are discounted because in terms of quality wise Indian arabica are in the bottom half of arabica producing origins and it may be one of the reason for fetching low prices in arabica coffee exports.

Robusta cherry export has shown increasing growth of 13.32 per cent. Due to increased production the cost of production is cheaper when compared to Arabica and is also easier to maintain Robusta. India's Robusta is considered to be one of the best. The perception of the majority of the roasters has changed over a period of time. Many of them are using Robusta than Arabica. A negative growth of 2.79 per cent was observed in the unit price. This is due to falling of International prices. Indian Robusta is highly qualitative but not cost effective. The cost of Robusta coffee in the countries like Vietnam is cheaper than the Indian coffee. Robusta parchment has a registered growth of 9 per cent. Since Robusta parchment is a washed coffee most of the countries prefer this type of coffee. Robusta parchment registered a negative growth of 2.30 per cent due to decline in international prices.

Value added coffee consists of instant coffee roasters and ground. Value added coffee has a growth rate of 14 per cent. India is the main supplier of instant coffee to USSR, as USSR is a major market for the instant coffee. Indian prices are not competing than other exporter prices in the absence of latest technology Indian prices are not competitive resulting in lower growth rate of 7.54 per cent.

Speciality coffee exports has shown an increasing growth rate of 21.7 per cent. The speciality coffee exports from India mainly comprises of monsooned coffee, Mysore nuggets, Extra bold, Robusta Kapi and Royale. Speciality coffee are gaining popularity in the world coffee market. They are high quality coffees and are different from that of normal coffee with reference to visual quality or in cup or both. Among the specialty coffee, the monsooned coffees are popular in 'scandinavian' market for their neutral mellow flavour in the cup. The Mysore nuggets is a premium coffee and represents the best quality coffee from India. The global coffee market is witnessing interesting and rapid changes in the way coffee is being offered to consumers. Over the years, the market for speciality coffee has been gaining prominence as a niche segment. As the consumers prefer high quality the speciality coffee are exported much in quantity wise. The price offered for the speciality coffee typically are not benchmark on the international spot or future prices for commercial grades but as based on a subjective appreciation of the intrinsic value of the product and relationship between buyers and sellers. Though there is a negative growth of 1.85 per cent but it is comparatively low when compared to other type-wise coffee export.

Increased output will depend, to a very large extent, on the prices received by growers. Individual coffee growers do not have much influence over the market prices as growers have to buy and large accept the prevailing prices. The bargaining power of individual growers is also low as coffee is harvested once a year while expenditure for farm operation is done throughout the year.

VI. SUMMARY AND POLICY IMPLICATIONS

Coffee occupies a place of pride among plantation crops grown in India. It is the most important cash crop that is grown in the tropics. Generally coffee is the second largest traded commodity next to petroleum products. Coffee is grown in the tropical belt of the world where there is good sunshine, heavy rains and rich organic soil. It cannot be grown in places where there is frost or snow.

Cultivation of this stimulating beverage crop is mainly confined to the southern states of Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. It is also grown to a small extent in Arunachal Pradesh, Assam, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Sikkim, Tripura and West Bengal forming the non-traditional belt.

In India, coffee was the only commodity marketed through a statutory organization viz., the coffee board. The coffee board fixed a minimum release price for each grade of coffee sold internally and this was based on the cost of production incurred by the grower. The complete pooled system which worked for 50 years gave way to partial pooling system with the announcement of internal sale quota and free sale quota.

According to internal sale quota, the grower was given the option of either pooling or selling on his own the 30 per cent of the total produce. This was introduced in 1992 to 1993. Later in the year 1996, 100 per cent FSQ (Free Sale Quota) was allowed to the coffee growers. Now most part of coffee sold directly to the roasters companies and exporters either directly or through purchase agents.

One of the main objective in coffee processing or curing process is to ensure that the inherent quality of coffee both visual and cup quality will be preserved. Coffee is one of the major export driven commodity in the country. Nearly 70 per cent of the production is exported consequent to market reforms, coffee exports have shown a remarkable growth.

Increase output will depend to a very large extent on the prices received by the growers. There was a general decline in prices received by growers until 1991-92. Prices than moderately recovered before rising sharply following the Brazilian frost and drought of 1994-96. Grower prices were comparatively higher during 1994-95 to 1997-98 seasons but from 1998-99 onward again there is a steep and continued decline in prices received by growers.

The specific objectives of the study were :

1. To study the secular trend in price of coffee beans
2. To study the impact of price of coffee beans on the producers after liberalization
3. To study the cost of processing of coffee by the processors
4. To study the growth and composition of exports of Indian coffee bean.

Methodology

The present study was conducted in Coorg district, which is the higher producer of coffee in Karnataka. Data was collected from Madikeri, Somwarpet and Gonikoppal.

To accomplish the objectives of the research, survey had been carried with the questionnaire for the various stakeholder in the industry such as coffee grower and curers. Random sampling was used to select the respondents. Sample size selected for the survey was 60 coffee growers and 10 curers.

The primary data was collected from the farmers and processors for the year 2004 with respect to impact of price on the growers and cost and returns structure of processing from the processors.

The secondary data was collected from the coffee board, foreign trade review with respect to domestic prices and international prices from 1980-2004 and the exports of type wise coffee and their unit prices from 1997-2004.

Tabular presentation was made by computing averages and percentages with respect to the impact of prices on the growers and the cost and returns of processing by the processors.

Growth rate analysis was employed to study the growth in type wise exports and their unit prices.

Trend analysis was used to study the trend in domestic prices and international prices.

Findings of the study

The important findings of the study are summarized and suitable conclusions are drawn and presented below.

Trends in domestic prices and international prices

Trends in domestic prices of both Arabica and Robusta decreased significantly in the earlier period this was because before liberalization the domestic prices was dependent on the coffee board, than in the mid period the prices started increasing. This was due to devaluation of rupee integration of domestic and international market shifting of tax from purchase point to sale point, subsequent frost in Brazil. While in the later period the prices again started decreasing due to supply out striping demand globally.

International prices for both Arabica and Robusta coffee showed a decreasing trend in the beginning because prior to liberalization international coffee organization used to regulate the price. In the mid years it started increasing due to supply constraint caused by the frost and in the later period the situation of decrease trend in prices was observed due to imbalance between supply and demand for coffee.

Impact of price on the coffee growers

All the Arabica and robusta growers (100%) were aware of liberalization and were of the opinion that the fluctuation of prices was due to liberalization.

More than 80 per cent of both Arabica and Robusta growers of the category more than 10 hectares were interested to continue under liberalization. About 70 per cent of the growers of the category less than 4 hectares were interested to continue under coffee board and in the category of 4-10 hectares 50 per cent were interested to continue under coffee board and the rest were interested to continue under liberalization.

About 30per cent of the category of 4-10 hectares of robusta growers reduced the area due to pests and diseases such as Berry borer and coffee rust. And in Arabica about 60 per cent reduced the area due to attack of white stem borer. Both Arabica and Robusta growers of all category 80 per cent of them have taken up vanilla and about 50 per cent belonging to the category of 4-10 hectares and more than 10 hectares have taken up ginger as the additional intercrop as they were fetching high prices.

All the categories had reduced the cost of cultivation during 2003-04 and under the category of less than 4 hectares have got negative returns in 2003 and 2004 because of decrease in yield due to reduction in cost of cultivation under the category of less than 4 hectares (80%) of both Arabica and Robusta growers have reduced their cost by reducing the round or quantity of fertilizer application and 70 per cent of Robusta growers have reduced the irrigation cost. Cost was reduced by more than 10 hectares by taking up less number of shade lopping and weeding. Under the category of less than 4 hectares who have reduced the cost of cultivation by 21-30 per cent have realized a lesser yield of 15 per cent. Yield reduction under the category of 4-10 hectares and more than 10 hectares were low i.e. 5 per cent and 2 per cent respectively. The ideal alternative for this may be gradual shift over to eco-friendly, low external inputs organic cultivation, the product of which has got highest premium in the international market.

Costs and return structure of processing

Quantity of coffee processed was 2500 tonnes. Total variable cost formed a substantial component (97%) of the total cost of processing of which cost of raw material (87%), constituted the major component of the total variable cost as the commission charged on the raw material was high. The total fixed cost accounted only (3%) of the total cost of

processing. The interest charged on the borrowed capital was the major component of the fixed cost.

Total quantity of output was found to be 2125 tonnes out of 2500 tones indicating 85 per cent of recovery. The gross returns per tonne of output was Rs. 32,300 and for byproduct it was Rs. 1000 per tonne. The net returns per tonne of output found to b Rs. 1373 per tonne.

A minimum quantity of 1148 tonnes of coffee should be produced so as to continue the production process without sustaining losses.

Growth rate in total exports, type-wise export and unit price of Indian coffee exports

Total quantity of coffee exported exhibited a growth rate of 4.1 per cent per annum with the unit price registering negative growth rate of 5.8 per cent due to decline in the international price. Export of plantation type exhibited a growth rate of 8.29 per cent because most of the countries prefer washed coffee. Arabica cherry registered negative growth rate of 8.5 per cent because of less production. Robusta cherry exports registered a growth rate of 13.22 per cent because of increased production. Robusta parchment registered a growth of 9.00 per cent because it is in the washed form. The growth in exports of value added coffee increased by 14 per cent because it is exported more in quantity to U.S.S.R and the speciality coffee registered a growth of 21.7 per cent because of its high quality.

It was found that the unit prices of all the type-wise coffee exports had a negative growth because of the declining international prices.

POLICY IMPLICATIONS

1. Since most of the small farmers were asking for coffee board to carry out the marketing aspect it would be better if the coffee board would continue with the marketing of coffee which was stopped after liberalization and to safeguard the small farmers who sell their coffee in raw form it is better if the ICTA auction are held for raw coffee instead of having only for clean coffee.

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POST LIBERALIZATION SCENARIO OF COFFEE INDUSTRY – A CASE STUDY OF COORG DISTRICT

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ABSTRACT

Coffee occupies a place of pride among plantation crops grown in India. It is the second largest traded commodity next to petroleum. The study was conducted in Coorg district of Karnataka, which is the highest producer of Coffee. Data was collected from Madikeri, Somwarpet and Gonikoppal. The analytical techniques included were Trend, Tabular and growth analysis.

The results revealed that trends in domestic prices and International prices of both Arabica and Robusta decreased significantly in the earlier period, than in the mid period the prices started increasing. While, in the later period the prices again started decreasing.

About 30 per cent of the categories of 4-10 ha of Robusta and Arabica growers have reduced the area due to pests and diseases. All the categories (<4 ha, 4-10 ha and >10 ha) had reduced the cost of cultivation by reducing the round or quantity of fertilizer application, irrigation cost, taking less number of shade lopping and weeding. As a result they realized the yield reduction.

Quantity of coffee processed was 2500 tonnes. Total variable cost formed a substantial component (97%) of the total cost of processing of which cost of raw materials (87%) constituted the major component of the total variable cost. Total quantity of output was found to be 2125 tonnes out of 2500 tonnes indicating 85 per cent of recovery. The net returns per tonne of output found to be Rs.1373 per tonne. Total quantity of coffee exported exhibited a growth rate of 4.1 per cent per annum with the unit price registering negative growth rate of 5.8 per cent.

Most of the small farmers are demanding for coffee board to carry out the marketing of coffee.