

A STUDY ON PRODUCTION AND EXPORT PATTERN OF COCOA IN INDIA

काशी हिन्दू
विश्वविद्यालय



BANARAS HINDU
UNIVERSITY

THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

Master of Science (Agriculture)
In
Agricultural Economics

Supervisor

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Submitted by

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Dedicated to



*My Beloved Parents and
Brother*

*...who sacrificed their today for
my tomorrow.*



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CERTIFICATE

To,

The Registrar (Academic)
Banaras Hindu University,
Varanasi - 221 005(INDIA).

Through: The Head, Department of Agricultural Economics,
Institute of Agricultural Sciences, B.H.U., Varanasi.

Dear Sir,

I have great pleasure in forwarding the thesis entitled "**A Study on Production and Export Pattern of COCOCA in India**" submitted by **Ms. T. Hindu Bhavani, I.D. No. E-15039**, in partial fulfillment of the requirements for the degree of **Master of Science (Agriculture) in Agricultural Economics**, from Department of Agricultural Economics, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, (U.P).

I certify that the work has been carried out under my guidance and the data forming the basis of the thesis, to the best of my knowledge are original, genuine and no part of the work has been submitted for any other degree or dissertation.

Thanking you,

Forwarded by
Head

Yours faithfully

(V. Kamalvanshi)
Supervisor

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By

T. Hindu Bhavani

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Date:

Place: Varanasi

(T. Hindu Bhavani)

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INTRODUCTION

1.1 History of the crop:

Theobroma cacao belongs to the family of Malvaceae (alternatively Sterculiaceae), and is characterized by three main cultivar groups: *Criollo*, *Forastero* and *Trinitario*, which have recently been widespread in the (sub) humid tropics. All cultivated species originate from America. The cocoa is believed to have originated in the midst of the Amazon wild forests in South America. Centuries ago, the Maya and Aztec had realized the importance of cocoa beans. They cultivated the trees and, apart from consuming the fruits as a delicacy, used the beans as a medium of exchange, money. Cacao is one of the world's most valuable crops, cultivated worldwide on 8.2 million hectares, playing an important role in the social and economic life of more than 5 million households, and affecting 25 million people in poor rural areas. Ivory Coast, Ghana, Nigeria, Indonesia and Brazil are the most important top cacao producers in the world. Cacao is grown in 58 countries and is worth in excess of US\$4 billion per annum to the world economy.

Cacao is a well-adapted agro-forestry plantation crop grown in hot, rainy climates. Its cultivation is concentrated between 0 and 20 degrees north and south of the Equator, sometimes called the "Cacao Belt". Although it is mainly known as principal ingredient of chocolate, there are actually other products derived from cacao beans: cocoa liquor, cocoa butter, cocoa cake and cocoa products. Yield of cocoa crop depends on many factors like variety\cultivar, soil type, age and other farm management practices. On an average 50-60, pods per tree per year can be expected. The yield would be in vegetative propagation when compared to seed propagation method. In seed propagation crop, 200kg/ha dried bean and in vegetative crop, 500-800 kg/ha dried bean can be obtained.

1.2 Background of the study:

Cocoa production in India is estimated to cross 20,000 tonnes by the end of 2016-17 with new plantations bearing fruits. Production touched 17,200 tonnes

in as the last financial year, registering a healthy growth of 6-8% . Indian chocolate market is thought to be worth some Rs 15 billion and has been hailed as offering great potential for western chocolate manufacturers , as the market is still in its early stages.

Cocoa is probably best known today as the raw material for chocolate , which uses approximately 90% of the World's Cocoa production. It is mainly cultivated in the southern parts for the last 40 years. Most of the cocoa plantations in Kerala , Tamilnadu and Andhra Pradesh are mixed gardens along with areca nut and coconut palms. In a few cases, it is grown in forest cleanings. Due to high nutritional value ,good taste and flavor, cocoa products have got a good demand. The countries that are blessed with the ideal climatic and environmental conditions for cocoa growing have the opportunity to generate substantial export earnings from the crop, which can benefit their national economies and rural communities.

“ Good and steady returns” from cocoa in the past few years is prompting more farmers to take the crop. Currently 68,000 hectares are under the commodity in India with 16,000 hectares in the state of Andhra Pradesh followed by Kerala with 11,000 hectares. Directorate of Cashew and Cocoa development (DACCD) has plans to bring another 75,000 hectares under cocoa cultivation in the next 5 years. The drop in the production in leading cocoa producing countries like Ivory Coast and Ghana , has escalated the price of cocoa in international market . Leading chocolate companies are turning to India's cocoa producing states, mostly in South India.

According to Markets and Markets, the cocoa market is expected to have a compound annual growth rate (CAGR) of 3.1 percent from 2014 to 2019, and the chocolate market is estimated to grow at a CAGR of 2.3 percent during the same period. For cocoa, specifically, the market size (volume) of cocoa was 3,455,622 metric tons in 2013 and is estimated to grow at a compounded annual growth rate (CAGR) of 3.1 percent from 2014 to 2019. As for the chocolate market, it's projected to grow at a CAGR of 2.3 percent from 2014 to 2019.

So, by 2019, the world cocoa market is expected to be worth about \$2.1 billion, and the world chocolate market is expected to be worth about \$131.7 billion.

AREA AND PRODUCTION

Cocoa is an important plantation crop grown for chocolates around the world. In India cocoa is being cultivated in states of Kerala, Karnataka, Andhra Pradesh and Tamil Nadu in an area of 78,000 ha with total production of 16,050 MT. Tamil Nadu ranks first with an area of 26,969 ha whereas Andhra Pradesh ranks first in production. The highest productivity is in Kerala which is 785 kg per ha. The average productivity of cocoa in India is 475 kg/ha.

Area, Production and Productivity of Cocoa in India:

Table 1.1 showing the area, production and productivity of cocoa in major producing states

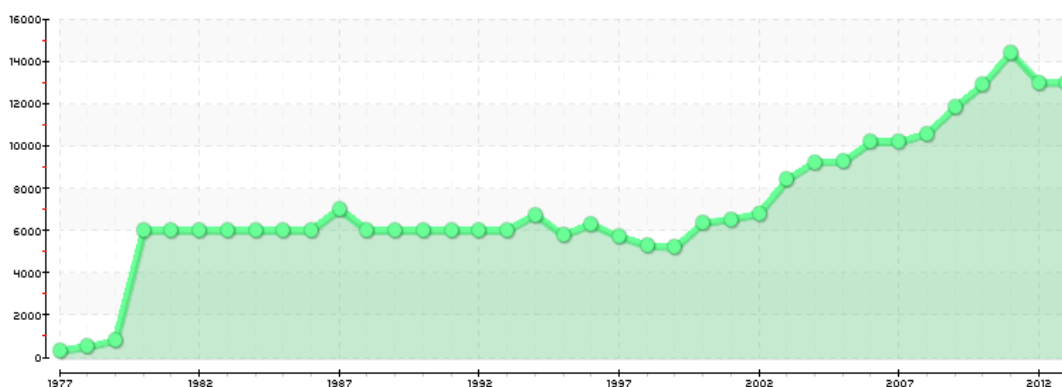
State	2014-15			2013-14			2012-13		
	A	P	APY	A	P	APY	A	P	APY
Kerala	14650	6000	785	13483	6320	750	12483	6136	537
Karnataka	12906	2000	525	11683	2142	500	10883	2080	212
Tamil Nadu	26959	1750	265	23959	1071	250	22389	1040	100
Andhra Pradesh	23485	6300	550	22210	5600	300	20710	4160	231
Total	78000	16050	475	71365	15133	450	66465	13416	268

Source: DCCD

A - Area in Ha

P – Production in MT

APY – Average productivity in kg per Hectare

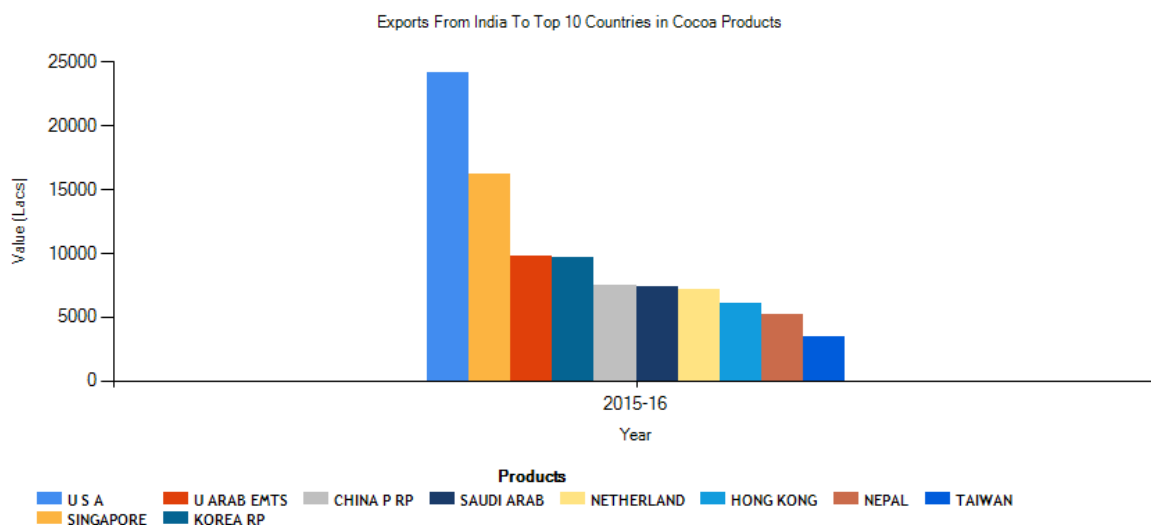
Fig.1.1 Graph showing increase in the production of cocoa:**India - Cocoa Bean - Production (Tons)**

Source: FAO

EXPORT:

Cocoa is an export-oriented commodity in India. At present there are 10 multinational companies engaged in the field of cocoa industry and export products like beans, chocolates. In addition, other products like cocoa butter, cocoa powder and cocoa-based products also exported to other countries. India earns foreign exchange worth Rs 849 crores through export of cocoa bean and its products. The country has exported 32,633.58 MT of Cocoa products to the world for the worth of Rs. 1,266.99 crores during the year of 2015-16.

1.2 Figure showing the export of cocoa from major producing states in India: 2015-16



source: DGCIS annual report

1.3 figure showing the export of cocoa from india from 2006-2016



Source: Ministry of agriculture

HIGHLIGHTS

- ❖ Cocoa production increased by fifty percent in the first decade of the 21st century.
- ❖ Small holders in West Africa produce Seventy percent of the world cocoa production.
- ❖ Yields remained low because of extensive cultivation practices and old age of cocoa farms
- ❖ Large government rehabilitation and replanting schemes are undertaken.
- ❖ Implementation of these schemes and higher cocoa producer prices offer scope for higher coca output.
- ❖ Climatic change and increased land use for food crops will negatively affect the cocoa output in the long run.
- ❖ Conditions for sustainable coca production require major structural changes in the entire cocoa sector.

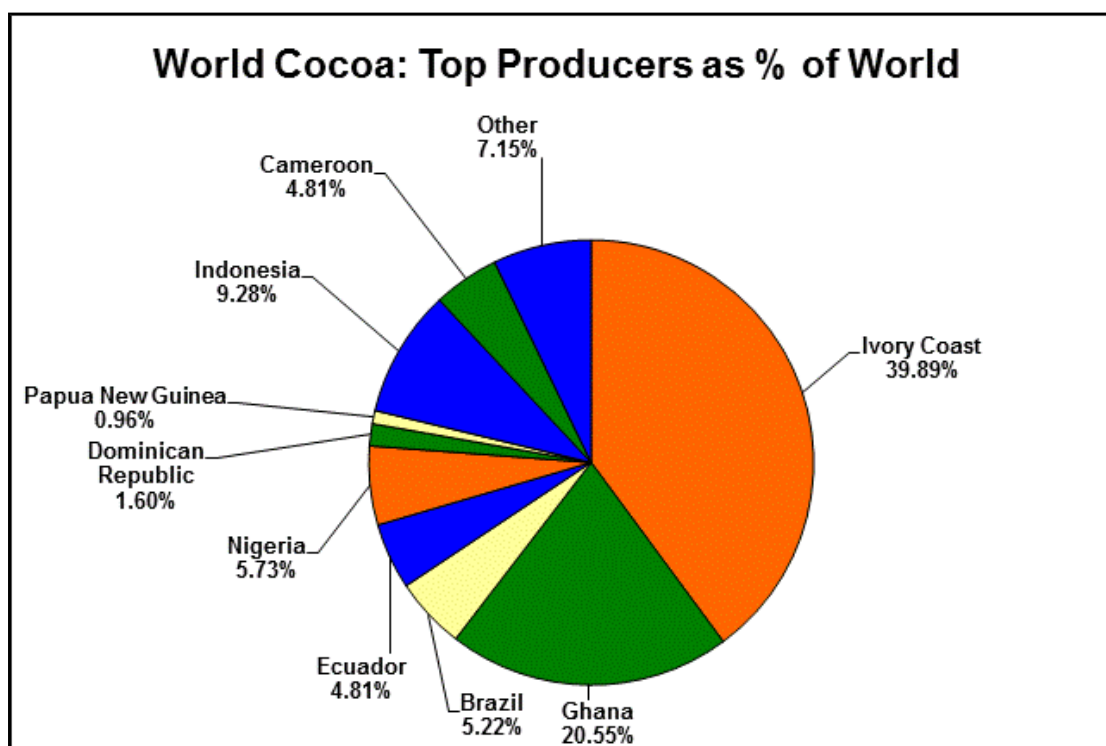
GLOBAL SCENARIO OF COCOA

Cocoa is a cash crop and critical export for producing countries and is also a key import for consuming countries, which typically do not have suitable climates for cocoa production. Traveling along a global supply chain, cocoa beans go through a complex production process that includes farmers, buyers, shipping organizations, processors, manufacturers, chocolatiers, and distributors.

Cultivation of cocoa is a delicate process, as the trees are susceptible to changing weather patterns, diseases, and insects. Unlike larger, industrialized agri-businesses, the vast majority of cocoa comes from small, family-run farms, which often rely on outdated farming practices and have limited organizational leverage. Steadily increasing demand from worldwide consumers encourages a number of global efforts and funds committed to support and improve cocoa farm sustainability.

Cocoa trees grow in tropical environments, within 15 to 20 degrees latitude from the equator. The ideal climate for growing cocoa is hot, rainy, and tropical, with lush vegetation to provide shade for the cocoa trees. The primary growing regions are Africa, Asia, and Latin America. The largest producing country by volume is Côte d'Ivoire, which produces 33% of global supply.








- Cocoa appears to have occupied an important place during sixteenth century and it is not known how it spread to Central America from its original place of origin in Amazon basin.
- The cultivation later spread to Venezuela, Caribbean islands and other areas in South America and from Caribbean area to Philippines and Malaysia. From there it might have Sri Lanka and India through introductions.
- The major cocoa producing countries are Trinidad, Brazil, Costa Rica, Ghana, Nigeria, Malaysia, Indonesia, Colombia, Madagascar, Cuba, and Fiji islands, India, China, Mexico, Guyana, Jamaica and Sri Lanka.
- Almost 90 per cent world's cocoa production comes from smallholdings of two ha or less as a lower storey crop under mixed cropping systems.

Fig.1.4 Pie chart showing worldwide production of cocoa

Worldwide cocoa production is disbursed among the major cocoa producing countries as shown above:

Cocoa is also grown in Sri Lanka parts of India, Venezuela, Belize, Costa Rica, Dominican Republic, Madagascar, Peru, Colombia, Guatemala, Hawaii, Mexico, Fiji and other countries clustered near the equator. India holds 17th position in the worldwide production of cocoa.

1.2 Table showing the worldwide production of cocoa and value obtained from it

Rank, Country	Value (Int \$1000*)	Production MT
1  Côte d'Ivoire	1,024,339	1,330,000
2  Ghana	566,852	736,000
3  Indonesia	469,810	610,000
4  Nigeria	281,886	366,000
5  Brazil	164,644	213,774
6  Cameroon	138,632	180,000
7  Ecuador	105,652	137,178
8  Colombia	42,589	55,298
9  Mexico	37,281	48,405
10  Papua New Guinea	32,733	42,500
11  Malaysia	25,742	33,423
12  Dominican Republic	24,646	32,000
13  Peru	21,950	28,500
14  Venezuela	13,093	17,000
15  Sierra Leone	8,472	11,000
16  Togo	6,547	8,500
17  India	6,161	8,000
18  Philippines	4,352	5,650
19  Congo, Rep.	4,336	5,630
20  Solomon Islands	3,851	5,000

In the table above shows top 20 cocoa producing countries in the world with their average production in a year.

1.3 problem statement

Cocoa crop is an important cash crop mainly grown for its bean purpose, as we know it is the basic raw material in many of the chocolate manufacturing companies. It generate the need for the research to know the reason of to what extent the cultivation of of cocoa in are and production has taken place and this study helps in knowing the growth rate n area and production. It helps us to determine the export and the competitiveness of cocoa in national and international markets.

1.4 Need of the study

- **INDUSTRIES:** The drop in production in leading cocoa producing countries like Ivory Coast and Ghana has escalated the price of cocoa in International market .Leading chocolate companies are turning to India's cocoa producing states, mostly in South India.
- **FARMERS :** Most of the farmers chose this crop, since it is grown as intercrop avoiding losses, so the farmer enjoys the profit of both the crops such as coconut +cocoa, arecanut + cocoa etc.

1.5 objectives of study:

The entire chapter under the study is presented in the following:

1. To study the growth rate in production and area of cocoa in India .
2. To examine the stability in the production and area of cocoa.
3. To analyse the dynamics of export of cocoa.
4. To examine the competitive ness of cocoa in the world.



REVIEW OF LITERATURE

This chapter attempts a brief review of the relevant research literature related to the present study. A review of past research helps in identifying the conceptual and methodological issues relevant to the study. This will enable the researcher to collect relevant data and subject them to sound reasoning and meaningful interpretation. Keeping in view, the objectives of the study, reviews are presented under the following headings.

1. Compound growth rate.
2. Co-efficient of variation.
3. Nominal protection coefficient.
4. Dynamics of export.

GROWTH RATE IN AREA AND PRODUCTION:

Parthasarathy and Suryanarayana (1976) analyzed regional growth rates of area, production and productivity of major food-grain crops in pre-green and green revolution periods in the selected districts of Andhra Pradesh. They computed linear growth rates and used standard deviation and coefficient of variation to study the stability or variability of area, production and productivity of certain crops. They concluded that there existed regional variations in the growth rates of area, production and productivity which could be attributed due to shifts in cropping pattern under the improved yield, increasing technology and adoption of high yielding varieties.

Kapila (1982), obtained the compound growth rates for Andhra Pradesh as 1.7, 0.81 and -0.39 per cent for area, production and productivity of groundnut crop for the whole period viz., 1951-52 to 1974-75 whereas, for the pre-green revolution period, the compound growth rates were -2.72, -2.78 and -0.06, but for the green revolution

period viz., 1964-65 to 1974-75, the compound growth rates of area, production and productivity were 2.74, 5.79 and 3.05, respectively.

Subrahmanyam (1982) analysed the growth of area, production and productivity of banana in different states of India. The study was based on secondary data covering the period 1965-66 to 1978-79. This period also signifies two important events viz,

- i) The introduction of high yielding varieties of paddy crop with which bananas rotated and
- ii) The period in which the 'bunch top' disease acquired epidemic proportion in some of the states where banana is grown on a large scale.

According to this study, there was an overall increase in area under banana by about 25 thousand hectares between the two periods, which was nearly 25 per cent more over the triennium ending 1967-68. In states like Assam, Bihar, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Andaman & Nicobar Islands there was an increase in area under banana, whereas there was fall in area in other states like Andhra Pradesh, Karnataka, Tripura and Uttar Pradesh. The largest increase in area was noticed in Madhya Pradesh, which were 27 per cent followed by Andaman & Nicobar Island with 177 per cent. The maximum decrease of around 6 per cent was in Karnataka, followed by Uttar Pradesh (4.76 per cent)

The overall production of banana increased from 3296 thousand tonnes by the triennium ending 1967-68 to 4183 thousand tonnes by the triennium ending 1978-79 an increase of 27 per cent. In seven states, viz., Assam, Kerala,, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Andaman & Nicobar Islands, there was an increase in production between the two periods, whereas in six states names by Andhra Pradesh, Bihar, Gujarat, Karnataka, Tripura and Uttar Pradesh, there was decrease in production.

Raju *et al.* (1987) analysed the Growth and Distribution of Fruit crops in Andhra Pradesh. This study was carried out for Banana, Mango, Citrus, and Grapes, Guava, Papaya, Cashew and other total fruits. The period of study was from 1970-71 to 1982-83. The distribution of fruit crops in Andhra pradesh over space and time was

studied over three-time periods, namely, 1972-73, 1977-78 and 1982-83 and over three regions (Costal Andhra, Rayalaseema and Telangana). For the analysis purpose, Compound growth rate was used.

Jeromi and Ramanathan (1993) examined the growth of world pepper market for the period from 1975 to 1990. Among the exporting countries, Sri Lanka recorded the highest annual compound growth rate of 24.59 per cent. This was mainly due to its low base in the initial years. Positive and statistically significant growth rate 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.

Prasad *et al.* (1996) assessed the growth pattern in area, production and productivity of rice crop and found out the causes for disparities in rice yield in Karimnagar district of Andhra Pradesh. In order to find out the growth pattern they collected secondary data from season and crop reports and computed compound growth rates with help of exponential function. They also collected the primary data to prove the yield discrepancies. They found that the co-efficient of variation of area, production and productivity were found to be by and large stable in the study area. They also found that the soil type, soil fertility and irrigation sources were the reasons for yield disparities in the sample area.

Hashmi (1996) reported the growth and production of horticultural crops in West India for the period of 1974-75 to 1986-87. Fruit and nut crop production in 15 countries of the Middle East is analysed using three-year data averages. Eight crops are covered: almonds, walnuts, strawberries, grapes, apples, oranges, dates, and other. These are analysed in terms of comparative production between 1974-76 and 1986-88, percentage growth rates and national comparisions. Area of specialization is apparent. This leads to trade between nations in the region as a whole is self-sufficient with regard to horticultural produce.

Behura and Naik (1997) examined the compound growth rates of area, production and productivity of cashew in India. The area under cashew has increased from 2.40 lakh hectares in 1965-66 to 6.35 lakh hectares in 1995-96, recording an increase of 160 per cent. On an average cashew area in the country has increased by 1.53 per cent per annum during 1981-82 to 1995-96. Between 1965-66 and 1995-96, the production of cashew increased by 190 per cent from 1.44 lakh tones to 4.18 lakh tones. Kerala has the highest cashew (1.19 lakh ha.) and is the largest producer of cashew, accounting for about one-third of the cashew production in India. Compound growth rates of production of cashew in all cashew producing state as well as in the country are positive and significant. The productivity of cashew in India is 720 kg per hectare (1995-96) and Maharashtra has the highest productivity of 1440 kg per hectare. Negative productivity growth has been observed in the state of Kerala, Karnataka and West Bengal due to existence of old senile plantation in these states. The productivity of cashew in India is increasing by 0.96 per cent per annum. About 48 per cent of the area under cashew plantations has become old and senile, contributing 32 per cent of the national output and the productivity is 440 kg per hectare.

Brothakur and Bhattacharyya (1999) used compound growth rates which Computed for area, production and productivity of rice based on the exponential function For three periods [viz., pre-green revolution period (1951-52 to 1970-71), post-green Revolution period (1971-72 to 1993-94) and the total period (1951-52 to 1993-94). Although, the high yielding varieties were introduced in the State of Assam during 1965-66, Its impact was felt only after 1971-72. Hence, the period 1951-52 to 1970-71 was considered as the pre-green revolution period.

Ashalatha (2000) analysed the growth rate in cashew in two periods; period-I, from 1956-57 to 1970-71 and period-II, from 1971-72 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 export were showing positive trend but the cashew nut shell liquid quantity exported showed non-significant negative growth.

Babu Reddy (2001) computed the compound growth rates for area, production and yield of Indian coffee as 2.86, 4.66 and 2.25 per cent for the period 1950-51 to 1999-2000. He concluded that both expansion of area and improvement in yield have contributed to the growth in production. He also estimated growth rates for export volumes, unit value and export earnings of Indian coffee as 6.10, 8.14 and 14.74 per cent during the period 1980-81 to 1999-2000.

Kumar and Badal (2004) evaluated the State level time series data on area, production and yield of various fruits and vegetables for the period 1991-92 to 1999-2000 were obtained from various issues of Horticulture Production Year Book, National Horticulture Board, Ministry of Agriculture, GOI, New Delhi. Compound Growth Rate of area and productivity was computed using this study.

Varghese (2004) observed the growth in area, production and productivity of cardamom in Kerala, during the period of 1970-1 to 2002-03. The analysis employed in this paper clearly portrays the real picture of the growth of cardamom economy in Kerala since 1970. Both log-linear and log-quadratic functions were tested for acceleration and deceleration of cardamom in terms of area, production and productivity. The results exhibit an emerging trend, which demand certain concrete solutions. The percentage annual trend growth rate of area, production and productivity of cardamom are -1.216, 4.14 and 5.512 respectively. The negative trend growth rate of area under cultivation of cardamom leads to certain concrete conclusions.

Rao and Reddy (2005) worked out the growth rates of area, production and productivity of groundnut for the period I (1988-89 to 2002-03) and period II (1953-56 to 2002-03) in the three geographical regions of Andhra Pradesh and also Andhra Pradesh state as a whole. Their study revealed that the compound growth rates of area, production for the period I, were negatively significant in coastal Andhra, Telangana and Andhra Pradesh state as a whole. However, in period-II, the compound growth rate of area is significant only in Rayalaseema, production is significant in all three regions and Andhra Pradesh state as a whole and productivity is significant in coastal Andhra and Andhra Pradesh state as a whole.

Lawwa and Kumar (2008) measured the development execution of oilseeds by computing the compound development growth rates, inconstancy and disintegration investigation. The essential time arrangement information on territory, creation and yield of oilseeds products were gathered from Agricultural Department, directorate of financial aspects and measurements Rajasthan and so on. For measuring the compound development growth rates (CGR) in zone, creation and yield, log-direct condition was utilized.

Biswas and Kumar (2011) reported in the article Revolution of Mango production that during the year 2008-09 India had an area of 2.1 million hectare under mango with a production of 12.7 million tonnes and productivity of 5.5 tonnes/ha. India ranked first in mango production in the world. But due to certain limitations, mango productivity is declining in the country. In the traditional low density cultivation, per ha plant population in mango orchard ranges from 75 –100. In such situation, mango trees become very big, which make it difficult to perform the needed cultural operations, like training, pruning, disease pests control etc. As a result, irregular bearing of fruits becomes the rule rather than an exception. Low yield or no yield is also common due to alternate bearing. Poor nutrient and water management are also very important factors to improve the needed productivity. High-tech horticulture known as high density planting (HDP), has come into vogue, which is capable of removing the limitations of mango productivity in India.

Kannan and Sujata (2011) discussed the trends and patterns in agricultural growth at national and sub-national levels in India. The secondary data is collected upon various variables like area, production, input use and value of output for the period 1967-68 to 2007-08 from various published sources. It is revealed that the cropping pattern in India has undergone significant changes over time. There is a marked shift from the cultivation of food grains to commercial crops. Among food grains, the area under coarse cereals declined by 13.3 percent between 1970-71 and 2007-08. The performance of pulses in terms of area and output was not impressive during the study period. The use of technological inventions in the cultivation of other crops was also not so conspicuous in pulses. The increase in crop yield has been a major factor.

VARIABILITY:

Pal and Sirohi (1988) studied sources of growth and instability in the production of commercial crops in India and concluded that growth and stability in the production of commercial crops were complementary, rather than competitive process, in intensively irrigated regions. There was no change in the frequencies of short fall in the production. However, the intensity of short fall had increased over time and groundnut was the worst affected crop. Instability was more prominent in production at the state level and may be much higher rate the farm level. Therefore, efforts should be made to safeguard the farmers against instability. The yields stabilizing policies in sugarcane, jute and potato would have greater impact on production instability.

Mohan Das (1992) examined the factors influencing growth and instability in the production of paddy, coconut, aeronaut, pepper, ginger, tapioca, cashew, rubber, tea, cardamom, sugarcane, banana and coffee, different districts of Kerala. The study was based on secondary data covering the period 1973-74 to 1987-88. He divided all the districts of Kerala into three categories. He used the tools like compound growth rates and co-efficient of variation. The following conclusions have emerged from Mohan Das's study:

- 1) The analysis reveals that only about 22 per cent of the gross cropped area in the state is having productivity above state average and this area accounts for 37 per cent of the total value of agricultural production.
- 2) The agricultural output per hectare is highest in Idukki district (Rs. 16.368) followed by wayanad (Rs. 12,128) while Kozhikode and Alappuzha districts with Rs. 4,439 and Rs. 5115, respectively are having the least productivity.
- 3) Cashew production registered negative growth rate in all districts and this has adversely affected the traditional cashew industry in the state.

4) Banana and rubber showed a positive growth rate in all districts and the compound growth rates of banana ranges for +5 per cent in Thiruvananthapuram to + 18 per cent in Palakkad district.

5) area and output in respect of crop like coconut, tapioca, paddy etc., is conversion. The relative stagnation and deceleration in the output of almost all Crops was mainly due to the unprecedented drought and lack of irrigation facilities. The reason for reduction of area under these crops into plantations.

6) During 1974 -87 periods, the area under commercial crops has generally grown faster than that of food grains and resulted in faster expansion of commercial crop production.

Bharathi *et al.* (1992) has analyzed the factors responsible for the instability of pulses production in Andhra Pradesh during 1970-71 to 1986-87 using Cop pock's Instability Index, Coefficient of variation and Standard Deviation. According to this study, the area has greatly contributed to the pulses' production than yield in the major pulses growing districts and Andhra Pradesh. Moreover, according to them the instability in yield levels has caused further instability in pulses' production.

Tripathy and Gowda (1993) observed that growth, instability and region reaction of groundnut in Orissa. They recognized that region was the overwhelming wellspring of development of yield amid the post-green upheaval period. The per hectare yield of groundnut was practically dormant in the state. Endeavors ought to be coordinated to build profitability through advancement of appropriate assortments for various agro-climatic zones by applying suggested compost and pesticides and bringing more zones under water system amid rabi season. The aftereffects of the observational discoveries of the review accentuation yield settling approaches in Central, Eastern Ghat and Northern zones of the state. Deliberate endeavors ought to be coordinated towards fortifying examination and expansion framework and expanding the water system offices in the state to settle the efficiency of groundnut.

Singh and Mathur (1994) analyzed the growth and instability in the production and price of potato in India. They found that the production of potato increased

rapidly mainly due to the significant high growth of area in the major growing states. Yield also showed a rising trend but its growth was low in some of the states. Hence, there was a need to raise the yield by the use of improved seeds and package of practices as recommended by the extension organizations of the regions. For storing a semi-perishable commodity like potato, cold storage capacity, particularly on the public and cooperative sectors, should be expanded by the Government.

Patel (1994) and others have analyzed the Growth and Instability of groundnut production in Sourashtra region of Gujarat, during 1960-61 to 1988-89 using Compound growth rate and Coefficient of Variation. According to this study, area, production and productivity of groundnut crop in the state of Gujarat has shown a negative growth during both the study period. Moreover, according to them, the instability in yield levels has caused further instability in groundnut production.

Ali and Singh (1995) conducted a study on growth rates and variabilities in area, production and productivity of wheat crop in Chhattisgarh Region and its constituent districts as well as the State of Madhya Pradesh as a whole using time-series data from 1970-71 to 1989-90. For the purpose of analysis, standard statistical techniques of coefficient of variation and linear regression models were employed. Their analysis reveals greater variability in area, production and productivity of wheat.

Upender' *et al.* (1996) analyzed the factors influencing growth and instability in acreage production and productivity of groundnut covering the pre and post Green Revolution periods in Andhra Pradesh and all India. He divided the whole period of their study into 2 sub periods, viz., 1949-50 to 1965-66 (pre-Green Revolution period) and 1966-67 TO 1990-91 (Post-Green Revolution period). The study was based on secondary data, which were collected from the basic statistics relating to the Indian Economy published by Economic Intelligence Service, Centre for monitoring Indian Economy. They used the tools of linear growth rates and coefficient of variation. The following conclusions have emerged from the Study are:

1) The annual average growth rates of area, production and productivity of groundnut were higher during the post-green revolutions period.

2) The growth rates of area and production of groundnut in Andhra Pradesh were higher in the post-green revolution period than that of growth rates in the same period in all India.

3) The high degree of instability in productivity in all India and in production in Andhra Pradesh during the post-green revolution period indicate that the variations were more in productivity in all India and production in Andhra Pradesh.

Radha and Prasad (1999) dissected variability and instability of region, creation and profitability of rice and maize in Northern Telangana Zone of Andhra Pradesh. They found that in maize, the range was observed to be diminished amid ex-post NARP over ex-stake, yet the mean estimations of generation and yield displayed a positive change. In spite of the fact that the coefficients of variety was observed to increment in ranges and yield, the creation variety diminished i.e., accomplishing strength of maize generation was seen amid the second time frame.

Wassim (1999) analyzed the nature of instability in major crop output in SAARC countries. The study is based on secondary data for the last 20 years i.e., from 1976-77 to 1995-96. It is further divided into period I (1976-77 to 1985-86) and period II (1986-87 to 1995-96)

The specific objectives are:

1) To estimate period-wise instability in crop output of major crops separately for each SAARC country and within SAARC countries.

2) To make a period wise comparison of instability in crop output of major crops in total SAARC countries.

The study showed that in period I bajra, rapeseed and mustard, sesamum and groundnut have the highest degree of instability in production. Whereas wheat, tea, potatoes and jowar has the lowest degree of instability in production in total SAARC countries. The magnitude of instability in the production of jute, chillies, jowar, bajra,

tobacco and groundnut increased during period II relative to period I in total SAARC countries and the fluctuations in both area and productivity turned out to be behind this instability.

Singh and Srivastava (2003) tended to the growth and instability in sugarcane creation in Uttar Pradesh. This review made utilization of time-arrangement information on zone, generation and profitability of sugarcane for western, eastern and focal (counting Bundelkhand) districts and in addition for the state with reference to the period, 1980-81 to 1998-99 and depended on the information accessible from auxiliary sources. Semi-log conditions were fitted to gauge compound development rates in zone, creation and efficiency of stick. Unsteadiness in area, production and efficiency was measured through coefficient of variety examination utilizing de-slanted information. The generation precariousness was additionally deteriorated to look at the extent of different segments of local sugarcane creation fluctuation.

Sadeesh *et al.* (2006) focused the growth and instability of major oilseeds in India. The study was based on the time-series data of area, production and yield of the major oilseeds in India for the period of 1971-72 to 2002-03. The statistical information pertaining to the period under study was gathered from www.indiastat.com. This study covered the period from 1971-72 to 2002-03 including the implementation of Technology Mission on Oilseeds in 1986. For analyzing the data, they used compound growth rates and co-efficient of variation.

Nethravathi *et al.* (2016) studied on growth and instability in area, production and productivity of different crops in Bengaluru division. Karnataka State has a typical composition having a large share of its area under highly diversified agricultural crops; higher growth in agriculture assumes great importance and is a matter of concern for policy planners and research scholars in recent times. In view of this the present study was aimed to analyse the growth and instability in area, production and productivity of different crops in Bengaluru Division. The results revealed that Bengaluru urban had the highest CAGR which was 24.26% in productivity in avare was significant at 5% level. In Bengaluru Rural the highest CAGR was 22.26% in productivity of avare (significant at 1%). Production of

chrysanthemum had growth of 22.36% was the highest annual growth and 4% (area of tamarind) was found to be lowest instability for selected crops in Chitradurga, In Davanagere the highest CAGR was observed in productivity of tomato (9.12%). In Kolar district, 19.65% instability observed in production of avare & was significant at one %. In Shivamogga district highest CAGR observed in production of sunflower to an extent 29.57%. In Tumkuru area under green chillies was growing at rate of 34.46% per annum.

COMPETITIVENESS:

Jayesh (2001) used the nominal protection coefficient technique for the export competitiveness of Indian pepper. Under the exportable hypothesis, the nominal protection coefficient value were found to be lesser than unity (0.849) in Calicut and (0.817) in Sirsi markets, indicating that the Indian pepper is competitive in the international market and which is an efficient export oriented commodity.

Kumar (2005) explores the growth performance of Indian export from 1951 to 2004. The study finds utility of the prevailing export promotion schemes, for making India's exports competitive in the international market. The appreciation of the rupee vis-a-vis the US dollar raises concerns regarding its adverse consequences on export performance. There is a positive association between exchange rate movements and exports. There are compositional changes within agricultural products group. The combined share of nine major traditional items (basmati rice, tea, coffee, tobacco, spices, cashew, oil meals, marine products and raw cotton) declined to 56 per cent in 2003- 04 from 84 per cent in 1990-91, while the share of non-traditional items increased. The food grains segment has attained the maximum gain. India's global share in these items has increased. The paper argues for a reorientation of India's export strategy.

Thanuja (2006) analyzed the export performance and competitiveness of ginger from in India for the period of 1985-86 to 2003-04. The study period is divide in to Pre-WTO period (1985-86) and Post-WTO period (1994-95). The finding indicates that area under ginger was increased at 0.73 per cent per annum and

production increased at 2.07 per cent during pre-WTO (1985-86 to 1994-95) period. Whereas during the post-WTO period the growth rate for area and production was increased at the rate of 1.356 per cent and 1.859 per cent respectively.

Mittal (2007) found that the supply constraints, yield gaps and huge logistics costs affect our competitive and comparative advantage in world trade markets. In this study the nominal protection coefficient and revealed comparative advantage are computed to examine the existing status. The study identifies the potential states for the fruits and vegetables, for which India is globally competitive and has comparative advantage in production. These states should be targeted for enhancing the export potential of the country. On the basis of export quantity and share from the export data from 2001 to 2005-06, the study has identified commodity wise the potential competing countries.

Savadatti (2007) analyzed export competitiveness of Basmati rice with the help of Nominal Protection Coefficient (NPC) for the period 1980-81 to 1989-99. Although Basmati rice trend is positive, it is not smooth and steady. Around 60 to 70 per cent of the entire basmati rice exports are going to Saudi Arabia, Kuwait and UAE. The study reveals that there is ample scope for USA, one of the important importers of Basmati rice. The estimated NPC of the basmati rice with respect to USA with an average of 0.82 reveals that basmati rice export is competitive and enjoys advantages in exports. Basmati rice is a good exportable product. There is ample scope to export basmati rice to USA. But there is stiff competition from Pakistan.

Karnool *et al.* (2007) study the growth in exports, economics of production and global competitiveness of groundnut from 1984-85 to 2004-05 for Karnataka. The study analyses the global competitiveness in groundnut and economies in its production over a period of time. Using the growth functions, tabular analysis, Nominal Protection Coefficient (NPC) and Domestic Resource Cost(DRC) the study finds that quantity of groundnut export has grown annually at a compound rate of 9.52 per cent per annum whereas the value of the same has grown at a much higher rate of 13.13 per cent. Structural changes in the quantity and quality of inputs associated with the technological process and also due to their prices Groundnut has shown

competitive disadvantage during pre WTO period, and the international competitiveness has increased during post WTO period due to fertilizer subsidy, decontrolling of phosphetic fertilizers and constant prices of groundnut. The study suggests that as Karnataka enjoys export competitiveness in groundnut, the state government should make efforts to increase the production and productivity of groundnut and other oilseed crops and enhance the exports of groundnut.

Deshmukh (2009b) in his paper liberalization and export competitiveness of Indian mango examines the export competitiveness of mango during the 1991-92 to 2005-06 for India. The time series data for the study is from APEDA and FAO database of United Nations. The study has used the Nominal Protection Coefficient (NPC), Domestic Resource Cost (DRC) and Compound Annual Growth Rate (CAGR). The study reveals that Indian mango was competitive till 1995-96 (highly competitive in 1991-92 to moderately competitive during 2005-06), thereafter it has become uncompetitive. The largest share of Indian mangoes is exported to UAE. The study suggests that - there is a need to improve the quality and productivity of mangoes, provide incentives for mango production, promote national horticultural mission project India as more consistent and reliable trading partner by regular trade.

Khunt *et al.* (2008) studied export competitiveness of onion from Gujarat across the countries and found that the tariff and non-tariff barriers in onion export. The results showed that the export of fresh onion is highly concentrated to its neighboring countries and middle east. Though European countries as well as USA were found highly competitive for export, the quantities exported to these countries is very small.

Siddaya and Atteri (2010) examined the export competitiveness under the cost compliance horticultural commodities. The NPC, Effective Protection Coefficient (EPC), DRC and Effective Subsidy Co-efficient (ESC) were computed under cost compliance as well as without cost compliance. Except for grapes, NPC, ESC and ORCs were found to be less than unity for fresh and processed fruits and vegetables, implying that the Indian horticultural sector has a comparative advantage in the selected fruits and vegetables. The EPC was more than unity for various fresh and

processed fruits and vegetables because the relation between domestic and international input and output prices were not uniform.

Sharma (2011) studied export competitiveness of coffee in India. Analysis has been done for annual time series data covering a time period between 1990-91 and 2005-06 with the help of nominal protection coefficient. The study reveals that coffee has been a highly competitive commodity in India with average NPC around 0.27 which is far below unity except for the year 1992.

EXPORTS:

Veena *et al.* (1994) examined the changing directions of Indian coffee exports in terms of importing country shares over the period from 1965 to 1990 using Markov chain analysis. It was observed that India could not retain its previous market share to USA, Netherlands, Yugoslavia and other importers. However, the actual quantities exported to all these countries have increased which was due to increased quantity of Indian coffee exports. India retained its market share to former West Germany, erstwhile USSR and Italy. The increased market share of the USSR in the seventies and eighties was then threatened by the economic and political upheaval in the region.

Pranab (1994) examines some basic impediments that come in the way of export of agricultural products. Though India's production scenario of agriculture has significantly improved despite inadequate storage facilities, the prime hurdle in the way of export is port and shipping infrastructure. Further there are inadequate facilities for the bulk movement of food grains in the country, i.e., rail and road transport. The study concludes that port facilities must be given an immediate attention and suggest that increase in transport efficiency and mechanisation of ports will be cost effective. The private sector is getting involved in ports. The authorities of surface transport, port authorities, trade, commerce and agriculture should come together to solve the infrastructural problems of export of food grains.

Rajesh *et al.* (2002) studied the trend in export of major spices in India for the period 1970-71 to 1990-00 and found that black pepper registered a positive annual

growth rate of 2.38 per cent in quantity and 12.78 per cent in value. While large cardamom registered 12.76 per cent of export quantity and 21.4 per cent export value, ginger registered 4.05 per cent growth in quantity and 10, 15 per cent in value. Turmeric export registered 4.14 per cent in quantity and 13.08 per cent in volume during the period under study.

Sachdeva J K, (2003) analyses domestic, international and realized export unit prices of twelve agricultural commodities to see whether export quantity of Indian agriculture products is dependent on international prices or domestic prices, whether we produce surplus to export. Some economists, who favoured free trade, had predicted that world prices would increase after Uruguay Round agreement and with establishment of WTO. The findings of the study reveal since 1995, world whole sale prices of commodities are falling at the rate ranging 1 to 17%. Secondly Indian commodity prices are rising at the rate of 1 to 7%. Minimum support price in India given to some commodities is rising at the rate of 5-7%. The trend growth of agricultural commodities prices appear to be same as rupee devaluation. As the rupee depreciates, the domestic whole sale prices are appreciating, this in turn affects our competitiveness. Price rise equivalent to the rate of rupee depreciation cannot be ignored.

Sananse *et al.* (2004) in the study of export scenario of Indian basmati rice in the post WTO era examine the trends in the export of basmati rice, effect of globalization of the economy and effect of fluctuation on export of basmati rice from India. They worked out compound growth rate analysis by using the secondary data from 1993-94 to 2001-02, collected from the APEDA website and other related sites and reports. The study reveals that there is year to year variability in the export of quantity of rice and the value received during post GATT period. However, the export earnings have almost doubled.

Hosamane *et al.* (2006) examine the export behavior of principal commodities during pre and post reform period using the Constant Market Share Analysis. Using the data from 1990-91 to 2003-04 the study finds out that total value of export has registered substantial increase but the share of primary sector was constant during the

first three years and decreased in subsequent period. During the last three years the share has declined to a considerable extent. Openness has led to increase in the volume of country's trade with the world. However, negative growth rate is observed in terms of primary products.

Bhattacharyya and Banerjee (2006) examined the direction of trade of Indian imports and exports using the gravity model considering panel data of 1950 - 2000. They observed that the number of export destinations more than doubled between 1950 and 2000. The top 5 countries continued to account for around fifty per cent of exports throughout the period. By the end of the century about 86 per cent of countries were smalltime export partners absorbing less than 1 per cent of total exports. USA was a very important trading partner of India during that period both in exports and imports while the importance of UK, which was very important in the first two decades since 1950, waned over the years. USSR Was important during the 1970s and the 1980s Savdvti (2006) studied the export behaviour of basmati rice using annual time series

Deshmukh (2009a) examines the export of horticulture, constraints and policy implications. He undertakes the export competitiveness of major horticultural crops of Maharashtra, based on the primary survey that covered the exporters, growers cum exporters, agency experts in the state of Maharashtra for the year 2005-06. The study provides an integrated view of the horticulture sector of the state. The study uses the primary and secondary data. The secondary data on export quantity and value of horticulture crops for India and Maharashtra is obtained from APEDA, Ministry of commerce, Government of India, Commissionaire of Horticulture, Government of Maharashtra, Pune. The study finds that export of horticulture corps has increased significantly in the post WTO period. For boosting the horticulture exports the study suggests several measures such as - State owned and private enterprises should continue to play a large role in agricultural markets including seed production, fertilizer distribution, fruit processing and exports; continuous monitoring of international prices and appropriate tariff protection;

Promotion of agri-information centers like www.phalbazar.com; Improve the infrastructure facilities like roads, water and power, refrigerated wagons; Intensify the

market promotion efforts in SAARC and Middle East countries; Improve domestic market channels- increase efficiency and reduce cost; Agricultural Export Zones should adopt end to end approach i.e., integrating the complete process from export queries to dispatch of export consignment; Exporters need to recognize the professional management approach of deriving synergy to build competitiveness to emerge as dependable suppliers on a sustained basis; Enlarge the market and concentrate more on traditional markets to gain more competitiveness.

Nageshwara *et al.* (2009) explore the direction and composition of Indian agricultural export. The study uses the data from FAOSTAT. The study period is 2003 to 2006. The study reveals that India is amongst top ten producers in the world for rice, buffalo milk, wheat, cow milk, fresh vegetables, sugar cane, potatoes, groundnut, pepper mint and buffalo meat. The technological developments, macro-economic reforms and Uruguay Round Agreement have contributed to the changes in agricultural trade. India is diversifying the rice export markets as it is negotiating free trade agreement with the EU and ASEAN. Agriculture holds the key position not only due to its contribution in GDP but also due to the dependence of a large population. The progress of agriculture has made a lot of changes in the net trading position of India. India had to depend on imports to feed its people but since 1990 we are exporting the agricultural products. Indian agriculture is so large and diverse that even a slight change in its trade can affect, the world agricultural market.

Yadav *et al.* (2009) in their study of export potential of major fruits examined India's position in the world export of fresh fruits - banana, mango, grapes, orange, apple and mosambi. The data from 1990 to 2005-06 is considered and data source is FAOSTAT. They examine India's share and position in fresh fruits export vis-a-vis other fresh fruits exporters in the world. In terms of production India's share in the total world production of mangoes is 65 per cent and that of bananas is 11 per cent. As against this India's share in the world export for these fruits is negligible i.e. less than 1 per cent. The importers of India's fresh fruits are Bangladesh, Nepal, UAE, UK and Malaysia. Major exporters of fresh fruits are Spain, USA, Italy, Belgium, Netherlands and Chile. China is biggest competitor for Indian fresh fruits. The study finds out some major constraints for the fresh fruits export are-low crop productivity,

limited irrigation Facilities, underdeveloped infrastructure like cold storage, roads, transportation facilities etc.

However the study lists the opportunities for the sector too. They are-Long growing season, diverse soil and climatic conditions comprising several agro-ecological regions. Thus efforts are needed in the direction to capitalize on our strengths and remove bottlenecks to meet the goal of moving towards formidable horticultural growth. For improving the situation the study suggest that - improve productivity and use of low cost technologies in production of fruits crops, make farmers aware about the quality standards and quality needed in the world markets, reschedule time of maturity to coincide with the shortage in the world markets, create essential market infrastructure facilities, identify more markets (European and US markets are major importers of the fresh fruits in the world), develop consumer preferred fruit products, establish efficient world and domestic market, introduce certification zoning system, and promotion of certification of organic farming for different horticulture crop.

Timothy *et al.* (2012) studied the impact of foreign trade on the economic position of Jordan. On the basis of secondary data, the major imports and exports are analyzed. It is pointed out that the international trade sector in Jordan is growing rapidly due to several factors including more trade agreements with other countries than any other Arab Nation and also due to the persistent regional instability. It is estimated that Jordan will continue its exports of Potash, Phosphates, as well as likely to expand its current manufacturing exports. Further, it is also found that the exports of food will decline due to increase in the local population growth.



METHODOLOGY

The source and nature of data for the study and the analytical tools employed in the study were presented in this chapter.

3.1 Description of the study area

3.2 Data Collection

3.3 Selection of the crop.

3.4 Analytical tools and techniques employed

3.1. Description of the study area:

Peninsular India has a land mass of 32, 00483 sq km with 15,200 km land frontier. India lies to the north of equator between 8.50 to 37.60 north latitude and 68.7 to 97.25 east longitudes. India has a varied temperature ranging between 15.70 c and 35.50 c. India's huge agricultural potential is embodied in its size and in its abundance and diverse nature resources, unlike most part of the World which have a cold and hostile winter and a relatively a small proportion of arable land, India is blessed with bounteous nature across vast fertile river plains, Indian cereal and agriculture crops provide another demonstration of her abundance, diversity and opportunity. The area under consideration for analyzing of Cocoa crop whole India was taken into consideration at aggregate level to facilitate data compilation and prices in the international market.

3.2 Data Collection

The data used for the study is entirely based on secondary source of data. For this study 32 years data were collected i.e. from 1983-84 to 2014-15. The data on area and production of cocoa were collected from Directorate of Cashew nut and Cocoa Development (DCCD), International Cocoa Organization (ICCO). The year wise data on export of Cocoa pertaining to quantity and value is compiled from various sources

like, Food and Agricultural Organization (FAO), Agricultural and Processed Food Products Export Development Authority (APEDA) and DCCD.

3.3 selection of the crop

Cocoa is a commercial agricultural export commodity though the domestic consumption is also high. India holds 17th position in the production of cocoa over the world. Indian cocoa and its products are exported to many countries all over the world. Therefore, there is, need to study the growth rate, stability, competitiveness and export of Indian cocoa.

3.3 Analytical tools and techniques employed

To fulfill the specific objectives of the study based on the nature and extent of availability of data, the following analytical tools and techniques was adopted.

- I. Compound growth rate.
- II. Co-efficient of variation.
- III. Nominal protection coefficient.
- IV. Dynamics of export.

ANALYTICAL TOOLS:

Compound growth rate:

Compound Growth rate will be worked out to examine the tendency of variables to increase, decrease or stagnant over a period of time. It will also indicate the magnitude of the rate of change in the variable under consideration per unit of time.

The trend of change of “Yt” per unit of time to express as a function of the magnitude of “Yt” itself will usually termed as the Compound Growth Rate (CGR) which can be expressed mathematically as :

$$\begin{aligned} \text{CGR} &= \left(\frac{1}{Yt}\right) \left(\frac{dYt}{dt}\right) \\ &= [(YT+1 - Yt/Yt)] \end{aligned}$$

The above expression if multiplied by 100, gives the compound growth rate of “Yt” in percentage term.

There are many alternative forms of growth viz., linear exponential, modified exponential, cob-Douglas etc. which have been developed and used by the researchers.

The mathematical form of log-linear function (also known as exponential function) is as follows :

$$Y_t = Ae^{bt} \dots\dots\dots (2)$$

The log transformation of this function is as follows:

$$\text{Log}_e Y_t = \text{log}_e A + bt$$

From the non-linear form, CGR can be worked as:

By differentiating,

$$d(\log Y_t) / dt = b.$$

But the estimate of ‘b’ in the log-linear function is in semi-log terms. Therefore, to convert it into the original form of Yt following transformation is done :

Since

$$b = \log (1+r)$$

$$\text{Antilog } (b) = 1+r$$

$$r = (\text{Antilog 'b'})-1$$

$$\text{CGR in percentage} = [(\text{Antilog 'b'})-1] \times 100.$$

Measurement of instability:

Instability is the deviation from the trend. It can be measured by using coefficient of variation. The standard deviation as percentage of means called as coefficient of variation.

$$CV = \frac{\sigma}{X} \times 100$$

Where,

CV =co-efficient of variation.

σ =S.D. of the variable.

X = mean of the variable.

Nominal protection coefficient:

Nominal protection coefficient were computed from 2000 -2016 to determine the extent of competitive advantage enjoyed by the commodity in the context of free trade . The coefficient shed light on whether a country has comparative advantage in the export of that commodity in free trade scenario or not , Nominal protection coefficient (NPC) is defined as the ratio of the domestic price to the world reference price of the commodity under consideration.

Symbolically,

$$\text{NPC} = \frac{P_d}{P_b}$$

$$P_d = \frac{\text{Domestic price}}{\text{world reference price}}$$

Where,

P_d = Domestic wholesale price of the commodity.

P_b = World reference price of the commodity.

If Nominal protection coefficient is greater than one, then the commodity is protected , compared to the situation which would prevail under free trade and if it is less than one the commodity is globally more competitive (dis protected). The domestic prices here used are the available wholesale prices of cocoa in Indian market. Here world reference prices are derived by dividing the value of exports by their respective quantities(Sharma,2008).

Export of cocoa:

To examine the growth rate in the export of cocoa from India to other countries, data were collected from the secondary sources(2004-05 to 2014-15). The data were calculated on the basis of annual growth rate from 2004-05 to 2014 -15 with the help of formula given below:

$$\text{Export of cocoa} = \frac{N-M}{M}$$

Where,

M = Previous year

N = current year



RESULTS AND DISCUSSION

This chapter aims at results of the present study. The results of the study are analysed with the help of secondary data. The data have been processed and tabulated in the light of the objectives under study.

The data were processed to determine co-efficient of variation in order to detect the magnitude of variation under acreage and production. The growth rate of area and production in India, export rate and competitiveness of cocoa in the global markets are also studied and calculated.

Data collected from the secondary sources, which were calculated and tabulated in the study, are from Apeda, ICCO, DACCD and MSOPI

The entire chapter under the study is presented in the following:

- 4.1. To study the growth rate in production and area of cocoa in India .
- 4.2. To examine the stability in the production and area of cocoa
- 4.3. To examine the competitiveness of cocoa in the world.
- 4.4. To analyse the dynamics of export of cocoa.

4.1 Growth rates in area and production of cocoa:

The growth rate in area and production of cocoa during the study period 2000-2015 were Determined and results were presented in the table 4.1

Table 4.1: Growth rates in area and production of cocoa in different periods in India

Year	Area (000'ha)	Production (000'MT)
2000	15.7	6.5
2001	16.1	6.8
2002	21.9	8.4
2003	25.2	9.2
2004	27.8	9.3
2005	29.5	10.2
2006	30.3	10.2
2007	31.9	10.6
2008	34	11.8
2009	46.3	13
2010	34.1	14.4
2011	63	12.9
2012	66.5	13.4
2013	71.4	15.1
2014	78	16
2015	81	17
CGAR	11.6	6.09

Source: DCCD

Table 4.2: Table showing growth rates in area and production in two sub periods

Items	Particulars	Study period-1 (1983-2000)	Study period-2 (2000-2015)
Area (in 000'ha)	F.value	1.65	238.35*
	R^2	0.91	0.944
	Growth rate	-1.64	11.6
Production (in 000'MT)	F.value	1.79	270.23*
	R^2	0.204	0.950
	Growth rate	-3.41	6.09

*significant at 1% level of significance

**significant at 5% level of significance

***significant at 10% level of significant

In the table above table shows the growth rate of cocoa which was divided into two study periods. In the period-1(1983-84 to 1999-2000) the cocoa registered a annual growth rate in area of -1.64 in India which was negative and the growth rate in production was -3.14, this is also negative which indicates that during this period the growth rate was slow or stagnant or there is no significant growth during this study period

The table indicates that area under cocoa registered a positive growth rate. During the study period (2000-01 to 2014-15), cocoa registered 11.6 per cent of annual growth rate in area and 6.09 percent in production in India. During the second study period, 11.6 per cent of annual growth rate and 6.09 percent growth rate in production compared to that of the first study period shows that there is significant increase in the area of production registering a healthy growth rate.

Cocoa production registered a positive growth rate in the study period (2000-2016). The whole study period registered a growth rate of 6.09 per annum in production.

Hence from the above table it is shown that during the two study periods, comparison between the study periods in the study period-2 the growth rate was positive and shows an improvement during this period than that of the study period-1,

while the growth in this period was in negative which shows that the growth was stagnant, by comparing the two study periods there was increase in the growth rate in the area and production of cocoa in the 2000-01 to 2014-15.

Ashalatha (2000) also studies the same where she analyzed and reported the growth rate in cashew in two periods. It was observed that the growth rate in area, production, productivity, kernel export, raw cashew import, cashew nut shell liquid value were showing positive trend but the cashew nut shell liquid quantity exported showed non-significant negative growth.

The table below shows major cocoa producing states and their growth rate in area:

Table 4.3: Table showing growth rates in different states in area from 1993-2015

S.No.	Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	India
1	1993-94	0.8	2.8	8.2	-	11.9
2	1994-95	1	2.8	6.9	-	10.7
3	1995-96	1	2.8	7.9	-	11.8
4	1996-97	0.7	2.8	8.4	-	11.9
5	1997-98	0.7	2.8	8.5	-	12
6	1998-1999	0.7	2.8	8.9	0	12.4
7	1999-2000	2.7	4.4	8.9	0.1	16.2
8	2000	2.7	4.4	8.5	0.1	15.7
9	2001	2.7	4.4	8.7	0.4	16.1
10	2002	6.4	6	9.3	0.2	21.9
11	2003	8.5	6	10.2	0.4	25.2
12	2004	10.2	6	10.2	1.4	27.8
13	2005	11.8	6	10.2	1.4	29.5
14	2006	11.9	6.9	10.2	1.4	30.3
15	2007	12.7	7.2	10.5	1.4	31.9
16	2008	14.1	7.3	10.7	2	34
17	2009	17	9	11	9.3	46.3
18	2010	14.1	7.2	10.7	2.1	34.1

19	2011	18.7	10.6	12.3	21.4	63
20	2012-13	20.7	10.9	12.5	22.4	66.5
21	2013-14	22.2	11.7	13.5	24	71.4
22	2014-2015	23.5	12.9	14.7	27	78
CGR		21.44	8.08	43.92	2.75	10.31

Source: WWW.Indianstat.com

	States	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	India
Area (000'ha)	F.value	143.87	389.64	199.56	74.38	408.66
	R^2	0.883	0.951	0.908	0.841	0.953
	Growth rate	21.44	8.08	2.75	43.92	10.31

From the above table it is shown that there is significant and positive increase in the growth rates in the area of cocoa during the study period 1993-94 to 2014-15. As a result highest growth rate is observed in Kerala of growth rate of 43.92 though in the initial years there was less production or no production in the area, then after Andhra Pradesh showing a growth rate of 21.44 next to Andhra Pradesh it is Karnataka showing growth rate of 8.08 and then after it is Tamil Nadu showing a growth rate of 2.75. As compared with Andhra Pradesh, Karnataka and Tamil Nadu highest growth rate was noticed in Kerala of 43.92. Overall India showing growth rate of 10.31. During the initial years there was less area under production of the crop as the people are not aware of the crop and its cultivation methods, since 2000-01 the crop gained its momentum as a result there is increase in the area in production.

Babu Reddy reports the same in (2001) that the compound growth rates of area, production and yield of Indian coffee as 2.86, 4.66 and 2.25 percent for the period 1950-51 to 1999-2000 and concluded that both expansion of area and improvement in yield have contributed to the growth in the production.

The table below shows major cocoa producing states and their growth rate in production:

Table 4.4: Table showing growth rates in different states in production from 1993-2015

S.No	Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	India
1	1993-94	-	1.4	5.3	-	6.7
2	1994-95	-	1.4	4.3	-	5.8
3	1995-96	0.5	1.4	4.5	-	6.3
4	1996-97	0.7	1.4	3.5	-	5.4
5	1997-98	0.1	1.3	3.8	-	5.3
6	1998-1999	0.2	1.3	3.7	-	5.2
7	1999-2000	0.8	1.6	4	-	6.4
8	2000	0.8	1.7	4	-	6.5
9	2001	0.8	1.7	4.1	0.2	6.8
10	2002	0.6	2.5	5.1	0.2	8.4
11	2003	0.7	2.5	5.9	0.2	9.2
12	2004	0.8	2.5	5.9	0.2	9.3
13	2005	0.7	2.8	6.5	0.2	10.2
14	2006	1.5	2.7	5.8	0.2	10.2
15	2007	1.6	2.8	6	0.2	10.6
16	2008	2.6	2.9	6.1	0.2	11.8
17	2009	2.7	3	6.3	0.9	13
18	2010	3	3.4	7.1	1	14.4
19	2011	4	2	5.9	1	12.9
20	2012-13	4.2	2.1	6.1	1	13.4
21	2013-14	5.6	2.1	6.3	1.1	15.1
22	2014-2015	6.3	2	6	1.8	16.1
CGR		17.92	3.48	22.08	18.56	7.89

Source: WWW.Indianstat.com

	States	Andhra Pradesh	Karnataka	Kerala	Tamilnadu	India
production	F. value	73.24	20.81	3360.	4.94	29.68
	R^2	0.802	0.509	0.994	0.260	0.597
	Growth rate	17.92	3.48	22.08	18.56	7.89

From the above table it is shows the growth rates in production of cocoa during the study period 1993-94 to 2014-15 are significant and positive. As a result highest growth rate in production was observed in Kerala of 22.08.then after Kerala it

is noticed in Tamil Nadu of 18.56 growth rate. Next to Tamil Nadu it is noticed in Andhra Pradesh of 17.92 growth rate in production. After Andhra Pradesh, it is noticed in Karnataka. Overall growth rate of production in India was 7.89. Highest growth rate was in Kerala since climatic conditions in Kerala are best suitable for the production and cultivation of cocoa. .

Babu Reddy reports the same in (2001) that the compound growth rates of area, production and yield of Indian coffee as 2.86, 4.66 and 2.25 percent for the period 1950-51 to 1999-2000 and concluded that both expansion of area and improvement in yield have contributed to the growth in the production.

Variability in area and production of cocoa

The variability in area and production of cocoa the whole study period was determined through co-efficient of variation and the results are given in the table below:

Table 4.5: Table-showing variability in area and production of cocoa during two sub periods

Items	Particulars	Study period-1 (1983-84 to 1999-2000)	Study period-2 (2000-01 to 2014-15)
Area	S.D	3.80	22.38
	Mean	14.07	42.04
	CV%	27	53.23
Production	S.D	0.74	3.1
	Mean	6.01	11.55
	CV%	12.3	27.44

The variability of cocoa was presented in the above table of two study periods which was in the variability in area which was in 000'hectares and 000' MT in the two study periods and the variability was 27 per cent during study period 1983-2000 and the variability in production which was in 000'MT was 12.3 percent.

The variability in area during second study period 2000-2015 was 53.23 and the variability in production was 27.44. From the above table it is shown that, the variability in the second study period was higher than that of the first study period.

The same is also studied by sadeesh *et al.* (2006) reported on growth and instability of major oil seeds in India based on time series data of area, production. For analyzing the data, they have used compound growth rates and co-efficient of variation.

The table below shows variability in different states in India in area of cocoa:

Table 4.6: Table-showing variability in area in different states

S.No:	Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	India
1	1993-94	0.8	2.8	8.2	-	11.9
2	1994-95	1	2.8	6.9	-	10.7
3	1995-96	1	2.8	7.9	-	11.8
4	1996-97	0.7	2.8	8.4	-	11.9
5	1997-98	0.7	2.8	8.5	-	12
6	1998-1999	0.7	2.8	8.9	0	12.4
7	1999-2000	2.7	4.4	8.9	0.1	16.2
8	2000	2.7	4.4	8.5	0.1	15.7
9	2001	2.7	4.4	8.7	0.4	16.1
10	2002	6.4	6	9.3	0.2	21.9
11	2003	8.5	6	10.2	0.4	25.2
12	2004	10.2	6	10.2	1.4	27.8
13	2005	11.8	6	10.2	1.4	29.5
14	2006	11.9	6.9	10.2	1.4	30.3
15	2007	12.7	7.2	10.5	1.4	31.9
16	2008	14.1	7.3	10.7	2	34
17	2009	17	9	11	9.3	46.3
18	2010	14.1	7.2	10.7	2.1	34.1
19	2011	18.7	10.6	12.3	21.4	63
20	2012-13	20.7	10.9	12.5	22.4	66.5
21	2013-14	22.2	11.7	13.5	24	71.4
22	2014-2015	23.5	12.9	14.7	27	78
Variability		84.14%	50%	19%	143%	68%

From the above table, showing variability in area of cocoa which was in 000'hectares under cultivation during the study period 1993-94 to 2014-15. In which highest variability was found in the Tamil Nadu registering variability of 143 percent, then after Tamil Nadu it is Andhra Pradesh showing variability of 84.14 percent. Next to Andhra Pradesh, it is Karnataka and Kerala registering variability of 50 percent and 19 percent. Moreover, variability in allover India is 68 percent.

The table below shows variability in different states in India in production of cocoa:

Table 4.7: Table-showing variability in production in different states

S.No.	Year	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu	India
1	1993-94	-	1.4	5.3	-	6.7
2	1994-95	-	1.4	4.3	-	5.8
3	1995-96	0.5	1.4	4.5	-	6.3
4	1996-97	0.7	1.4	3.5	-	5.4
5	1997-98	0.1	1.3	3.8	-	5.3
6	1998-1999	0.2	1.3	3.7	-	5.2
7	1999-2000	0.8	1.6	4	-	6.4
8	2000	0.8	1.7	4	-	6.5
9	2001	0.8	1.7	4.1	0.2	6.8
10	2002	0.6	2.5	5.1	0.2	8.4
11	2003	0.7	2.5	5.9	0.2	9.2
12	2004	0.8	2.5	5.9	0.2	9.3
13	2005	0.7	2.8	6.5	0.2	10.2
14	2006	1.5	2.7	5.8	0.2	10.2
15	2007	1.6	2.8	6	0.2	10.6
16	2008	2.6	2.9	6.1	0.2	11.8
17	2009	2.7	3	6.3	0.9	13
18	2010	3	3.4	7.1	1	14.4
19	2011	4	2	5.9	1	12.9
20	2012-13	4.2	2.1	6.1	1	13.4
21	2013-14	5.6	2.1	6.3	1.1	15.1
22	2014-2015	6.3	2	6	1.8	16.1
Variability		96.29%	30.60%	20%	140.21%	68%

From the above table it is clear that there is variability in the production of cocoa in different states in India, which was in 000³MT during the study period 1993-94 to 2014-15. Among all the states listed above highest variability was observed in Tamil Nadu showing variability of 140.21 percent. After Tamil Nadu it is noticed in Andhra Pradesh registering variability of 6.29 percent. Next, it is observed in Karnataka and Kerala showing variability of 30.60 and 20 percent. Moreover, variability in India is 68 percent.

The dynamics of export of cocoa

Cocoa is not only domestically consumed but it is also exported in other countries as there is scarcity in production, since the chocolate companies worry for long term supply of cocoa as the productivity is low. The data of export from 2004-05 to 2014-15 are presented in the below table.

Table 4.8: Showing the dynamics of export rate

Year	Export(MT)	Growth rate
2004-05	2446	-
2005-06	2560	0.04
2006-07	3412	0.33
2007-08	4979	0.45
2008-09	6832	0.37
2009-10	5864	-0.14
2010-11	9078	0.54
2011-12	16,679	0.83
2012-13	19,084	0.14
2013-14	16,229	-0.14
2014-15	20,878	0.28

It is evident from the above table that there is no significant growth during 2004-15. In 2005-06 the export was 2560 MT, which was higher than the previous year i.e 2446 MT and growth rate was 0.04. In the next two years 2006-07 and 2007-08 the export increased by 3412 MT and 4979 MT, the growth rates are 0.33 and 0.45 and the difference in the growth rate by 0.12. In the next year (2008-09) there is decline in the growth rate i.e. 0.37 and in the next year (2009-10) the export was decreased by 5864 MT and the growth rate was negative -0.14. In 2010-11 and 2011-12, the export again increased by 9078

MT and 16,679 MT and the growth rates are 0.54 and 0.83. The export in the 2012-13 is 19,084 MT and the growth rate is 0.14. In the 2013-14 the export decreased to 16,229 MT and the growth rate was in negative i.e. -0.14. There is increase in the export again by 20,878 MT and the growth rate was 0.28

The same is also reported by Hosamane *et al.* (2006) he reported that the export behavior of principal commodities. Using the data from 1990-91 to 2003-04 the study finds out that total value of export has registered substantial increase but the share of primary sector was constant during first three years and decreased in subsequent period. During the last three years, the share has declined to a considerable extent. Openness has led to increase in the volume of country's trade with the world. However, negative growth rate is also observed in terms of primary products.

In the overall years the export of cocoa was increased from 2446 MT to 20,878 MT from 2004-05 to 2014-15 and also in overall years the highest growth rate of export of cocoa was in 2011-12 i.e. 0.83 and negative growth rate was in 2009-10 and 2013-14 i.e. -0.141 and -0.149.

India's major export destinations:

Table 4.9 Showing export value of cocoa

Country	2014-15		2015-16	
	Quantity (T)	Value (millions)	Quantity (T)	Value (millions)
United states	4565.65	31.49	6185.51	37.02
Singapore	377.60	2.17	5889.14	24.94
United Arab emirates	908.86	11.08	1736.46	14.94
Korea Republic	42.35	0.26	1757.34	14.66
China	1623.38	12.06	1559.52	11.65
Saudi Arabia	749.92	6.49	1641.90	11.17
Netherland	2074.06	14.29	1785.85	10.73
Hong Kong	557.31	6.37	723.94	9.25
Nepal	2799.21	10.16	1857.67	7.86
Taiwan	51.87	0.59	587.73	5.28

Source: ICCO

The above table shows India's major export destinations and the value obtained from them.

4.9.1 Table showing the growth rate in export of cocoa to different countries from India

Country	Quantity in 2014-15	Quantity in 2015-16	Growth rate
United states	4565.65	6185.51	0.35
Singapore	377.60	5889.14	14.59
United Arab emirates	908.86	1736.46	0.91
Korea republic	42.35	1757.34	40.49
China	1623.38	1559.52	-0.03
Saudi Arabia	749.92	1641.90	1.18
Netherland	2074.06	1785.85	-0.13
Hong Kong	557.31	723.94	0.29
Nepal	2799.21	1857.67	-0.33
Taiwan	51.87	587.73	10.33

Source: DCCD

From the above table it is clear that there is growth rate in export of cocoa of the top ten countries. Highest growth rate was observed in Korea republic recording growth rate of 40.49 then after Singapore showing growth rate of 14.59 and next to that Taiwan of 10.33 growth rate, next to that Saudi Arabia, United Arab Emirates, United States and Hong Kong their growth rates are 1.18, 0.91, 0.35, and 0.29. Negative growth rates are also recorded in china, Netherlands and Nepal of -0.03, -0.13 and -0.33.

Competitiveness of export of cocoa.

The fluctuative export value of the largest exporters of cocoa beans indicates that, the existing competition between exporters in the world market. Therefore analyzing the competitiveness of India's cocoa beans export will be an important information especially in determining the marketing strategy with rival countries.

India's export of cocoa to the international market has reached 60-70% of the total output.

The values of NPC for Indian cocoa are presented in the table below:

Table 4.10: Showing competitiveness of cocoa

Year	Domestic price (Rs/kg)	International price (Rs/kg)	NPC
2000	64.00	38.80	1.64
2001	54.00	44.63	1.20
2002	70.00	78.02	0.89
2003	73.71	83.08	0.88
2004	74.37	70.32	1.05
2005	65.34	69.30	0.94
2006	63.58	71.94	0.88
2007	67.11	78.58	0.85
2008	80.00	118.65	0.67
2009	140.00	137.05	1.02
2010	170.00	142.74	1.19
2011	155.00	148.90	1.04
2012	127.00	130.00	0.97
2013	126.00	152.00	0.82
2014	190.00	215.00	0.88
2015	200.00	210.00	0.95
2016	210.00	220.00	0.95

Source: Directorate of cashew and cocoa development.

$$=16.82 \div 17$$

$$\text{Npc} = 0.98$$

The values for the study period (2000 – 2016) reveal that cocoa has been globally a highly competitive commodity in India with average NPC of 0.98, which is less than 1. There is year-to-year fluctuation in NPC of cocoa. since value for NPC is less than one in most of the years under study, this indicates that cocoa is an effective export crop. So more resources are needed to provide fillip to export momentum. India has comparative advantage in producing cocoa.

The same is also studied by Sharma (2011) he reported the export competitiveness of coffee in India by performing analysis on annual time series data covering a time period between 1990-91 to 2005-06 with the help of nominal protection coefficient, the study reveals that the coffee has been a highly competitive commodity in India with average NPC around 0.27 which is far below unity.

Conclusion: The average NPC of cocoa under study is 0.98, which is less than one, shows that the commodity is treated as globally more competitive.



SUMMARY AND CONCLUSION

5.1 Summary

Cocoa was introduced into India during 20th century though its cultivation was restricted to a few government farms. Both Criollos and Forasteros were introduced into the country in the early 1930's. The Criollos which were maintained in the farms failed to come up well and were damaged by pests and diseases. A few plants continued to survive though their yields were low. Cocoa cultivation was resumed in a big way in the 1960's with pods of Forastero type. The initial introduction was made by pods mainly from Malaysia. These were then followed by introduction from the African countries, which were top producing countries at that time. Cocoa being a tropical crop, India offers considerable scope for its development. This has been found well adaptive as a companion crop in irrigated coconut and arecanut gardens because of its need for partial shade for proper growth. States like Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Goa, some parts of Pondicherry, Maharashtra, Orissa and West Bengal will therefore offer considerable scope for its development as these areas are coastal belts where coconut is grown under irrigated condition. Of the 15 lakh hectares of coconut gardens in India, the coconut areas in Karnataka, Pondicherry, Tamil Nadu and Andhra Pradesh are mostly irrigated in nature. In respect to other states, nearly 30-40 per cent is under irrigation.

In India cocoa cultivation on commercial scale started with meager acreage in the states of Kerala, Karnataka and Tamil Nadu in the 1960's. Further expansion was stagnant up to 1970s, but by the middle of 1970's, consequent on, the impressive rise in the price of raw beans in Indian and International markets, there was a boost in the acceptance of cocoa as a crop. Starting from a few hundred hectares during 1960's the area under the crop increased to 1927 hectares by 1970-71 and to 29,000 hectares by 1980-81. From this peak in area there was a drastic decline to about 22,500

hectares by 1982-83. Present area under cocoa in India is 17800 hectares (2002-03). Decline in price of the produce was the reason for such a lack of interest in this crop and the consequent decrease in area under cultivation. The current area under the crop also is a meager fraction of the area under coconut and areca nut in the country. The potential of area expansion is immense as an inter crop of these two main crops.

Cultivation of cocoa is gaining momentum and as per the final estimate 2014-15, India presently produced 16050 MT of cocoa from an area of 78000 ha. The country is importing about 40 % of the demand for cocoa and the demand is increasing in the country by 15 % annually. India imports rest of its requirement from other cocoa producing countries. There is lot of scope and demand to further increase in the area and production of cashew nut and cocoa. The Directorate of Cashew nut and Cocoa Development is implementing development programs under MIDH to increase the area and production of these two horticultural crops in the country.

The present study mainly concentrated on cocoa production, export and trade scenario of cocoa in India. The study covers the period from 1983-84 to 2014-15 for cocoa area, production and 2000-01 to 2014-15 for export of cocoa.

With the above facts in mind the present study has been under taken with the following objectives:

- i. To study the growth rate in production and area of cocoa in India .
- ii. To examine the stability in the production and area of cocoa.
- iii. To examine the competitive ness of cocoa in the world.
- iv. To analyse the dynamics of export of cocoa.

The present study on cocoa was done from the secondary data. The secondary data on area, production and productivity and export of cocoa in India were collected from the secondary sources. Compound growth rate, coefficient of variation, nominal protection coefficient and trend of export were performed. Secondary data from ICCO, DCCD, FAO and ministry of agriculture

Growth rate of cocoa

The analysis revealed that the production and area under the crop has been increasing in the recent times due to the awareness among the farmers to take the crop and the increase in the prices in the international market fetching higher income to the farmers. In the whole second study period from 2000-2015 the area under cocoa has been increased by 11.6 percent and production also increased by 6.09 percent compared to that of first study period which registered a negative growth rate. During the first study period (1983-84 to 1999-2000) the growth rate in area was -1.64 and -3.14 in the production. Hence there is increase in the cultivation of cocoa in area and production compared to that of the first study period.

Instability in cocoa

The instability refers to inconsistency/variability from a particular period of time. It indicates the extent of variability. During the whole study period (1983-84 to 1999-2000) the variability of cocoa in area was 27 percent and 12.3 per cent of production followed by variability in the second study period (2000-01 to 2014-15) in area was 53.23 percent in area and 27.44 percent in production. As a result highest instability was recorded during the second study period.

Competitiveness of cocoa

The analysis of export in general, indicated that all the countries were found to be competitive for export as it was evident from NPC's with less than unity. Npc of cocoa in the study period 2000 to 2016 is 0.98 which is less than one show that the commodity is competitive in the market. Hence, India has comparative advantage in the production of cocoa.

Export of cocoa

This objective helps us to find whether there is increase or decrease in the export of cocoa during the study period from 2004-05 to 2014-15. In 2005-06 the export was 2560 MT, which was higher than the last year i.e 2446

MT and the growth rate was 0.046. The export in the 2000-08 was 4979MT which was 1567 MT higher than the last year and the growth rate was 0.59 and in the 2009-10 there was decline in the growth rate which registered a growth rate of 0.372, then after there is further decline which was in negative . In the overall years the highest growth rate was notice in the year 2011-12 with export of 16,679 MT and registering a positive and significant growth rate of 0.837. The negative growth rates are observed during 2009-10 and 2013-14 showing growth rates of -0.141 and -0.149. This shows that there is fluctuations in the export of cocoa though there was increase in the export.

5.2 CONCLUSION

Due to the decrease in the production of cocoa in the African countries the chocolate companies turned towards India for their production . This has escalated the production of the crop. Many chocolate companies are providing buy-back schemes to the farmers assuring them that their produce will be bought after production ,in spite of providing inputs to the farmers. Hence this seems like a boon to the farmers under the cultivation of the crop. In spite of the domestic consumption of the cocoa , India is able to produce to meet the export demand fetching remunerative and fair prices to the farmers in the international market. To the multinational chocolate companies this is like a boom for the fulfillment of the requirement of the raw material. And moreover Swiss chocolate companies started looking towards India, for it is having delicacy in the Indian beans. Since the crop requires shade for its growth, in many places it is grown as an intercrop with coconut and areca nut and the sweetness of the beans depends on the available moisture in the soil and the number of rainy days per annum. On the basis of the availability of the export data of cocoa ,revealed that there was significant growth in the export of cocoa during the study period.

However, the productivity of cocoa was decreasing though there is increase in the area and production under the crop. Two dissimilar crop patterns are observed under rain fed and irrigated conditions in India.

The liberalized industrial policy and relaxation of duties on imports made imported beans cheaper than the domestic produce and the prices fell sharply in the country. Cadbury and many others imported cocoa beans for processing. The steep downfall in prices forced many growers to cut down their cocoa trees and to change their cultivation to other remunerative crops. Farmers are afraid of this type of price fluctuations.

5.3 POLICY IMPLICATIONS

- There is a need to sustain and increase the productivity through technical advancement and proper management practices.
- The DCCD (Directorate of Cashew and Cocoa Development) should act as nodal agency for accreditation of existing cocoa nurseries and issue recognition and increasing the global competitiveness through export of the commodity to all the nations.
- To plan interventions like market linkages, handling facilities, processing and protection measures should be implemented so that farmer's take interest to increase the production.
- The government's measures on focused markets and focused product schemes in increasing the export pattern several export-boosting measures like extension of its interest subvention scheme to boost exports.



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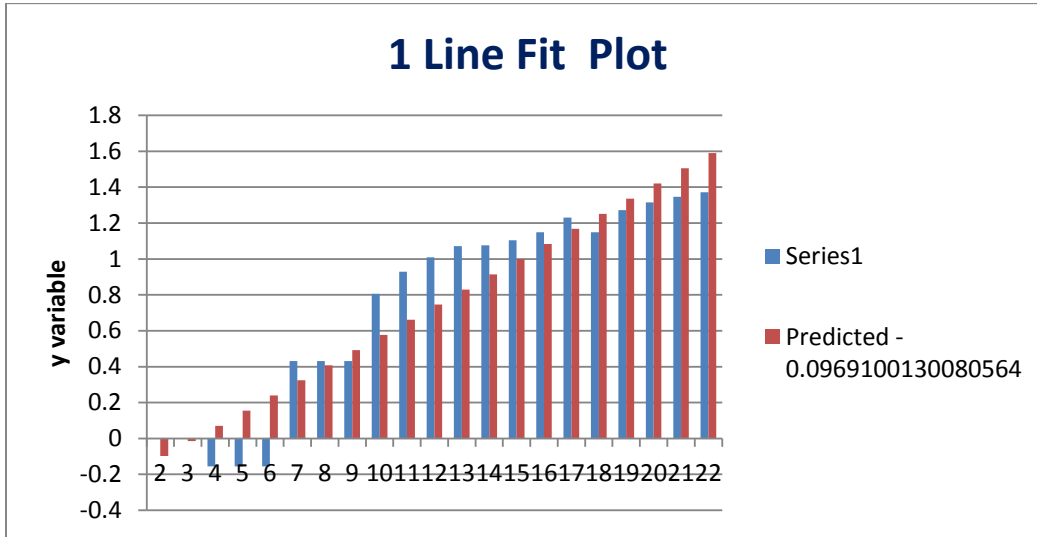
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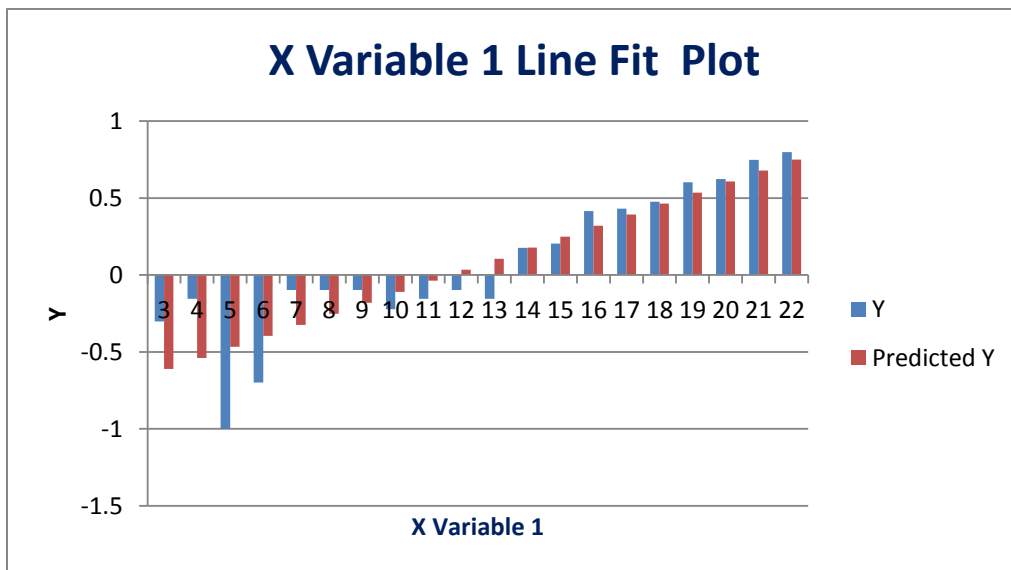


Appendices:

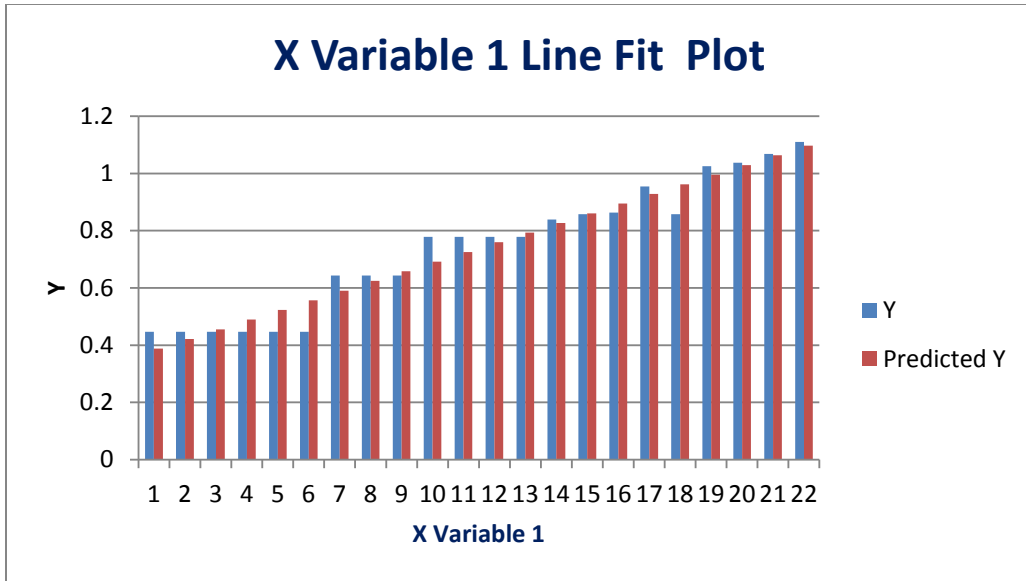
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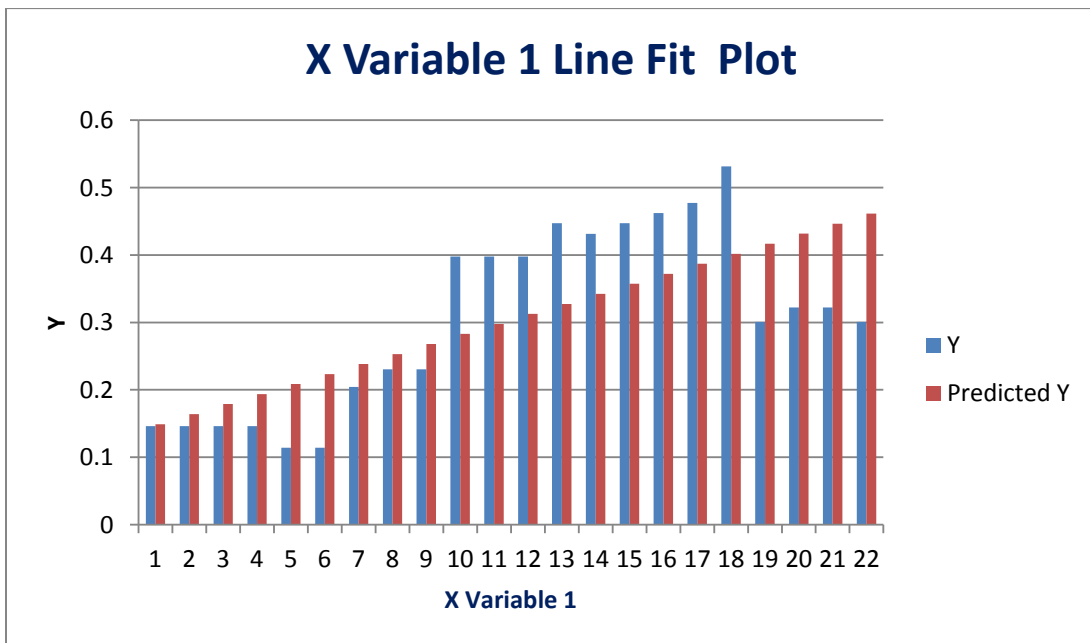
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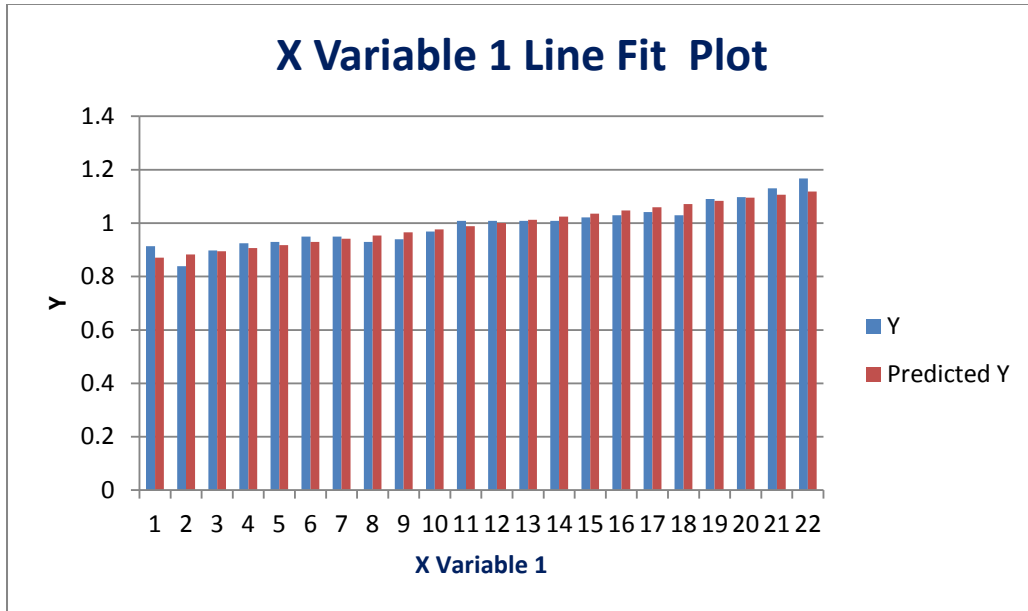
Area of cocoa in Karnataka:



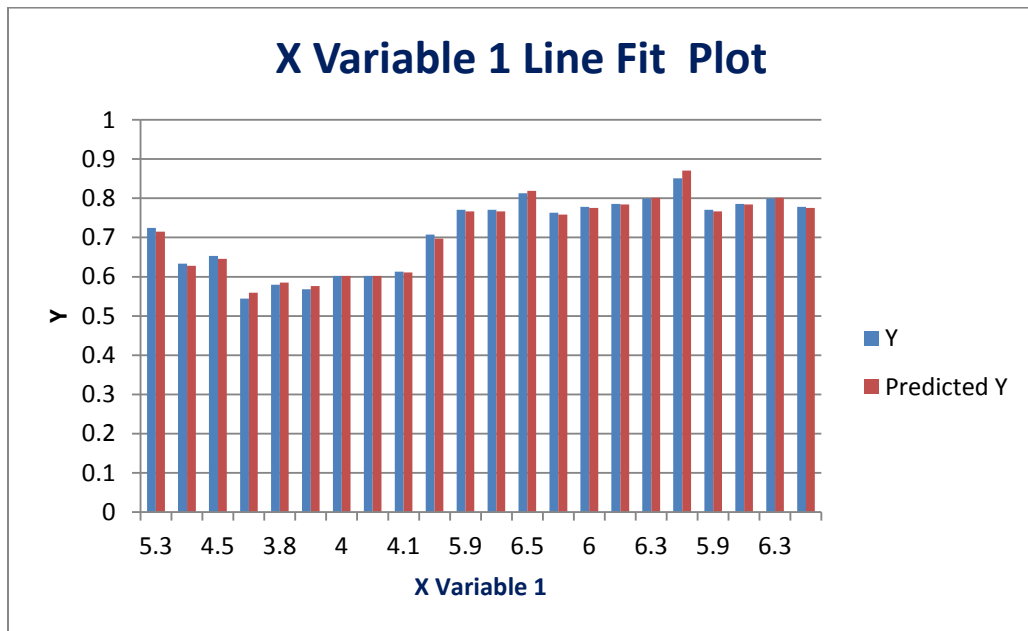
Production of cocoa in Karnataka:



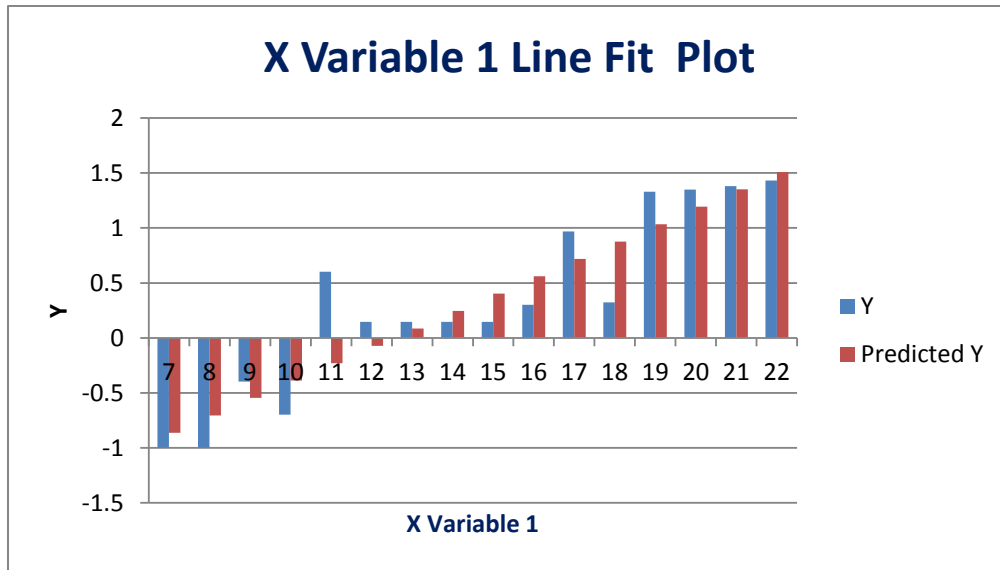
Area of cocoa in Kerala:



Production of cocoa in Kerala:



Area of cocoa in Tamilnadu:



Production of cocoa in Tamilnadu:

