

EXPORT PERFORMANCE OF BANANA IN INDIA

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DISSERTATION

Submitted to the
Vasantrao Naik Marathwada Krishi Vidyapeeth,
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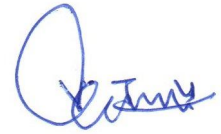
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2020

CANDIDATE'S DECLARATION

*I hereby declare that the dissertation or
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Date : 30/09/ 2020




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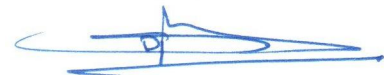
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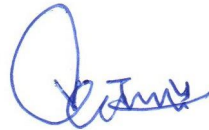
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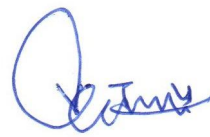
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Introduction



CHAPTER-I

INTRODUCTION

India is known as fruits and vegetable basket of the world. It ranks second in fruits and vegetables production in the world after China. India's contribution in the world production of fruits and vegetables was 14.3 per cent and 15.6 per cent respectively during the year 2016-17. (National Horticulture Database 2016). India is the world's largest producer of mango (45%), banana (29%), papaya (37%), pomegranate, sapota and acid lime in addition grape recording highest productivity (21.6 t/ha) in the world.

The potential of horticulture in raising agricultural production, value added, farm income and employment in the country has been recognized long ago. The Fourth Five Year plan (1969-74) recognized the importance of this sector (Chand *et al.*, 2008) with budgetary supports. After a decade or so this sector was identified by the Government of India in the mid- 1980s as a promising emerging sector for agricultural diversification to enhance profitability through efficient land use, optimum utilization of natural resources and creating employment for rural masses (ICAR, 2005). As a result, India contributes 10-13 per cent of the total world production of fruits and vegetables occupying second place in the world (Chadha, 2004). Hence, the horticulture sector plays an important role in contributing to the world production. Diversification of agriculture in favor of horticultural crops brings new opportunities to agrarian sector. If carried out appropriately, diversification can be used as a tool to augment farm income, generate employment, alleviate poverty and preserve soil and water resources (Joshi et al 2004).

1.1 Origin, domestication and history of Banana in India

Bananas may be the world's oldest cultivated crop. There is evidence that bananas were cultivated in the highlands of New Guinea at least 7,000 years ago and that *Musa* varieties were being bred and grown in the Mekong Delta area of Southeast Asia as long as 10,000 years ago. In the first or second millennium B.C. Arab traders carried banana suckers from Southeast Asia back home and introduced the fruit to the Middle East and the east coast of Africa. Swahili people from the coast of Africa traded the fruit with Bantu people from the interior of Africa and they carried the fruit to western Africa. The introduction of the banana to Africa occurred

so long ago that areas of Uganda and the Congo basin have become secondary centers of genetic diversity. Bananas were discovered by the Portuguese on the Atlantic coast of Africa. They cultivated the fruit on the Canary Islands. From there it was introduced to the Americas by Spanish missionaries. Documenting the arrival of bananas in the New World a Spanish historian wrote: "This special kind [of fruit] was brought from the Island of Gran Canaria in the year 1516 by the Reverend Father Friar Tomas de Berlandga...to the city of Santa Domingo whence the spread to the other settlements on this island [of Hispaniola]...And have been carried to the mainland, and in every part they have flourished."

All bananas eaten today are descendants of two kinds of wild fruit: 1) the *Musa acuminata*, a plant originally from Malaysia that produces single sweet-pickle size green fruit that have a milky flesh and several hard peppercorn-size seeds inside; and 2) the *Musa balbisiana*, a plant originally from India that is larger and more robust than *M. acuminata* and produces more fruit with thousands of round, button-like seeds. About half the genes found in banana are also found in humans. Thousands of years ago *acuminata* and *balbisiana* crossed fertilized, producing natural hybrids. Over time, random mutations produces plants with seedless fruit that were more edible than seed-filled varieties so people ate them and cultivated them. In this way mankind and nature worked side by side to produce sterile hybrids that are incapable of reproducing sexually but constantly produce new generations of daughter plants by suckering from a long-living rhizome that lives underground.

Banana (*Musa paradisiaca* L.) is an important fruit of tropical countries like India, China, Brazil, Philippines etc, belongs to **Musaceae** family and *Musa* genus to the order **Zingiberales**. Banana is also known as *Apple of paradise*. Banana is native to tropical south and south East Asia. It is the most popular fresh fruit all over the world and its name comes from the Arabic word 'banan', which means finger. Banana is the national fruit of Central African Republic. The banana were grown in southern Asia even before the prehistoric periods and the world's largest diversity in banana population is found in this area. Hence, it is generally agreed that all the edible bananas and plantains are indigenous to the warm, moist regions of tropical Asia comprising the regions of India, Burma, Thailand and Indo china. In India banana is known for its antiquity and are interwoven with Indian heritage and culture. The plants are considered as the symbol of prosperity and fertility. Owing to

its greater socio-economic significance and multifaceted uses banana is popularly known as *Kalpataru* (a plant with virtues). It is tree that all parts including leaves, pseudostem, flower bud and corn can be used in one or another way.

1.2 Banana in World

Banana are the major fruit which have maximum export in the world. The world wide trade of bananas is worth \$4 billion a year. About 80 million tons of bananas produced around the world. Less than 20 percent is exported, with 15 per cent are exported to the United States, Europe and Japan. Bananas have traditionally been a cash crop for banana companies in South East Asia, Central America, northern South America, and the islands of the Caribbean. In 1954, the price of bananas raised so high that why it was called "green gold." India, Ecuador, Brazil and China collectively produce half the world's banana crop. Ecuador is the only leading producer that is oriented towards producing bananas for the export market. India and Brazil, the world's leading producers, export very little. Banana is also grow in many other countries of the world namely Bangladesh, the Caribbean islands, the Canary islands, Florida, Egypt, Israel, Ghana Congo, South Africa, Fiji, Hawaii, Taiwan, Indonesia, the Philippines, South China, Queensland, Sri Lanka. The highest acreage of bananas is in Africa where bananas reach their maximum importance as starchy food. They are the staple food of the Bungda in Uganda, the Wahaya in Bukoba, and the Wachagga in Tanzania. Worldwide more and more countries are raising bananas which means the price is getting lower and lower and smaller producers have a rougher time. Since 1998, worldwide demand has dropped. This has led to overproduction and a further drop in prices.

Banana is reported to be grown in 130 countries in the world with a total production of 113918.763 thousand tones and area of 5637.508 thousand hectares in 2017 (Food and Agriculture Organization 2017). Bananas are the fifth largest agricultural commodity in world trade after cereals, sugar, coffee and cocoa. However, production as well as exports and imports of Banana are highly concentrated in a few countries. The top five banana producing countries are India, China, Philippines, Brazil, Ecuador, alone produced more than 60 per cent of the total world Banana production. Banana is being cultivated throughout the warm tropical regions of the world. The Table 1.1 shows the major Banana producing countries in

the world during the year 2017. At the global perspective India is the largest banana producing country in the world followed by China and Philippines. India's share in the world banana production is about 24 per cent followed by China at 10 per cent and Philippines at 9 per cent. Besides these three countries, the other major banana producing countries are Ecuador, Brazil, Indonesia, Angola, Guatemala, Tanzania, Mexico, Costa Rica and Colombia. Even though banana is grown in about 130 countries, the below 10 countries contributed more than 75 per cent of the world banana production.

Table No.1.1 Major Banana producing countries in the world in 2017

Countries	Area (in '000' Ha)	Production (in '000' tones)	Productivity (in MT/Ha)	Per cent share in world production
India	860.000	30477.000	34.16	24.38
China	366.166	11170.000	26.38	10.34
Indonesia	464.882	7162.685	58.94	6.07
Brazil	465.434	6675.100	14.35	6.77
Ecuador	158.057	6282.105	33.25	6.88
Philippines	446.764	6041.369	20.31	9.05
Angola	142.482	4301.880	25.84	2.93
Guatemala	185.812	3887.439	40.91	2.65
Colombia	139.162	3786.672	25.00	1.94
Tanzania	489.980	3484.788	5.71	2.48
Other countries	1918.789	30649.722	12.88	26.51
World total	5637.508	113918.763	20.70	100.0

Source: Food and Agriculture Organization (2017)

1.3 Banana in India

Banana is important fruit crop of many tropical and subtropical regions of India. Banana is the largest produced and maximum consumed amongst the fruits cultivated in India and accounts for about 33.40 per cent of the total fruit production in India. India is the largest banana producing country in the world, and because it produces 2.4 times more than China with roughly the same population, it is very impressive indeed. Geographically, India is better placed compared to South East Asian, Central and South American countries for exports to gulf countries. It is the reason why India is the major player in banana export market as it even exports to the western regions.

India ranks first both in terms of area and production of Banana in the world contributing around 15 per cent of the total global area and about 29 per cent of

the total world's production. The average productivity of banana in India is 37.90 Mt/ha. compared to the world average of 21.20 Mt./ha. (National Horticulture Board 2016). Jalgaon district known as the “Banana City of India”, Jalgaon district in north Maharashtra contributes about half of Maharashtra's banana production and more than 16 per cent of the of the India. The five important Banana producing states in the country are Tamil Nadu, Maharashtra, Gujarat, Karnataka and Andhra Pradesh. These five states contribute more than 70 percent of total banana production in the country.

Table No. 1.2 Major banana producing state in India in 2017

State	Area (in '000' Ha)	Production (in'000' MT)	Productivity (in MT/ Ha)
Tamil Nadu	82.63	3205.04	38.79
Maharashtra	80.88	4209.27	52.05
Gujarat	68.15	4472.32	65.63
Karnataka	110.55	2328.90	21.07
Andhra Pradesh	88.96	5003.07	56.24
Madhya Pradesh	26.38	1834.03	69.54
Bihar	31.07	1396.39	44.94
West Bengal	49.30	1200.00	24.34
Assam	53.08	913.27	17.20
Odisa	24.20	449.82	18.59
Others	264.5	5744.14	12.60
INDIA	883.77	30807.50	34.86

Source: Indiatat.com (2017)

1.4 Economic importance of Banana

Banana is considered as the fourth important fruit crop in terms of economic importance after rice, wheat and milk. The advantage of this fruit is its availability round the year. Banana contains nearly all-essential nutrients including minerals and vitamins and has several medicinal properties. They are rich source of carbohydrates and potassium. These are the first choice of athletes owing to its high energy potential. Its high vitamin B6 content helps fight infection and is essential for the synthesis of 'heme', the iron containing pigment of hemoglobin. It is also a good source of phosphorous, calcium and magnesium. The fruit is easy to digest, free from fat and cholesterol. The fruit is a great source of fiber too. It is one of the oldest fruits known to mankind. Banana is one of the world's most important fruit crops. In India, banana crop accounts for 2.8% of agricultural GDP. It is an important fruit crop for subsistence farmers, and ensures year round security for food and income.

Considering the year round availability of fruits, unlike the seasonal availability of other fruits, it has become an inevitable necessity in any household in India for all functions. Bananas are exceedingly good for students as the rich source of potassium can make a person very alert, the fruit is often called a brain tonic. For those suffering from depression, bananas are good as they contain a protein called serotonin which is also called the ‘happy hormone’. Eating bananas helps people give up smoking as this fruit is rich in vitamin C, A, B6 and B12. Bananas contain potassium and magnesium which help the body to recover from nicotine withdrawal. When you suffer from a hangover – a banana milkshake with honey can give you immense relief. Cold milk soothes the stomach lining and banana with honey build up depleted blood sugar levels. For pregnant women suffering from morning sickness, eating bananas in between meals helps immensely in settling the queasiness in the stomach. The peel of a banana fruit can be rubbed on a mosquito bite with good effect, the stinging sensation stops and the swelling also reduces.

Table No. 1.3 Nutrient Composition of Banana

Moisture	70.0 per cent
Carbohydrate	27.0 per cent
Crude fiber	0.5 per cent
Protein	1.2 per cent
Fat	0.3 per cent
Ash	0.9 per cent
Phosphorus	290.0 ppm
Calcium	80.0 ppm
Iron	6.0 ppm
b-carotene	0.5 ppm
Riboflavin	0.5 ppm
Niacin	7.0 ppm
Ascorbic acid	120.0 ppm

Source: www.ikisan.com

1.5 Export Scenario of Banana

As export and import of agricultural products depend on several factors such as international and domestic demand & supply situation, international & domestic prices, quality concerns and food security concerns, no targets for exports or imports are fixed. Banana is considered as one of the most important one in terms of production, productivity and export potential in India. It has been argued that India

with its integration into the global markets through WTO could benefit substantially from International trade in agricultural and horticultural commodities. In order to take advantage of these opportunities, it is essential to analyze current export performance of banana. However, there are some evidences available in respect of export trends in agricultural and horticultural commodities. But not much information is available with respect to export of major Indian fresh fruits, direction and magnitude of change in exports and constraints faced by various players in the area of export of fresh banana. India's major export destination in 2017-18 were UAE, Nepal, Saudi Arab, Baharain IS, Kuwait, Oman, Qatar, Maldives, USA, Iran and other are unspecified countries.

1.6 Objective of the study

To study the growth and instability in area, production and productivity of banana in India

To study the export profile of banana in India

To estimate the growth and instability in export of banana from India

To study the direction of trade and changing export pattern of banana in India

1.7 Scope of the study

India has varied agro-climatic zones which are highly favorable for growing a large number of horticultural crops. The growing importance of commercial horticulture is mainly important as its nationwide increase in the national income. Banana is the second most important fruit in India next to mango. Banana is very popular fruit because of its low price and high nutritive value. Banana fruits and leaves have steady demand in market. Its round the year availability for demand and supply. The cultivation of banana provides employment, income to the farmers. Diversification of agriculture in favor of horticultural crops brings new opportunities to agrarian sector. The study covers trend and instability analysis, direction of trade and changing export pattern which will be useful to the Government in formulating effective new policies for further encouraging existing banana exports. The methodological part and results of the study is useful to researchers and students carrying out further research on the foreign trade in agriculture.

1.8 Limitation of the study

The present study has been done mostly based on the secondary data collected from various published sources. Often data from various sources may not agree with each other and some efforts to choose the better among them are inevitable. Care has been taken to avoid personal bias in such decision. However, the limitations inherent in the secondary data were to be recognized.



*Review of
Literature*



CHAPTER- II

REVIEWS OF LITERATURE

A comprehensive review of literature is essential for any scientific investigation. It is a guideline to research study. There are references relating directly as well as indirectly to present research constraint which are received from research papers, previous thesis, journals, surveys and books. The collected references are arranged as per the objectives of research study.

1. To study the growth and instability in area, production and productivity of banana in India
2. To study the export profile of banana in India
3. To estimate the growth and instability in export of banana from India
4. To study the direction of trade and changing export pattern of banana in India

2.1 To study the growth and instability in area, production and productivity of Banana.

More (1999) studied the growth rate in area, production and productivity of banana in Nanded and Parbhani districts and Maharashtra state as a whole. In Nanded district, production had shown higher growth rate (21.04 %). The higher growth in production was contributed mainly by significant increase in area coupled with productivity. The growth rate of productivity was high (1.43 %) in Maharashtra state as a whole as compared to Nanded (1.40 %) and Parbhani (0.90 %) districts. It was due to use of improved cultural practices, higher use of manures and fertilizers, more use of other inputs and also increased yield levels in other districts of the state.

Bairwa *et al.* (2012) this paper attempted to examine the performance including the growth and instability of important fruit crops in the light of shrinking resource base and risky horticulture. The main focus of this paper is to examine how year to year fluctuations in area, production and productivity of fruit crops in India and what is the effect of newly ongoing horticultural development programmes on its instability and export performance. For this study Cuddy-Della Valle index is used. Data (1991-92 to 2007-08) shows the major fruit producing countries of the world where India was stand at second in area and production of fruit in the world with 5.79

million hectare area and 94.42 million tones production respectively. The productivity in India was much little than Brazil and USA but higher than China. The share of major fruits in the world fruit production has been estimated which shows that, India is the largest producer of mango, papaya and banana. About 41 % of world's mango, followed by papaya and banana contributed about 30 % and 29 % respectively in world's fruit production. The area and production of fruits crops in India were increasing impressively.

Koujalgi and Mundinamani (2012) the focus of the present study was on production, marketing and export performance of Pomegranate in Karnataka. A sample size of 100 farmers and 30 market intermediaries were selected using multistage random sampling to elicit the required information. Field level data were elicited for the agriculture year 2008-09 through personal interview method. For analyzing the data collected during the study, tabular analysis, growth rate analysis, instability analysis, financial feasibility analysis, Markov chain analysis and SWOT analysis were employed. The compound growth rate of pomegranate production showed a significant growth of 2.60 per cent followed by growth in area with 2.29 per cent for Karnataka state. The average yield obtained by sample farmers of Koppal district was 5.11 tons/ha and 4.81 tons/ha in Bagalkot district.

Patil *et al.* (2013) studied growth, instability in area, production and productivity and direction of trade of chilli from India. Compound growth rate analysis, Instability analysis and Markov chain analytical tools were used for the study. The results indicated that the growth in area under chilli was negative, while production showed increasing growth due to increased productivity. The sources of instability in chilli production were found to be change in area variance and change in yield variance.

Singh and Rani (2013) estimated growth rate of area, production and productivity of fruit crops in Jharkhand. Data collected during study period 1990-91 to 2009-10. The study was based on secondary data collected from various sources. For estimating the growth rates of major fruits crops with respect to area, production and productivity, compound growth rate model was selected for further analysis. The study revealed positive growth rate in all selected fruit (litchi, mango, guava and banana) except citrus. It has also been observed that among periods, IVth period

(2005-10) was found to be favorable for litchi, mango and guava particularly, while negative growth rate was found in banana and citrus. The productivity growth rate was also observed to be positive nearly 2.56 percent, 2.56 percent, 1.50 percent and 5.21 percent respectively in litchi, mango, guava and banana. This trend resulted in positive growth in volume of these fruits in the state. The study further revealed that variability in area was highest in litchi (71%) due to shifting in area from other fruit crops in the litchi area followed by mango and banana respectively. Similarly variability in productivity was observed to be high in banana and there was no considerable variation in the yield of other fruit crops.

Hosali *et al.* (2014) the main focus of this paper is to examine how year to year fluctuations in area, production and productivity of Banana crops in Karnataka. Time series secondary data on area, yield and production on Banana for a period of 10 years from 2002-03 to 2011-12 were obtained from the publications of Directorate of Economics and Statistics, Govt. of Karnataka. Cudda-Della Valle method, exponential method and CGR method employed for analyzing growth rate and instability index. The relevant data observed from National Horticulture Board, 2012 shows that the major Banana producing district of Karnataka was stand at fifth place in area (58.13%) followed by Tamil Nadu (97.22%), Maharashtra (87.40%), Andhra Pradesh, Kerala and in case of production of Banana concerned Karnataka stands 4th place of about (1441.07 tones) followed by other states like Maharashtra (5019.45 tones), Tamil Nadu (4621.90), Gujarat (2912.662 tones). In case of productivity, Karnataka placed in fourth of about 24.79 tones/ha. The values in the data showed that the growth rates and instability in area, production and productivity of Banana. In Karnataka growth rate of Banana crops productivity was positive (1.32%) at one per cent level of significance and was associated with high instability index of 70.33 per cent. In the same period a positive growth rate of area was observed (4.82%) with instability index of 10.50 per cent, while a positive growth rate of production (6.21 %) with instability index of 28.13 per cent was observed for production.

Kadli *et al.* (2014) did growth and instability analysis of fruit crops in India. They observed that, in India growth rate of fruit crops productivity was positive (1.05%) and was associated with instability index of 10.16 per cent. In the same period a positive growth rate of area was observed (7.34%) with high instability index

of 10.16 per cent, while a positive growth rate of production (8.48 %) with instability index of 0.10 per cent was observed for production. The average of area, production and productivity of fruit crops during this period were 5084.55 ('000 hectares), 55364.64 ('000 Tones) and 10.83 (Million ton/ha).

Bondar *et al.* (2015) the present study is undertaken with specific objectives, to estimate the trends in area, production and productivity of Banana in Kolhapur District. The data was collected for the period 2003-2004 to 2012-13. The growth rates of area with respect to banana crop in Kolhapur district is increasing with rate of 7.72 per cent per annum which is non-significant. The production of banana in the district increasing with rate of 6.08 per cent per annum which is non-significant and the productivity of banana in the district decreasing with rate of -1.29 per cent per annum which is negative and non-significant because of the production is increase due to increase in area not due to increasing productivity . It is clearly showed that the ACGR of area and production is increases but non- significant. Productivity decreases which are negative and non-significant.

Boyal *et al.* (2015) studied compound growth rates and instability in area, production and productivity of fenugreek crop in selected districts and for the state in India a whole for the period I (1991-92 to 2000- 01), period II (2001-02 to 2010-11) and overall period (1991-92 to 2010-11). Growth rates of area and production in fenugreek was observed positive and significant in Kota and Jhunjhunu districts of period I and overall period. Growth rates of production in fenugreek was found negative in Sikar district during period I and in Kota and Sikar districts during period II due to negative growth in area of fenugreek seed spice.

Gowari and Shanmugam (2015) analyzed the trends in area production and productivity of Banana. A time series data from 1951-2010 were collected. In order to meet the objective of trends in banana area, production and productivity in India, compound growth rate was used. Compound growth rate of banana, area was 1.88 in the year 1951-60 and it increased to 3.78 in the year 1961-70 and decreased to 2.20 in the year 1971-80 and increased to 5.80 in 2001-10. In the same way production of banana also increased from 1.13 in the year 1951-60 to 4.88 in the year 1961-70, and decreased to 3.52 and shown an increasing trend from 1971-80 to 2001-

10. Productivity of banana has shown an increasing trend from -0.75 in the year 1951-60 to 3.77 in the year 2001-10.

Kaur *et al.* (2015) analyzed the trends in area, production and yield of important crops *viz.* Cotton, Castor and Banana of India. A time series data from 2000-01 to 2011-12 (12 years) regarding area, production and yield of these crops were collected. Cotton crop showed an increasing trend in area under crop at both country and state level while slight ups and downs were observed at district level. Production of cotton also showed overall increasing trend at state and district level. Area under Castor crop showed an increasing trend at country level and variations were found at state and district level. Its production also showed instability but on average increase was observed at state and district level. Yield of castor crop also showed variations but on average an increasing trend was observed. Area under banana crop showed variations on at all three levels. Its production showed annual instability at state level but overall decrease at district level.

Landge *et al.* (2016) studied growth rate and instability of area, production and productivity of Banana in India. The secondary data of area, production and productivity of Banana in India were collected from published source database of National Horticulture Board (NHB), Ministry of Agriculture, and Government of India. The data from pertained to the period of 20 years from 1993-94 to 2012-13. The instability in area of Banana in India during study period, the highest instability was observed in period-III (9.96 per cent), followed by period-II (4.10 per cent) and the lowest instability was observed in period-I (3.18 per cent). Area of Banana in India for period-I, II, III, it was positive and significant at 1 per cent level. The highest instability in production was observed in period III (15.39 per cent), followed by period-I (9.51 per cent) and the lowest instability was observed in period II (5.78 per cent). Production of Banana in India for period I, II and III showed positive and significant at 1 per cent level. The instability in productivity of Banana in India during study period, the highest instability was observed in period-III (8.54 per cent) followed by period-I (7.59 per cent) and the lowest instability was observed in period-II (6.29 per cent). Productivity of Banana in India, for period-I, II and III (overall) it was positive and significant at 1 per cent level.

Raman and Umanath (2016) the growth rate and instability of area, production and yield of banana for Tiruchirapalli district and Tamil Nadu were studied. A time series data considered for the study from 1980-81 to 2009-10. Coppock's instability index was used to estimate the variation in area, production and yield. The results of the annual compound growth rate and coppock's instability index were found to be positively significant at one per cent level in area (2.67 %), production (5.02 %) and yield (2.41 %) for Tamil Nadu. In Tiruchirapalli, growth rate of area was found to be negatively significant (-1.67 %) and for production and yield they were non significant. The result revealed that area, production and yield in Tamil Nadu for the period from 1980-81 to 2009-10 indicate stable growth as the coppock's instability index is less than 30 per cent, but in the case of Tiruchirapalli district, growth of area and yield was found to be stable while growth in production was found to be unstable.

Arora and Dhawan (2017) examined the trend of area, production, export and import of different fruits in India. Results reported that, the growth rate found to be 3.18, 4.72 and 1.48 per cent per annum for area, production and productivity of fruits, respectively. The productivity of fruits in India increased from 9.96 MT/Ha to 14.2 MT/Ha during the year 1991-92 to 2014-15. The result showed that, export of fruits increased over the years which is good for the growth of a country but as far as commodities (with low value addition) are concerned, India's volume of imports rate were growing at a much higher rate than the growth rate for exports.

Sharma and Kispotta (2017) the present study was aimed to analyze the trends in area, production and productivity of banana crop in India and in district of Kaushambi in Uttar Pradesh. District Kaushambi is selected purposively because of banana cultivation in large scale and also due to better profitable cash crop. A time series data from 2001-02 to 2013-14 (13years) regarding the area, production and productivity of banana crop in India and to analyze the trends in district of Kaushambi a time series data from 2005-06 to 2010-11 (6 years) regarding the area, production and productivity of banana crop were collected. It is observed that for as many as 3 years the growth rate of India's banana cultivation area has been negative, for 3 years it has been less than 5 per cent and for 1 year, the growth has been registered over 18 per cent. Percent increase in area under banana in the district of Kaushambi is 9.51

from 2005- 08 to 2008-11 but the production has decreased by 26.38% while productivity is increasing as 1.3 %.

Singh *et al.* (2017) studied the trends of area, production and productivity of pineapple in Manipur. The study was based on the secondary data from 2001 to 2011. To analyze the trend of area, production and productivity of pineapple in Manipur, semi log linear functional form was used. Beside these, compound growth rate and instability index was also estimated. The effect of area, production and their interaction towards increasing production were also estimated in the present study. The instability indices for area, production and productivity of pineapple crop in Manipur were positive there by indicating less risk for growing pineapple in the State.

Loganathan (2018) The study was conducted in Sathi, Gobi talukas of Erode district in Tamil Nadu. These talukas are important zones where banana is cultivated in an extensive manner. The data was collected from farmers who cultivated different varieties of banana in Sathi and Gobi talukas. The proportionate random sampling technique was adopted to select the sample size. A sample of 140 farmers was selected from 12 villages of Sathi and Gobi blocks. Personal interview method was followed to collect data from sample farmers. Tamil Nadu and Maharashtra registered a negative growth rate in production and yield that is of - 1.13 and -1.17 per cent per annum respectively, during the period which seems mainly due to the negative growth rate in the yield in these states. Maharashtra and Gujarat recorded the highest growth rate in production of banana that is of 11.54 and 10.98 per cent per annum respectively. The highest growth rate in area of Banana was recorded in Madhya Pradesh and Karnataka of 6.36 and 6.27 per cent per annum respectively. The instability analysis in the area, production and yield of states reported that, the highest instability in the production was recorded in the states of West Bengal (41.24 %), Madhya Pradesh (34.33 %) followed by Gujarat (27.63 %) and the highest instability in the area was recorded in Madhya Pradesh (30.1 %) and Karnataka (22.20 %). This shows that the instability in production in Madhya Pradesh was mainly due to instability in the yield of Banana (18.94 %) in the state which was also the highest growth rate in the overall Banana growing states of India.

Meenakshi (2018) analyzed the trends in area, production and productivity of banana crop in India. The study was based on secondary data collected from Department of Agriculture and Cooperation (Horticulture Division) 2000-01 to 2016-17. For this study compound growth rate (CGR) was used. It is seen from data that, the area of banana cultivation in India increased from 458.5 thousand hectares in the year 2000-2001 to 858.1 thousand hectares in 2016-2017 showing an increasing trend. The production of banana cultivation in India rose from 12899.2 thousand tons in 2000-2001 to 29162.6 thousand tons in 2016-2017. The yield of banana cultivation in India has risen from 28133 Kg. /Hectare in 2000-2001 to 35544 Kg./Hectare in 2016-17. Similarly, the proportion of the area of banana cultivation in India, which is 1.11 per cent in 2000-01, had increased to 1.31 per cent during 2016-17 through the amount of production performance of banana cultivation in India showed an increasing trend and the proportion ranges from 31.08 percent during the year 2000-01 to 44.48 percent during the period 2016-17. Likewise, the ratio of the yield of banana cultivation in India, which is 67.81 per cent in 2000-01, had decreased to 54.21 per cent during 2016-17 respectively. The analysis shows that trend in the area, production and yield of banana cultivation are positive and significant and the growth is increasing at a compounded rate of 3.76 per cent, 4.92 per cent and 1.38 per cent, respectively. The study reveals that the growth of the area, production and yield of horticulture crops and banana in the country was found to be statistically significant.

2.2 To study the export profile of Banana in India

Jadhav (2003) in his paper “Export competitiveness of Indian onion” has studied the export competitiveness of Indian onions with the objectives to estimate the share of import and export of onion from different countries and estimates the normal protection coefficient of different countries. Researcher found that out of the total import (3297329 MT), Europe remains the main import market for onions contributing between 42 to 44 per cent of total world imports. Asia is the next largest import market absorbing 30 to 33 per cent and north Central America absorbing 13 to 14 per cent onions to the total world imports. The major countries of Indian onion importer were, Bangladesh (28.35 per cent), Malaysia (27.22 per cent), Shri Lanka (19.20 per cent), U.A.E. (12.67 per cent) and Mauritius (2.26 per cent) respectively during the year 1999-2002. During the same year the price realized were in France (18.68 per cent), Bramble (11 to 17 per cent), Canada (18 per cent),

Australia (11 to 14 per cent) and Netherlands (15 per cent) respectively. It is suggested that onion export be increased high in per unit price realized countries and increase the share of export lines in France, Bramble, U.K. and Maldives because nominal protection coefficient value is only 0.21 to 0.38.

Jadhav and Kumbhar (2003) in their study on mango export trade and future prospects revealed that among the different products of agriculture origin, mango possessed high potential for expending export trade with a number of countries. They also observed that, the UAE, Saudi Arabia and Bangladesh were the major importer countries of Indian mangoes (18 to 58% share). During last 25 years mango export was increased to the tune of 12 times and coming of foreign exchange was Rs. 68.61 corers. The growth of mango export in quantity and value was 16.85 and 22.92 per cent respectively and it was positively significant at 1 per cent level. The projected export during 2010 was 143.11 thousand metric tons.

Kumar *et al.* (2008) analyzed export trends in cucumber and gherkin products from India. Time-series data (1990-2005) on the export of cucumber and gherkin products for India and world were obtained from FAO Trade Yearbook as well as export statistics of APEDA and Commodity Trade Statistics of UNO. The country-wise share in the world exports of cucumber and gherkin products for the period TE 2005-06 have been shown in data. France, USA, Belgium, Spain and Netherlands have been the major importers of fresh cucumber and gherkin from India and their cumulative share was about 61 per cent of total Indian export of cucumber and gherkin. France has been the single largest importer of fresh cucumber and gherkin from India with a share of 21 per cent, followed by USA (14%), Spain (10.7%), Netherlands (8.5 %) and Belgium (7%), in quantitative terms. France has also been the largest importer of provisionally-preserved cucumber and gherkin during TE 2005-06 from India in value terms with a share of 19.9 per cent, followed by USA (19.39%), Russia (8.61%), Belgium (2.61%) and Spain (1.03%). However in quantitative terms, Russia was the biggest importer of provisionally-preserved cucumber and gherkin, followed by Russia, France, Spain and Belgium. These five countries jointly contributed about 78 per cent share in quantitative terms and 81.5 per cent in value terms of total share of provisionally-preserved cucumber and gherkin export from India. Other important destinations were Estonia, Australia, Netherlands, Canada, Italy and UK.

Yadav *et al.* (2009) in their study of export potential of major fruits examine 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 are negligible that is 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.

Patil and Nirban (2010) studied trends in export of mango from India. Secondary data on country-wise export of mango were obtained from Directorate General of Commerce, Industries and Statistics, Kolkata for period 2000-01 to 2010-11. In order to study the variability in the time series data, coefficient of variation (CV) was used. India's export was concentrated to around 33 countries in the world. Major importing countries were United Arab Emirates and Bangladesh. United Kingdom, Saudi Arabia, Kuwait, Bahrain, Singapore, Qatar, Nepal were the other major importing countries of mango from India. In 2000-01, total export of mango was 44430.00 MT which increased to 63441.00 MT in 2010-11. This indicated that in comparison with 2000-01, export was increased by 19011 M.Ts. in last 12 years. But in these 12 years' period, export to United Arab Emirates had increased by 9204 M.Ts. It means, more than 50 per cent export increased in U.A.E. only. In Bangladesh export in last 12 years had increased by 6565 M.Ts. Total export increased was 15769.00 M.Ts. out of 19011 M.Ts. India must concentrate on other countries to export and also search new countries to export mango as production is on large scale in India.

Kusuma and Basvaraja (2014) studied the computed Compound growth rate (C.G.R.) for grape production, area, yield, and export quantity and export value over the years. The Markov chain analysis was attempted to assess the transition probabilities for the major grape markets. The major export markets for Indian grapes are Bangladesh (35.42 %), Netherlands (21.5%), U.K. (13.85 %), U.A.E. (10.87%) and Germany (3.01 %). The major Indian grape export markets were

categorized as stable markets (Bangladesh, U.A.E, and Netherlands) and unstable markets (Germany, U.K.) based on the magnitude of transition probabilities.

Kusuma and Basvaraja (2014) India is native to mango and is also the largest producer of mangoes with 44.14 per cent of the total world production. The export of fresh mangoes has increased from 35.2 corers in 1991-92 to 162 corers in 2010-11. Paper attempt to quantify the changing structure of Indian mango exports. Data obtained from various published issues of Agricultural Processed Food Product Export Development Authority (APEDA) for analysis was taken for a period of 10 years from 2001-02 to 2010-11. Compound growth rate (CGR) was used for analyzing the growth in mango production, area, yield, and export quantity and export value over the years. The Markov chain analysis was attempted through linear programming method to assess the transition probabilities for the major mango markets. The major export destinies of Indian mangoes were UAE, Bangladesh, Nepal, Saudi Arabia, UK and others have. Export of mango to Nepal recorded a significant and positive growth rate of 33.82 per cent and 32.03 per cent in terms of quantum and value of export but it recorded a negative growth rate of -1.34 per cent in unit value of export. Saudi (-4.18 per cent) and other countries (-5.10 per cent) exhibited negative growth in quantum of export but positive growth in value and unit value of export. UAE, Bangladesh, UK export were having moderate positive growth.

Rekhpriyadharshini (2015) studied the export performance of fresh mango from India. Secondary data were collected from Agricultural Processed food product Export Development Authority (APEDA) and analyzed for period of five years from 2009-2010 to 2013-2014 has been taken for the study. Statistical tools such as percentage analysis and trend analysis were used to analyses the data. The data shows the export value of fresh mangoes to top 10 countries in the year 2013 – 014. The data reveals that export is highest to UAE (30.58 US \$ mill) followed by UK (8.06 US \$ mill), Saudi Arabia (2.15 US \$ mill), Kuwait (1.47 US \$ mill), Qatar (1.15 US \$ mill), US (1.00 US \$ mill), Singapore (0.89 US \$ mill), Bahrain (0.72 US \$ mill), Bangladesh (0.69 US \$ mill) and Nepal (0.57 US \$ mill). There is an increasing trend in the export of fresh mangoes from India. It has increased from 41.53 (US \$ mill) in 2009 - 2010 to 50.55 (US \$ mill) in the year 2013 – 2014. The export value for 2014 – 2015 is estimated to be 53.77 (US \$ mill). It concluded that, growing more

varieties, adopting better farming techniques, and better post-harvest techniques and certification techniques would increase the Indian mango exports to great extent.

Thulasiram and Alagumani (2015) analyzed the export of grapes from India. The study was based on time series data on quantity and value of fresh grapes exports from India. The data were collected from various published documents of National Horticulture Board (NHB) and Agricultural Processed Food Product Export Development Authority (APEDA) for 20 years from 1994-95 to 2013-14. Markov chain analysis was employed to analyse the structural changes in grapes export. Export of fresh grapes from India to the top 5 importing countries Netherland, Bangladesh, Russia, UAE and UK clearly shows that over the ten years from 2004-05 to 2013-14, Indian grapes exports to Netherland has increased gradually to 46136.91 tonnes. For Russia it has increased from 745.81 tonnes to 24503 tonnes and it was low during 2007-08 with around 190 metric tonnes during. Again, it gained momentum from 2010-11 where it has increased by almost 3 times as that of the previous year. Bangladesh imported a minimum of around 30 thousand tonnes every year from 2008-09 to 2013-14. Since Indian grapes were banned in European Countries for the high chemical content from 2009-10 to 2012-13, export has decreased. The export to U.K. and U.A.E. was also showing increasing trend over years. The results of the study revealed that fresh grapes export from India registered significant growth.

Thulasiram and Alagumani (2015) study was based on secondary data. The time series data on export of Indian fresh tomato were collected from various published issues of National Horticulture Board and APEDA for 20 years from 1994-95 to 2013-14. The compound growth rates were estimated for the overall period by using the exponential growth function. India ranks 13 among the major tomato exporting countries. The country has exported nearly 4 lakh tonnes of fresh tomato in 2013-14. The share of export of tomato production was 2.13 per cent in 2013-14 which was only 0.39 during 2010-11. Other products include tomato seeds, preserved tomatoes, juices, ketchups and other sauces. The major export destinations of fresh tomato from India are Pakistan, UAE, Bangladesh, Oman, Nepal and Maldives constituting around 99 per cent. Among these countries, the share of Pakistan was high with 81.60 per cent in 2013-14.

Ingale *et al.* (2016) studied export performance of fruits and vegetables in India. This study was based on secondary data collected for the period 1990-91 to 2004-05. India can be safely referred as the fruits and vegetable basket of the world, being the second largest producer of fruit next only to Brazil and of vegetable next only to China in spite of this its share in the global market is less than one percent indicating vast potential for India to emerge as a major exporter of fruits and vegetables. India's export of fresh fruits and vegetables went up Rs. 4.7 lakh tonnes valued at Rs 385.39 crore in 1993-94 to Rs 64.58 crore in 2001-02. The traditionally exported vegetables have markets mainly in Malaysia, Singapore, the gulf countries, Sri Lanka and Bangladesh, while the non-traditional vegetables have markets mainly in Europe and south East Asia. India is the proud producer of the world's largest and most exotic varieties of fruits including Mango, Banana, Papaya, Orange, Grapes, Apples and Pineapples. But the major share in fruits export is claimed by mangoes only. The UAE, Kuwait, Saudi Arabia and the UK are the importers from India.

Suresh and Mathur (2016) The present study has analyzed the trend in exports of agricultural commodities from India, the changes in the comparative advantage, the export scenario witnessed during the past decade and the prospects for further boosting the agricultural export. There was significant rate of growth of export during the past decade; with wide difference across various commodity groups. The growth was 41.5% in case of guar gum and other resins; 27% in meat and offals; 26.6% in case of meat and meat products; 24-25% in case of sugar and spices and 16.4% in case of cereals. The rate of growth was low in case of fish and marine products, tea and coffee. The differential trend growths have resulted in the changes in the composition of export. The study finds a significant increase in the share of export of cereals from 3.3 to 6.9%, guar gum and other resins (1.0 to 7.5%), cotton (14.1 to 17.3%), spices (2.3 to 3.3%), and sugar (3.9 to 4.3%). On the other hand, the share has declined in some commodities. The notable one being fish and marine products (14.0 to 7.6%), fruits and nuts (6.1 to 3.5%) and coffee and tea (5.4 to 3.5%).

Adhikari *et al.* (2016) The study has examined the growth performance and identified determinants of rice exports from India with special reference to basmati rice during the period 1980-81 to 2012-13. Compound growth rate, instability index and Markov chain analysis, were applied to estimate trend, and instability and the project export to different countries. The data on export quantity and value were

collected from Agricultural Statistical Compendium, and Agricultural Processed Food Product Export Development Authority (APEDA). The major export destinations of Indian rice vary according to variety of rice. Basmati rice is mainly exported to Iran, Saudi Arabia, Kuwait, Iran, UK, USA, UAE and Iraq. The major destinations of Indian basmati rice and their shares that nearly 75 per cent of the total export of basmati rice from India was concentrated in countries like Saudi Arabia, UK, Kuwait, UAE, Iran and Iraq. Among the major importing countries, Iran accounted for the highest share (33.3%) in total export of basmati rice from India, followed by Saudi Arabia (18.85 %), UAE (6.76 %), Kuwait (5.46 %) and Iraq (5.55 %) in the year 2012-13.

Ganesan (2016) analyzed trends in export of Banana from India. The study was based on secondary data. Data was collected from Food and Agriculture Organization (FAO). The data collected during study period from 1995 to 2012. The collected data were systematically analyzed through the semi log transformation model. India has mainly exported Banana to Middle East Asian countries. The total banana exports from India have gone up from 45581 tones in 2011 to 50003 tones in 2012. In 2011, five main importers of Indian banana are UAE (33.2 per cent), Nepal (21.43 per cent), Saudi Arabia (11 per cent), Iran (9.05 per cent) and Kuwait (7.01 per cent). In 2012-13, the share of UAE, Saudi Arabia, Kuwait and Iran declined to 29.6 per cent, 8.81 per cent, 4.44 per cent and 1.58 per cent respectively. Banana exports to Nepal, Oman and Qatar have considerably increased in 2012. A major portion of banana (10.4 per cent) has exported to Pakistan in 2012. It concluded that the share of banana export in total exports and total banana production is quite small. Since India is largest producer of banana in the world, India has a huge potential in banana exports. Producers and exporters should reap these opportunities.

Landge *et al.* (2016) studied export performance of mango and banana from India. The study was based on secondary data. The relevant secondary data for mango and banana with respective quantity and value of export and various export destination countries was collected from the publication of the National Horticulture Board (NHB) and Agricultural and Processed Food Products Export Development Authority (APEDA) for the period 1993-94 to 2012-13. Linear and compound growth rate were computed by the time series data of export of fruits separately for volume and value. The export of mango from India mentioned period was 49879.64 MT and

earning value from 10741.489 lakh per annum and that for banana was 17436.59 MT and 3882.31 lakh per annum respectively. It was found from the study that UAE was the major export destination for both mango and banana.

Kiran and Shuvakumar (2016) studied the direction of trade analysis of Indian grapes. The data on exports of grapes from India collected from APEDA during 2005-06 to 2015-16. Compound Growth rates were calculated to know growth in exports of grapes from India. Destination wise growth rates in export of fresh grapes from India during 2005-06 to 2014-15 are presented. Export of grapes to Russia recorded a significant and positive growth rate of 29.71 per cent and 41.74 per cent in terms of quantum and value of export, followed by others and Netherlands. Bangladesh recorded a negative growth rate of -7.50 per cent in quantum of export. UAE, UK, exports were having moderate positive growth.

Nagarajan and Minakshi (2016) this study is based on Secondary data related to export performance of Areca Nut in India and the World. Data related to the study have been collected from the Annual Reports of Food and Agriculture Organization (FAO), (1997-2014) Rome, Hand Book of National horticulture Board of India (2014), Haryana, Annual Reports (1997-2014) of Directorate of Areca nut and Species Board, Calicut. The period covered is from 1997-98 to 2014-15. In order to study the various objectives and make inferences, statistical tool of analyses like percentage, annual growth rate, mean, standard deviation and co-efficient variation are used in the study. Not only our neighboring SAARC countries but also Middle East and other Muslim countries have become an assured destination for the value-added areca nut products. Demand for these products has been fast increasing globally, especially among the people of Indian / Asian origin. Export of areca nut products from India has almost triple in a span of 20 years since 1991. India's export currently reaches to more than 40 countries in the world. During 2009-10 India exported nearly 1750 tones of areca nut in the forms of splits nuts (13%), whole nuts (37 %) and value added forms like scented Supari (50%). Major destinations of these items are Malaysia, Maldives, UAE, Nepal, UK, Sri Lanka, South Africa, Canada and Kenya. Interestingly, the demand is increasing gradually in the developed world also including USA, UK, Canada, Australia, Thailand, Singapore and France, that too for the products such as Ghutka and Panmasala. The panmasala and scented supari are exported to countries like UAE, Afghanistan, Canada, Mexico, Saudi Arabia,

Singapore, UK and the like. The UAE has been major market for Indian panmasala, accounts for 50 per cent of export from India in recent years. The UK, Canada, Saudi Arabia and USA stand next to UAE in import of Indian panmasala.

Narasalagi and Shivshankar (2017) studied the export profile of fruits and vegetables in India. During the study period (2015-17) data were collected from Directorate General of Commercial Intelligence and Statistics (GCIS) annual report. The countries where India's export market share is higher for fresh fruits and vegetables are, in terms of quantity and value, the country has exported highest fruits and vegetables to Bangladesh. Malaysia, United Arab Emirates (UAE), Sri Lanka, Nepal and Indonesia stands next in order. The export was very less to Saudi Arabia, Qatar and Kuwait. The commodity-wise analysis shows that the neighboring countries where maximum share of India's fruits and vegetables are exported. One of our major trading partners for exports of fresh fruits is Bangladesh. The maximum share of exports of apple, grapes, litchi, mango and oranges go to Bangladesh. In vegetables the maximum shares of onion and tomato exports go to Bangladesh. Among Vegetables, Brinjal has found the market in UK, Saudi Arabia, the Netherlands and France, with 63.4 percent share of total Brinjal exports going to UK. Among our neighboring countries, Nepal receives bulk of India's exports of cauliflower, potatoes, banana, citrus fruits other than orange and lemon. UAE imports more than 60 per cent of India's exports of papaya, Pineapple, Sapota, Lemon and Pumpkins. Other major exporting countries for India for fresh fruits and vegetables are Malaysia, Singapore and Saudi Arabia.

Landge and Ingale (2018) Banana is the second most important fruit in India next to mango. The study was based on secondary data collected from APEDA. The data pertained to the period of twenty year that is from 1993-94 to 2012-13. The major importing countries of banana from India during the study period are UAE (29.53%), Nepal (20.91%), Saudi Arabia (12.52%), Baharain (7.52%), and Kuwait (6.54%). The linear growth rate of export of banana from India during the study period was positive and significant in UAE, Nepal, Saudi Arabia, Baharain and Kuwait. The compound growth rates during the overall study period were positive and significant. The export earning of banana from India (in terms of value) during the overall period was positive and significant.

Nayak and Singh (2018) studied export performance of Banana in India. This study was mainly based on secondary data collected from Agricultural Processed Food Product Export Development Authority (APEDA) for overall period of twelve years (2005-06 to 2016-17). For this study linear trend projection technique was used. The major export destinations of Indian banana are Nepal, UAE, Iran, Oman, Kuwait, Saudi Arab, Bahrain, Qatar and Maldives. Total banana export in the year 2016-17 was about 110871.87 tones with the total export value of 38,852 lacks in rupees. It was also evident from the data that, in terms of quantity, Nepal (24.72 %) was the major importer followed by UAE (21.98 %) and Iran (14.29 %). In terms of value of total banana exported, UAE holds the top position (30.62 per cent of the total export value) followed by Iran (14.17 %) and Oman (11.89 %). The export earning of banana from India (in terms of quantity and value) during the overall period was positive and significant.

2.3 To estimate growth and instability in export of Banana from India

Patil and Deshmukh (1992) studied the performance of India's fresh fruit export for the period 1976-89. The mango, grape, oranges and banana were selected for the study. The study revealed that, mango, grape and oranges exhibited an increasing trend, while banana had shown decreasing trend in case of both volume and value of export. On an average per ton FOB price fetched for mango, orange, grape and banana was Rs. 10962, Rs. 2333, Rs. 10616 and Rs. 2316 respectively. Hence, more emphasis should be given on export of mango and grape. The share of mango, orange, grape, banana in a total export of fresh fruits worked out to 14.87, 2.05, 2.20 and 0.11 per cent, respectively while, in monetary term it was Rs. 12.01, Rs. 1.66, Rs. 1.76 and Rs. 0.11 corers, respectively.

Dorge *et al.* (1997) studied horticultural export trade status and future prospects. They depicted that, out of total export during 1992 maximum was imported by gulf countries. Annual compound growth rates were positive and highly significant. Maximum growth rate was found for grapes (23.88 per cent) followed by oranges (20.53 per cent), mango (15.85 per cent). In terms of value, significant difference was not observed in the growth rates for mango (21.92 per cent), grape (23.81 per cent) and oranges (23.70 per cent). They had estimated the export of mangoes (42.60), grapes (17.59), and orange (9.58) in thousand metric tonnes for the year 2001. They further concluded that, though India is the second largest producer of

fruits and vegetables, the export of the same are suffering from scanty and limited infrastructure.

Murthy and Subrahmanyam (1999) in his paper “Growth and Instability in Exports of onion from India.”, has analyzed export of onion from 1980-81 to 1994-95. The data for six major countries importing Indian onion consisting of Malaysia, Singapore, Sri Lanka, UAE, Saudi Arabia and Bangladesh was analyzed with the help of Markov Chain Model. The study revealed that, UAE and Malaysia, are major importers of Indian fresh onion together accounting for 7 per cent of export share. The expected shares of UAE based on the Markov Chain Model for different years, was almost nearer to the observed values for most of the years indicating the validity of the fitted model. The export of fresh onion from India is likely to increase to 5.06 lakhs tons during 2004-05. Malaysia and UAE continue to be the major importers of Indian onion in next decade. But, it is expected that UAE is likely to have lesser share at 24.07 per cent during 2004-05, about eight per cent decrease in share compared to 1994-95. While Malaysia and Singapore are likely to sustain the same level of their shares during 2004-05 which is 24 and 12 per cent, respectively. Sri Lanka is predicted to increase its share gradually to 14.35 per cent during 2004-05. It is expected that Bangladesh is most likely to increase its present share of 2.85 per cent to 9.10 per cent in 2004-05.

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 two periods period-I, covering 1956-57 to 1970-71 and period-II, covering 1971-72 to 1998-99. It was observed that the growth rate of area, production, productivity of kernel export, raw cashew import, cashew nut shell liquid value and cashew nut shell liquid-unit value of export was showing positive trend but the cashew nut shell liquid quantity exported showed negative growth and it was non-significant.

Goyal *et al.* (2000) in their study titled India’s agricultural exports growth and instability use export values of various agricultural commodities from 1970-1998. The data was collected from FAO Trade Year Book, Economic Survey of India etc. The study uses compound growth rates and instability indices. It finds out

that, that there is a decline of agricultural exports in the composition of total exports of India and commodities like tea and meat, cashew kernels, spices and coffee were the dominant exportable items during 1970's but their share had declined later on. During the 90's marine products, oil cakes, rice, fruits etc., were found to have potential for export earnings. The share of our agricultural export in world exports although is very low but is increasing over the years competing with other countries. The study reveals that the prospects of increasing agricultural exports have improved after the liberalization.

Singh *et al.* (2003) studied the prospects of agricultural exports of India using composite index approach. The study is based on the analysis of 46 major agricultural products. The commodities are selected on the basis of their total share in the world export (greater than or equal to one). The study uses the time series data of export value and export quantum from 1980 to 2001 obtained from Food and Agriculture Organization (FAO) website. The findings of the study reveal that - coffee (green), coffee extract, groundnuts, shelled milled paddy, rice, pepper, potatoes have bright prospects, bananas, beef and veal, buffalo meat, cake of rape seed, cotton waste, ghee from cow milk, hen eggs, infant food, lentils, oil of castor beans, oranges, sesame seed, tobacco leaves and walnuts shelled have also been visualized to have positive prospects. The study suggests that there is a need to formulate long term policies for reaping the benefits of liberalization and globalization.

Talathi *et al.* (2003) in their study on variability in mango exports and export competitiveness, revealed that, export of fresh mango from India at overall level, the simple growth rate increased significantly (Rs. 29020.16 thousand) at current prices and at constant prices (Rs. 5573.48 thousand). There were upward and downward swings in the exports of mango (both for volume and value) which indicated instability in quantum and earnings from fresh mango export. Variability in mango export indicated that, the coefficient of variation was more at an overall level for almost all the items of export by quantum and value. There was maximum variability in other mango processed products (79.46%), followed by pulp (36.36%), fresh mango (34.10%), and mango pickle and chutney (29. 11%).

Mekonnen (2003) analyzed the growth and instability in production and export of fresh fruits in India from 1974 to 1998. The result shows that the pre

liberalization period mango was the major export crop both in export quantity and value (36% and 57% respectively) followed by citrus.

Jyothi *et al.* (2004) has studied “Export performance of onion and potato from India- An economic analysis”. In this study an attempt was made to ascertain the export performance of onion and potato in India, during the period 1970-71 to 1999-2000. They evaluated the performance of onion and potato exports from India with respect to quantity, value and unit value of exports by using an exponential growth model. During the overall period (1970-71 to 1999-2000) the quantity of onion and potato exports from India registered a positive and significant growth rate of 6.27 per cent per annum. Export earnings and unit value realization exhibited significant positive growth rates of 16.70 per cent, 12.28 per cent and 9.74 per cent and 7.45 per cent for onion and potato respectively during the same period. They used the coefficient of variation around the trend rather than the coefficient of variation around the mean to measure the instability and found that during 1970-71 to 1999-2000 the coefficient of variation for quantity of onion and potato exports was 29.86 per cent and 102.13 per cent respectively where as in export earnings and per unit value of exports, the same was 45.95 per cent, 124.22 per cent and 28.52 per cent, 38.74 per cent, respectively. The results indicated that in both onion and potato the unit value of exports were found to be stable when compared to the quantity and export earnings. With the help of coppock’s Instability Index they found the instability index during 1970-71 to 1999-2000 for the quantity of onion and potato exports was highest with 57.86 and 231.19 whereas index for unit value and export earnings of the same was 25.83, 57.95 and 55.87,141.03 respectively.

Vaishali (2010) studied performance of Indian agriculture exports among SAARC countries. The study revealed that, the compound growth rate of export quantity of Mango was 58.17 percent and onion was 55.43 per cent for the period 1991-92 to 2008-09. The compound growth rate of export value during overall study period (1991-92 to 2008 – 09) for mango was 69.25 per cent and for onion 152.72 per cent. The compound growth rate of export of mango and onion to the overall SAARC is significant.

Patil (2011) studied the growth in export of selected fruits and vegetables from India. The compound growth rate of export quantity of Mango to

Oman was 10.53 per cent in the study period (1993-94 to 2009-10). For Grapes it was 26.12 per cent, pomegranate it was 42.11 per cent and Sapota it was 4.3 per cent for the same period. The compound growth rate of export value of Mango to Oman was 17.42 per cent in the study period (1993-94 to 2009-10). For Grapes it was 32.46 per cent, pomegranate it was 35.95 per cent and Sapota it was 7.14 per cent for the same period. The compound growth rate of export quantity of mango, grapes, and pomegranate to Oman was significant while export of sapota was not significant. The Compound growth rate of export quantity of Onion to Bahrain was 14.24 per cent in the study period (1993-94 to 2009 10). For Potato it was 33.69 per cent, Peas it was 19.32per cent and Green chilli it was 58.36 per cent for the same period. The compound growth rate of export value of Onion to Bahrain was 19.33 per cent in the study period (1993-94 to 2009-10). For Potato it was 35.26 per cent, Peas it was 27.63 per cent and Green chilli it was 66.20 per cent for the same period. The compound growth rate of export value of onion, potato, peas and green chilli to Bahrain was significant.

Patil *et al.* (2013) examined the status, growth and instability in the spice export over period of time (1979-80 to 2006-07 and from 2010-13) and also study has an attempt to examine the various export management practices under taken by the government in order to promote the quality export. During period 1979-80 to 2006-07, the compound growth rate for export of chilli (22.44% and 7.29%) in term of quantity and value was found to be increasing.

Rajkumar and Dadhich (2013) studies show year to year fluctuations happens in export of agricultural and non-agricultural commodities from India. The study was based on secondary data collected from Directorate General of Commercial Intelligence and Statistics (DGCIS) government of India for the period 1991-92 to 2010-11. Share of agricultural exports in GDP originated from agriculture sector rose from 2.4 per cent in 1991-92 to 6.1 per cent in 1997-98. Later in next two years there was a decline to 5.7 per cent, thereafter, it gradually increased from 6.4 per cent in 2000-01 to 14 per cent in 2007-08. The share of nonagricultural commodities export in national GDP increased from 3.3 per cent in 1991-92, to 16.9 per cent in 2009-10, whereas the agricultural export increased to 1.9 per cent during 18 years from 1991-92 to 2009-10. Data shows that the share of agricultural exports in the total exports was 17.9 per cent in 1991-92, which has increased to nearly 3 per cent by the year

1996-97, there after the share was continuously declining and it reduced to 9.9 per cent in 2005-06. Between the year 2005-06 and 2007-08 there was an increase of 2.3 per cent. With a fall in 2008-09 to 10.2 per cent it has seen a growth of 0.4 per cent in 2009-10. However, the share of agricultural exports in India's overall exports has been declining from 17.9 percent in 1991-92 to 10.5 percent in 2010-11. Contribution of Indian agricultural export to the total export of India in 2010-11 stood at 10.5 per cent. There is an increase in the volume of agricultural export from 3130.08 million USD in 1991-92 to 16753.23 in 2009-10.

Rather *et al.* (2013) studied production and export of fresh and dry fruits in Jammu Kashmir state. Secondary data was obtained from government official records, department of horticulture, magazines, journals and other active related agencies of the department of horticulture in the state, for the period from 2003-04 to 2010-11. The total production of fruits under horticulture is increasing every year particularly production of apple and walnut however, there is no significant growth in the export of outside the state. The export of dry fruit *viz.* almond and walnut during 2007-08, was 688.11 metric tons comprising of 197.11 metric tons of almond, 6692 metric tons of walnuts. The figure mentioned in data shows that during 2003-04, the total export of fresh and dry fruits outside the state was 7.76 lakh metric tons in which the relative share of fresh fruits was 7.63 lakh metric tons and relative share of dry fruit was 0.13 lakh metric tons however, this figure has been reached to 8.66 lakh metric tons during 2010-11, in which the relative share of fresh fruit was 8.51 lakh metric tons while, as relative share of dry fruit was 0.51 lakh metric tons. In absolute terms the share of fresh fruits in total export of state has shown a considerable progress as compared to export of dry fruits. The data mentioned edicts that the growth rate of export of total fruits has been showing upward and downward movement during the overall period. During 2004-05, the growth rate of export was 7.47 percent and during 2010-11, the growth rate of export was negative (-9.50 percent) which has marginally decreased and it was significantly very low as compared to earlier period (2004-05). However, during the overall period the average growth rate of total exports was 2.88 percent.

Mokashi *et al.* (2014) conducted a study to assess the growth and instability in export of grapes. The result showed that, the grapes exports during pre-WTO period, registered a significantly positive growth with less instability index in terms of export quantity, value and unit price realized as against comparatively less growth rate with the higher instability index during post-WTO period. Quantum of fresh grapes exported to Bangladesh, Germany, Netherlands and Saudi Arabia were increasing positively in association with high instability indices.

Balyan *et al.* (2015) studied the dynamics of Indian fresh mango export. Most of the countries registered negative/insignificant growth rate but exemplary growth rate for Bangladesh. In addition, the instability index also increased for eight out of ten countries under consideration by exemplary higher overall instability (20.8%) observed in case of Bangladesh and Bahrain compared to pre-WTO period (20.8%).

Kuthe and More (2015) studied export performance of other processed fruits and vegetables from India. The study estimated mean, compound growth rate, instability and diversification. The average quantity of processed fruits and vegetables exported to these countries were 16857.50, 11939.12, 9777.27, 8963.45 and 7052.52 MT, respectively during the study period. Similar trend was observed in respect of value realization.

Thulasiram and Alagumani (2015) Banana is one of the important fruit crop in India contributing 27.82 per cent of the total world production. The export of fresh banana from India has increased from Rs.89.56 lakhs in 1994-95 to Rs.156.93 lakhs in 2013-14. Paper made an attempt to quantify the growth and instability in export of banana from India. For the study purpose data for a period of 20 years from 1994-95 to 2013-14 was collected. The Compound growth rate and Coppock's Instability Index was worked out. The result shows that, banana exports registered positive growth and instability has declined in recent years. The growth of export to major importing countries recorded a double digit positive growth rate in terms of quantity.

Ingale *et al.* (2016) studied performance and prospects of horticulture produce in India. The study was based on secondary data collected for the period 1990-91 to 2004-05 of total export. The growth analysis was carried out using linear

and exponential trend equations. The volume of export of apple increased significantly at the compound growth rate 9.95 per cent per annum and export of banana increased significantly in linear trend by 17.59 per cent per annum, while growth in export of grape was 7.98 per cent which was significant. The trend in export of mango was positive and significant. In case of orange the growth was at the rate of 14.33 per cent per annum. In case of papaya growth in export was 27.04 per cent and pineapple exhibited significant increasing trend @ 20.58 per cent. In case of export growth of volume in pea, potato and tomato were 133.95, 81.91 and 35.94 per cent annum respectively. Export of flowers during the study period was positive and significant. Bangladesh was found to be major market importing about 83 per cent of Indian apple. The country UAE alone had imported 32.63 per cent share of the total banana exported from India. In case of grape export, UK, Bangladesh, Netherlands and UAE were the major importers during post WTO period. The Major export of mango was 57.43 per cent towards developing countries and it was 277.66 per cent towards less developed countries. In case of orange export during post WTO period was confined to Sri Lanka i.e. 0.29 per cent and UK 0.25 per cent. The highest growth in export of papaya from India to the Saudi Arabia was 34.16 per cent followed by UAE 26.98 per cent. The pineapple was exported to UAE that is 59.90 per cent share during study period. Thus there is great scope for export of fruits, vegetable and flowers to earn the valuable foreign exchange.

Qammer and Baba (2016) examined the growth, instability and determinants of Indian walnut export using time series data. There has been a significant expansion in area under walnut at an annual growth rate of 1.70 per cent and this coupled with growth in yield levels has led to the increase in its production. It has been found that, India's export constituted only 2.73 per cent of the global export of shelled walnut in 2012, while it has a meager share in export of walnut with shell. It was observed that the largest importer of Indian shelled walnut, is United Kingdom followed by Egypt, Germany, Spain, and Netherlands. The Indian walnut export as equivalent has significantly increased between 1979 and 2012, though it has shown some swings in 2000. The export of shelled walnut (kernel) has significantly increased between 1979 and 2012, at an annual growth rate of about 3 per cent.

Ushunde *et al.* (2016) India has exported banana mainly to U.A.E., Nepal, Saudi Arabia, Bahrain and Kuwait. However, the two major countries that import most of India's banana are UAE and Saudi Arabia. Export of banana, which was 1086 tons during the year 1992-93, increased to 54004 tons by 2012-13. The compound growth rates for export quantity and export value of banana for the period 1992-1993 were 26.64 and 23.46 per cent per annum respectively. However, only export value was statistically significant. The respective values for the second period (2006-2013) were lower than those of first period at 17.87 per cent for export quantity and 16.61 per cent for export value. Both export quantity and export values were statistically significant. The growth rates for overall period (1993-2013) showed that the growth rate of export quantity and export values were 26.59 and 29.81 per cent respectively and these growth rates were statistically significant. The growth rate of per unit value realized during the overall period (1993-2013) was 2.64 per cent, but it was statistically non significant.

Bhala and Sudakar (2017) studied the composition of India's agricultural export during the period (2003-04 to 2012-13) under analysis. Compound growth rate of different export products has been worked out by fitting exponential function by using the least square method. The exports of all commodity groups have registered an increase in value terms. However, there was a change in the composition of export characterized by an increase in the share of meat (and meat products), cereals, spices, sugar, oilseeds, cotton and guar gum and a decline in the share of the fish (and fish products), vegetables, fruits and some traditional export commodities like tea and coffee. In the total export of US\$ 30 billion in 2012-13, the major items of export were cotton (17.3%), cereals (16.4%), fish and marine products (7.6%) and meat (6.9%). All the commodity groups have registered significant positive growth rates. One notable commodity has been meat and meat products which have registered a growth rate of 27.6% with a low instability at 4.8%. This was mainly due to the growth in export of buffalo meat which account for close to 80% of total meat exported. Another significant sector is marine fish and fish products which has registered a growth rate of 8 per cent per year. The marine products' export is facing a slowdown in recent periods, mainly on account of reduced demand in European and United States market. Further, there has been stagnation in marine fish production in recent years. Other significant commodity groups in terms of growth performance are

spices and cereals. Among non-food crops, cotton and natural gums/resins have registered significant export growth. Cotton has traditionally contributed to Indian foreign exchange earnings through textile export. Such a raise in export contributed by productivity improvement through research and development activities. In case of cotton, the production advantage brought about by Bt cotton technology helped India to achieve higher export levels.

Narasalagi and Shivshankar (2017) studied growth and instability in export of fruits and vegetables from India. The study was based on secondary data collected from loksabha unstarred questions (11.08.2015) for the period 2012 to 2015. The quantity and value of exports of fresh fruits from India to the world, the quantity increased by more than four times in the last 15 years and the value of exports by 10 times. The major fruits exported in terms of quantity are mango (53.5 thousand tones), grapes (38.9 thousand tones), orange (31.5 thousand tones), apple (23.2 thousand tones), banana (12.8 thousand tones), other citrus fruits (11.4 thousand tones) and lemon (10.5 thousand tones). In value terms, grapes and mango exports earn the maximum foreign exchange for India. Among Vegetables, onion and potato are the most important ones among the fresh vegetables, both in terms of quantity exported and value. Tomato and pumpkin are also among our major fresh vegetables exported to the world but their volume is very low. Brinjal had recently been added to the export list. Result revealed that positive and significant growth rate in terms of quantity and value of exports.

Suvagiya *et al.* (2017) the study is concerned with the export promotion of pomegranate from India. The study examines compound growth rate of export of pomegranate from India from 1987-88 to 2009-10. The study revealed that the total quantity of pomegranate exported from India showed a significant and positive compound growth rate for all the three periods. The highest growth was observed during pre-WTO period (42.33 %) followed by overall period (20.61%) and post-WTO period (20.52%). As far as the value of export was concerned, highest growth was observed during the pre-WTO period with 50.84 per cent followed by post-WTO period (28.09%) and overall period (27.86%). Also the study examines variation in export of pomegranate from India. It can be observed from the results that the coefficient of variation value (82.84%) was higher in terms of quantity during post-WTO period compared to pre-WTO period (73.51%). Similarly, in terms of

value, the coefficient of variation value was again higher in post-WTO period (100.56%) as compared to pre-WTO period (82.30%). The coefficient of variation value for overall period was relatively higher than pre and post-WTO periods both in terms of quantity and value with 113.43 and 138.60 per cent, respectively.

Meena *et al.* (2018) the study was based on primary as well as secondary data collected from various sources for the period 1996-97 to 2013-14. Researcher has used Policy Analysis Matrix (PAM) approach to measure export of commodity. Results showed that, India's share in world groundnut market has improved substantially in post WTO period from 11% in 1995 to 30% in 2013-14. Groundnut export registered more instability because it depends on many market and non-market factors. However, instability in export from India decreased to almost one-fourth, from 90% during 1996-97 to 2003-04 to 25% during 2004-05 to 2013-14. India's share in global export has been increasing since 2003-04 reaching to 42% in 2011-12. Between 1996-97 and 2013-14 groundnut export from India has increased by 5 and 14 times in quantity and value term, respectively. It confirms the increasing preference for Indian groundnut in the world market. Further, export instability in quantity as well as value terms declined to half from during 1996-97 to 2003-04. This establishes the tremendous performance by Indian groundnut from 2005-06 and onward.

Nayak and Singh (2018) the export growth in quantity, value and price term of Banana was estimated for the period of twelve years that is 2005-06 to 2016-17. The results reported that, 18.53 per cent and 26.40 per cent of growth in banana export achieved in quantity and value, respectively. The growth rate of unit value realized from Banana export for overall period was 6.64 per cent. The results clearly indicate that the export performance of banana is good. The instability indices were constructed for quantity and value of Banana exports. The instability in total quantity and value of banana export during the overall period was 60.24 per cent and as 83.74 per cent respectively. The unit value of Banana export was found to be low that is 40.70 per cent during the study period. The results of instability index clearly showed that, price instability is low. Hence, it is expected that the export would increase without much variation in future. The results on growth and instability of Banana export revealed that the Banana export from India registered a significant growth in

terms of quantity exported (18.54%) and its value (26.40%). However, the variation in value of export (83%) was greater as compared to quantity (60%).

Meenakshi (2018) analyzed the export performance of Banana from India for period of 2000-01 to 2016-17. The data were collected from Indian Horticulture Database (2017). The data explains the export of banana from India during study period. It has increased considerably from 9475.620 million tons in 2006-07 to 110,871.87 million tons in 2016-17. The value of export has also increased significantly from Rs. 1,606.78 lakhs in 2006-07 to Rs. 38,852.57 lakhs in 2016-17. The export of Indian banana rose from 9475.620 million tons in 2006-07 to 57,539.29 million tons in 2010-11. The export of Indian banana increased to 45,573.24 million tons in 2011-12 to 110871.87 million tons in 2016-17. In 2008-09, the export quantity of Indian banana rose to 54,319 million tons and the value of Rs. 57,539 lakh from 1,662 million tonnes and Rs. 30,401 lakh in 2007-08. The banana export in India has declined to 45.5 thousand million tons in 2009-10 from 54.3 thousand million tons due to the failure of monsoon and the scarcity of water resource. Considering the share of export value in the overall banana cultivation, it could be observed that the share of the export quantity of banana increased from 16.96 per cent in 2006-07 increased to 35.04 per cent in 2016-17 showing the predominance of the export quantity of banana production in the share of export value of banana in India.

Geetha and Srivastavas (2019) examined the growth, instability, trade direction, potential and determinants of maize exports from India from the period 1981 to 2016. Compound Annual Growth Rate, Cuddy-Della Valle method, Markov Chain analysis, Revealed Comparative Advantage Index and Regression analysis were used in the study. The growth of export quantity and export value in pre WTO has found to be non significant, while unit value had negative growth. In post WTO period, the export quantity, value and unit value grew significantly at the rate of 38.74, 42.12 and 2.43 per cent per annum, respectively.

2.4 To study the direction of trade and changing export pattern of Banana in India

Veena *et al.* (1994) studied changing direction of Indian coffee export. The structural changes in India coffee export was analyzed through first order Markov

chain model. There are seven major countries importing Indian coffee. They are U.S.A., Germany, U.S.S.R., Italy, Netherlands, Yugoslavia and other. To estimate the transitional probability matrix P., Indian coffee annual export data for the period 1965 to 2000 were used. The data revealed that Indian export markets which have been stable are U.S.S.R. has indeed been a growing market for Indian coffee. The high retention to this market is further reinforced by the high probability of transfer from the U.S.A. (0.7724) and Germany (0.4960); however, there are small probabilities of loss to Italy (0.1496) and others (0.0281). Other importer also have a fairly high retention of 0.5059 and high transfer probability of 0.4941 to the U.S.A. They have gained from the U.S.S.R.'s share by (0.0281). Germany has a moderate probability of retention of 0.3152 which is reinforced by the very high probability transfer from the Netherlands (1.0). But there is a strong tendency to lose its share to the U.S.S.R. (0.4960) and the Netherlands (.1314). The U.S.A., Italy Netherlands and Yugoslavia are not the stable market for Indian coffee. The USA has lost its share to the tune of 0.7724 to the U.S.S.R., 0.1161 to the Netherlands and 0.1115 to Yugoslavia. It has gained all of Yugoslavia's and Italy's market share (1.00) and 0.4941 of others. India's coffee export to Italy exhibit a tendency to shift to the U.S.A., at the same time it has gained market shares of Germany and the U.S.S.R. to the tune of 0.0574 and 0.1496 respectively.

Verma and Singh (2004) The direction of banana exported from India to different countries during a period of three years 2005-06 to 2007-08 was studied. The data collect from Agricultural Processed food product Export Development Authority (APEDA). The data reflects that the total export of banana to different countries increased during the period 2005-06 to 2007-08 with a slowdown in 2006-07. The major portion of banana goes to UAE followed by Nepal. Although, Nepal imported the largest volume of banana from India in 2005-06, it came to the second position in the rest two years. In the same way there was a decreasing trend in export of banana to the United Kingdom and others, whereas, Bangladesh showed slight increase in 2007-08. Contrarily, there was an increase in export to the countries of the Middle East namely- UAE, Saudi Arabia, Bahrain, Kuwait, Qatar, Oman and Maldives. Result revealed that UAE and Nepal are stable market of banana export and Kuwait, Bangladesh are unstable market for banana export.

Masal (2010) studied export of banana from Pune area of Maharashtra. The researcher has estimated direction of trade and changing pattern of banana export from India. For this purpose, time series data on quantity and value of banana export from the period from 2001-02 to 2008-09 were collected from Directorate General of Commercial Intelligence and Statistics (DGCIS) for export data in terms trade and changing pattern of banana export was studied by applying transitional probability matrix. This matrix was estimated through linear programme technique. Result revealed that India retained its share proportion to UAE during the study period. The other share of UAE market was directed to Saudi Arabia and Nepal. India's previous banana export to Saudi Arabia was retained to tune of 3.82 percent only. The other share of Saudi Arabia market was directed to other countries and Kuwait.

Angles *et al.* (2011) the transitional probability, depicts a broad idea of change in the direction of trade of Indian turmeric. The five major countries which imported Indian turmeric were: UAE, USA, UK, Ireland and Japan. The export to remaining countries was pooled under the category of other countries. It was seen that USA was not a stable importer of Indian turmeric even though the quantity imported by USA was higher. The USA would lose its share of 42.28 per cent to the UAE, 25.88 per cent share to Japan and 24.87 per cent share to other countries, even though USA gained considerable share from Japan(83.89 %). In future, its share may be reduced from the total turmeric traded from India. The countries such as China give a stiff competition to India in turmeric trade. The UK was found to be one of the stable importers of Indian turmeric because it retained its original share of around 35.20 per cent over the period. It lost its major share of 32.77 per cent to Iran and 25.60 per cent to UAE.

Yeledhalli *et al.* (2012) studies the changing direction and magnitude of India's major export to Middle East countries. The present study was undertaken on a macro framework based on secondary data on various aspects of international trade among Middle East countries. Many agricultural commodities are commonly exported from India to Middle East countries. The yearly data on export in quantity and value have been compiled for the period of 18 years (1993-94 to 2009-10). U.A.E. has most stable market fruits such as mango, grapes, pomegranate and sapota as reflected by high retention probabilities among the Middle East countries.

Sivasankari and Rajesh (2014) studied export of black paper in India. The researchers has estimated direction of trade and changing export pattern of Black paper from India. For this purpose, time series data on quantity and value of black paper export for the period from 1970-71 to 2011-12 was collected from the official websites of Spices Board, Kochi (India), Indian Institute of Spice Research, Kozhikode (India) and Directorate of Economics and Statistics, New Delhi. Markov chain analysis was applied to study the direction of trade by estimating the transitional probability matrices. Result revealed that India retained its share proportion to USA during the study period. The other share of USA market was directed to Germany and UK. India's previous black paper export to Germany was retained to tune of 56.63 per cent. The other share of Germany market was directed to other countries and Canada.

Bishat *et al.* (2015) Transitional probability matrix using the Markov chain framework was used to examine the direction of trade of banana to different importing countries during the period 2006-07 to 2011-12. It was evident from researcher that, Bahrain, Iran and UAE retained a share of 3.59 per cent, 0.26 per cent and 2.59 per cent respectively. Bahrain lost its share of 32.33 per cent to UAE and Iran each, 4.79 per cent to Kuwait and 26.95 per cent to other countries and gained share of 95.95 per cent from Iran and 4.82 per cent from other countries. UAE lost its share to Saudi Arabia (50.48%) and Kuwait (46.93%) while it gained a share of 32.34 per cent from Bahrain, 12.21 per cent from Saudi Arabia and 1.19 per cent from Iran. Iran lost its share to Bahrain, Kuwait, UAE and other countries and gained share from Bahrain and Kuwait. Saudi Arabia lost its share completely to Kuwait, UAE and other countries and gained from UAE and other countries. Kuwait also lost its complete share to Iran and other countries while gained from Saudi Arabia, UAE, Bahrain, Iran and other countries. It concluded that, Bahrain, Iran and UAE were stable market for banana. Therefore it was suggested that the attention should be focused on the market requirement and specifications of those stable markets.

Arvinda Kumar *et al.* (2015) the direction of Cashew trade was assessed using the Markov chain analysis for the period from 1997 to 2011. The study utilized the secondary data gathered from the various publications *viz.*, Cashew Board, Directorate General of Commercial Intelligence and Statistics (DGCIS), indiastate.com, APEDA.com, The Cashew Journal, etc. Major importing countries of the Indian Cashew consisted of USA, Netherland, UAE, UK, Japan and the remaining

tiny countries importing smaller quantity of Cashew are pooled under other countries category. Data revealed that, during over all period the UK was the most stable importers of Indian Cashew as it retained 100 per cent of its original share over the years. It gained major share from Netherlands (4.08%), followed by USA (2.03%). USA was also one of the stable importers of Indian Cashew as it retained 71.52 per cent of its original share over the years. It lost 2.36 per cent of its share to Netherland and 7.65 per cent to UAE by gaining 53.16 per cent from other countries. Japan was another stable importer of Indian Cashew (51.61%) and it gained major share from USA (2.84%) and lost 48.38 per cent to other countries. Other countries were succeeded to retain sizeable share in Cashew imports (9.43%) and were gained mostly from Netherland (95.92%) and from USA (13.57%). Netherland and UAE were having probability retention of zero indicating that these two countries were unstable importer of Indian cashew kernel.

Thulasiram and Alagumani (2015) in this paper an attempt was made to quantify the changing pattern of Indian banana export. The data for a period of 20 years 1994-95 to 2013-14 was collected. The Markov chain analysis was attempted through linear programming method to assess the transition probabilities for the major banana markets. The major Indian banana export markets were categorized as stable market (Oman, U.A.E and Saudi Arabia) and unstable markets (Kuwait and Baharain) based on the magnitude of transition probabilities matrix P. It was found that Oman and U.A.E are loyal markets for Indian banana in future. The share of importing countries clearly shows that the Indian banana markets are confined to neighboring countries and hence efforts are needed to device suitable strategies to increase the export to these countries.

Suvagiya *et al.* (2017) studied export of pomegranate from India; overall period comprises the triennium average data for the period 1987-88 to 2009-10. The transitional probability matrix was worked out using the triennium averages for the data of the above said period. It is observed from the data that other countries and UAE were the stable importers of Indian pomegranate as reflected in high probability of retention at 0.84420 and 0.69624, respectively. Saudi Arabia and Bahrain were able to retain their share only to the extent of 11.35 per cent and 2.10 per cent, respectively. On the contrary, UK and Bangladesh were having a probability of retention of zero indicating that they were the unstable importers of Indian

pomegranate during the overall period. The other countries and UAE showed stability in the import of Indian pomegranate during the overall period by gaining its share from UAE (0.08387) and U.K (0.83788). Similarly UAE gained from Bangladesh, Saudi Arabia, UK and other countries with transfer probability of 0.63219 from Bangladesh, 0.16849 from Saudi Arabia, 0.16212 from UK and 0.10253 from other countries that is, the probability that UAE would gain in the export share of Indian pomegranate during overall period was at the cost of Bangladesh, Saudi Arabia, UK and other countries. On the other hand UK and Bangladesh which had zero probability of retention would likely to gain from some major countries i.e., UK from UAE (0.10806) and Bangladesh from Saudi Arabia (0.53846).

Mohandas *et al.* (2018) The study analyzed the performance of export of vegetables from India using the data on export of vegetables derived from the World Integrated Trade Solution (WITS) and Agricultural and Processed Food Products Export Development Authority (APEDA), India for the period from 1988 to 2016. Markov Chain analysis was used to identify the major and consistent markets for vegetables exported from India. The most stable markets for onion and shallots were identified as Nepal, Singapore and Kuwait with retention probability values of 0.7898, 0.6364 and 0.6350 respectively. This means that the probabilities that Nepal, Singapore and Kuwait would retain their export share of onions and shallots from India from one year to next year were 79 per cent, 64 per cent and 63 per cent respectively. In case of dried onions and tomatoes, the most stable export markets were Belgium and Pakistan which would retain their export share from one year to the next year with probabilities of 60 and 80 percent respectively. The stable markets identified for potatoes were Mauritius and Oman with probability values of 0.972 and 0.919 respectively. United Arab Emirates (0.8109), Sri Lanka (0.8104) and Bangladesh (0.8556) were the stable export markets identified for dried leguminous vegetables, dried lentils and garlic respectively. The probability that the countries UAE, Sri Lanka and Bangladesh would retain their export share from one year to the next year was 81 per cent for both dried leguminous vegetables and dried lentils and 86 per cent for garlic, respectively.

Patil *et al.* (2018) studied export of mango from India. The researchers has estimated direction of trade and changing export pattern of mango from India. Time series data on quantity and value of mango export for the period from 2004-05

to 2014-15 were collected from Agricultural Processed food product Export Development Authority (APEDA) .Changing export pattern of mango was studied by applying transitional probability matrix. Result revealed that, India retained its share proportion to Bangladesh during study period. The other of Bangladesh market was directed to UAE and Saudi Arabia. India's previous mango export to UAE was retained to 51.73 percent. The other share of UAE was directed to other countries and Bahrain.

Thulasiram *et al.* (2018) the direction of trade of cocoa exports are presented. The top seven major importing countries were taken for the analysis while the rest of the countries as other countries. The data on quantity of cocoa exported to various countries from 2004-05 to 2013-14 was taken from various published issues of Agricultural Processed food product Export Development Authority (APEDA) for the analysis. As indicated by diagonal element of 0.4760, China was found to be highly loyal market for cocoa from India. In other words, this market retained about 48 per cent of the share of the previous period. China market share was absorbed by U.S.A. (19.73 per cent) and Turkey (11.07 per cent). However, China gained 65.61 per cent share of UAE and 18.04 per cent of Saudi Arabia. As evident from data, the probability matrix indicated that cocoa exports to Indonesia, U.S.A and U.A.E could not be retained by India with zero per cent retention. Indonesia and Saudi Arabia had retained Nepal's share.



Methodology



CHAPTER III

METHODOLOGY

The research methodology and design of the study is an important component of research. To analyze various objectives of the study an appropriate methodology describing study area, data collection, analytical tools and techniques are important. This chapter discusses the methodology adopted in present study. The chapter is presented under the following headings.

- 1.1 Study area
- 1.2 Nature and source of data.
- 1.3 Period of study
- 1.4 Analysis of data
- 1.5 Analytical tools and techniques

1.1 Study Area.

The study area pertains to the country as a whole in general. Growth rate and instability in area, production, productivity, export and direction of trade were studied for the country as a whole.

1.2 Nature and Source of Data

1.2.1 Selection of commodity

Many Agricultural commodities are commonly exported from India to other countries. It includes cereals, fruits and vegetables, livestock products such as milk and milk products, meat products etc. Banana was purposively selected for the present study in view of its importance among fruit crops in India. India is one of the largest producer as well as exporters of banana in the world and occupies the first position in terms of total area and production under banana cultivation.

1.2.2 Data Collection

The nature of data for study is mainly based on secondary sources. The time series data were obtained for 22 years from the year 1996-97 to 2017-18. The data on export quantity and value were collected from Directorate General of Commercial Intelligence and Statistics (DGCIS), Government of India, Food and

Agriculture Organization (FAO), National Horticulture Board (NHB), Agricultural Processed Food Product Export Development Authority (APEDA). Similarly, area, production and productivity of banana were collected from Indiastat website. The export data of banana was collected for HS code of 0803. The details of this code are as follows

08039010- Fresh banana

06039000 – Banana leaf

21069099 – Banana chips

08030000- Banana including plantains, fresh/dried

08031090- Other plantain

08039090- Other bananas excluding plantain

1.3 Period of study:

The secondary data was collected for latest twenty-two years period i.e. from 1996-97 to 2017-18. For the purpose of comparison, the period of study was divided into different periods:

Period-I: 1996-97 to 2006-07

Period-II: 2007-08 to 2017-18

Overall Period: 1996-97 to 2017-18

1.4 Analysis of data

The data so compiled were processed using statistical and analytical tools for arriving at desired conclusions. From the list of banana importers from India, top 11 countries, which were major and regular importers, were identified and remaining countries were grouped as unspecified countries. Thus, for top 11 countries trend analysis was carried out. The list of top 11 banana importers is given below.

- | | |
|------------------------------|-----------------------------------|
| i. United Arab Emirate (UAE) | ix. United State of America (USA) |
| ii. Nepal | x. Iran |
| iii. Saudi Arab | xi. Other |
| iv. Baharain IS | |
| v. Kuwait | |
| vi. Oman | |
| vii. Qatar | |
| viii. Maldives | |

1.5 Analytical tools and techniques :

According to the objectives the following different analytical tools and techniques were used in the study.

- 1.5.1** Tabular analysis
- 1.5.2** Growth analysis
- 1.5.3** Instability analysis
- 1.5.4** Diversification Index
- 1.5.5** Markov-chain analysis

1.5.1 Tabular analysis

For meaningful interpretation of data, appropriate percentages and averages were worked out and presented in the form of Tables.

1.5.2 Growth analysis

To examine the growth in area, production, productivity and export of banana from India, compound growth rate (CGR) was computed based on its fit using non-linear models, especially the exponential model. Conventionally, the compound growth rate were estimated after the converting the growth model to semi-log form and estimated through Ordinary Least Square (OLS) technique assuming multiplicative errors term. However, there are several problems associated with this technique including the difficulty in estimating standard error of estimates of original

parameters. Hence, a non-linear estimation technique for solving exponential model assuming additive error terms was used to estimate compound growth rate by using exponential growth function as given below:

$$Y^t = \text{constant} * (1 + \text{CGR})^t + E_t \quad (1)$$

Where,

Y^t = time series data for area/ Production/ Productivity / export quantity / export value for year t

t = Time trends for years of interest

E_t = error terms

CGR is compound growth rate for the period under consideration.

The Marquardt algorithm was used to parameters of equation. The significance of regression coefficient will be tested by applying standard 't' test procedure.

1.5.3 Instability analysis

Cuddy-Della Valle Instability Index was used to estimate the instability in area, production, yield and export of banana data. This index is modification of coefficient of variation (CV) to accommodate for trend which is commonly present in time series economic data. It is superior over other scale dependent measure such as Standard Deviation or Root mean Square of the residuals (RMSE) obtained from the fitted trend lines of raw data and hence suitable for cross comparison. The Cuddy-Della Instability Index calculated as follows:

$$I_x = CV \sqrt{1 - R^2}$$

Where,

CV = coefficient of variation (σ/x)

R^2 = adjusted coefficient of multiple determination

Where, ever trend in time series data is non- significant, instability of that particular was analyzed with the help of conventional statistical tool of instability i.e. coefficient of variation. The coefficient of variation was calculated by using formula,

$$CV (\%) = \frac{\text{Standard deviation (a)}}{\text{Mean (x)}} \times 100$$

1.5.4 Diversification Index

However, literature has shown various methods used to measure level and degree of diversification but for the present empirical examination, Barry's index and Theil's Entropy index were used.

$$\text{Berry's index of Diversification (BID)} = 1 - \sum_{i=1}^n P_{it}^2$$

$$P_{it} = \frac{A_{it}}{\sum_{i=1}^n A_{it}}$$

Where,

P_{it} = share contribution of ith sub-sector to the main sector at time 't'

A_{it} = ith Export value ith sub-sector at time 't'

$\sum_{i=1}^n A_{it}$ = Export value of cotton sector at time 't'

The value of Barry's index varies between zero and one. It is one (1) in case of perfect diversification and zero in case of perfect specialization.

1.5.5 Markov chain analysis

The trade directions of export were analyzed using the first order Markov chain approach. Central to Markov chain analysis is the estimation of the transitional probability matrix P_{ij} . The elements P_{ij} of the matrix P indicates the probability that export will switch from i^{th} country to j^{th} country with the passage of time (Dent, 1967; Lee *et.al* 1970; Gillet, 1976). The diagonal elements of the matrix measure the probability that the export share of a country will be retained. Hence, an examination of the diagonal elements indicates the preference of an importing country to a particular country's exports. In the context of the current application, structural changes were treated as a random process with selected importing countries. The

average exports to a particular country was considered to be a random variable which depends only on the past exports to that country, which can be denoted algebraically as

$$E_{jt} = \sum_{i=1}^r E_{it-1} \times P_{ij} + e_{jt}$$

Where,

E_{jt} = Exports from India to j^{th} country during the year t .

E_{it-1} = Exports from India to i^{th} country during the period $t-1$.

P_{ij} = Probability that the exports will shift from i^{th} country to j^{th} country.

e_{jt} = The error term which is statistically independent of E_{it-1} .

t = Number of years considered for the analysis

r = Number of importing countries

The transitional probabilities P_{ij} which can be arranged in a $(c \times r)$ matrix have the following properties.

$$0 \leq P_{ij} \leq 1$$

$$\sum_{j=1}^r P_{ij} = 1 \text{ for all } i$$

Thus, the expected export shares of each country during period “ t ” were obtained by multiplying the export to these countries in the previous period ($t-1$) with the transitional probability matrix.

1.5.5.1 Estimation of the P_{ij}

In the present study, Minimum Absolute Deviations (MAD) estimation procedure was employed to estimate the transitional probability, which minimizes the sum of absolute deviations (Fisher, 1967; Wagner, 1959). The conventional linear programming technique was used, as this satisfies the properties of transitional probabilities of non-negativity restrictions and row sum constraints in estimation.

The linear programming formulation is stated as

$$\text{Min } OP^* + Ie$$

Subject to,

$$XP^* + V = Y$$

$$GP^* = 1$$

$$P^*e \geq 0$$

Where,

0 = vector of zeroes.

P^* = vector in which probability P_{ij} are arranged.

I = appropriate dimensioned column vector of units.

e = vector of absolute error ($|U|$).

Y = vector of export to each country.

X = block diagonal matrix of lagged values of Y

V = vector of errors

G = grouping matrix to add the row elements of P as arranged in P^* to unity.

After calculating the transitional probability matrix, the expected shares of export were calculated by

$$Y_{jt} = \sum_{j=1}^r y_{it-1} \times P_{ij} \quad (j=1,2,3\dots r)$$

Where,

Y_{jt} = Predicted proportions of j^{th} country's share at time 't'.

Y_{t-1} = Observed proportion of i^{th} country share at time 't-1'.

P_{ij} = Estimated transitional probability matrix.

This analysis was done with the help of Excel oncl Lingo 18.0 software available at the department.

A decorative graphic on the left side of the page. It features a vertical green scroll that curves at the top and bottom. At the bottom of this scroll is a cluster of green leaves and two red hibiscus flowers. A horizontal green scroll extends to the right from the bottom of the floral cluster.

*Results and
Discussion*

CHAPTER- IV

RESULT AND DISCUSSION

The present investigation had been undertaken with a view to study “Export performance Banana in India”. This chapter deals with general information regarding export, growth, instability and export performance of banana, direction of trend and changing export pattern of Banana. For the study, data were analyzed for a period 1996-97 to 2017-18 (22 year) and the major findings of this study are presented in this chapter.

4.1 Growth in Area, Production and Yield of banana in India

4.2 Instability in area, production and yield of banana in India

4.3 Export profile of banana from India.

4.4 Growth and Instability of banana exports from India

4.5 Direction of trade and changing export pattern of banana

4.1 Growth in Area, Production and Yield of Banana in India

The growth in area, production and yield of banana was estimated by using compound growth rates (CGR) as illustrated in methodology chapter. The compound growth rate of area, production and yield of banana during period from 1996-97 to 2017-18 were calculated and presented in the Table 4.1.

Mean, compound growth rate (CGR), standard error (SE) and ‘t’ value were given for area, production and productivity of banana in India. Total area under banana cultivation in India is 613.63 thousand ha, total production was 11786.20 thousand MT and total yield obtained was 32.09 MT/Ha. Compound growth rate for area was 4.478 percent, 5.673 percent for production and 1.475 percent for yield obtained under banana which recorded statistically positive and significant compound growth rate at one per cent level. Table 4.1 showed that, compound growth rate of production was maximum followed by area and yield of banana in the country. The enhancement in production of banana was mainly due to area expansion followed by yield improvement in the country during the study period.

Table 4.1: Growth in Area, Production and Yield of Banana in India

Particulars	Area	Production	Yield
Mean	613.63	20581.05	32.09
CGR	4.478**	5.673**	1.475**
SE	0.4318	0.4976	0.1887
“t” Value	10.37	11.40	7.82

Note: Area in “000”ha; Production in ‘000’MT and Yield in MT/Ha.

** Significant at one per cent level of significance.

Fig.4.1. indicates the growth in area, production and productivity of banana in India from the period 1996-97 to 2017-18. The graph indicates that there is fluctuation in data point of area, production and yield of banana. The graph shows that yield has less fluctuation as compared to area and production. The graph shows that the productivity of banana lies between 23 to 37 tons per ha.

Fig.4.2. indicates that growth in area of banana significantly increased over the past 22 years i.e. (1996- 2017).The graph indicate that area of banana steady increases from 2003 to 2010 then increases but slow rate. It can also be seen that the graph is not a smooth line but has lots of fluctuations indicating that area of banana is increases and decreases but steady increase in above mentioned period.

Fig. 4.3. Shows that growth in production of banana from the period 1996-97 to 2017-18. The production line indicate that there is a tremendous fluctuations in production of banana from period the 1996-97 to 2004-05.

Fig 4.4 indicates that the growth in yield of banana from period 1996-97 to 2017-18. The line shows that there are fluctuations in yield of banana. From the period 1996 to 2018 the yield of banana lies between 23 to 37 MT/ ha. The increase in yield is mainly due to the new improved varieties especially Grand-9 imported from Israel and adoption of integrated nutrient, pest, disease management practices. This slow growth in productivity of Banana may be due to poor management practices used by producers.

4.2 Instability in area, production and yield of Banana in India

Instability in area, production and yield of banana in India was estimated and reported in Table 4.2. The purpose of this objective was study the

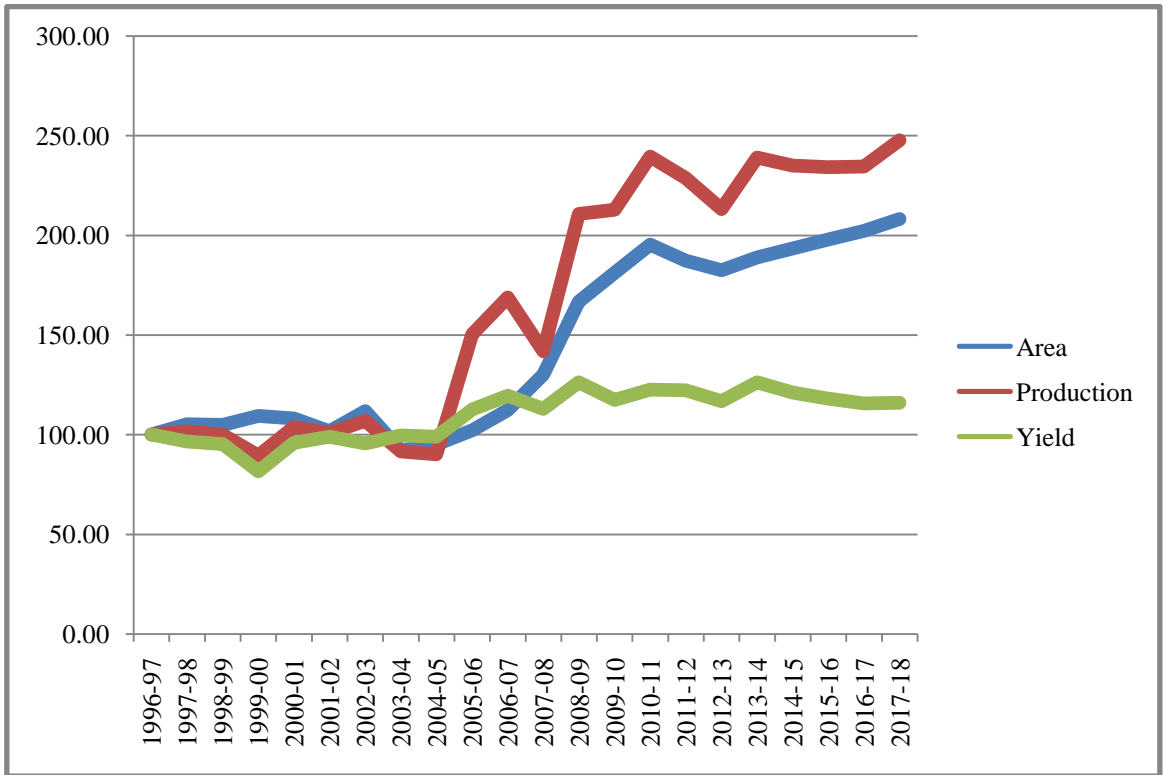


Fig.4.1. Time Sequence plot of Area, Production and Yield of Banana in India

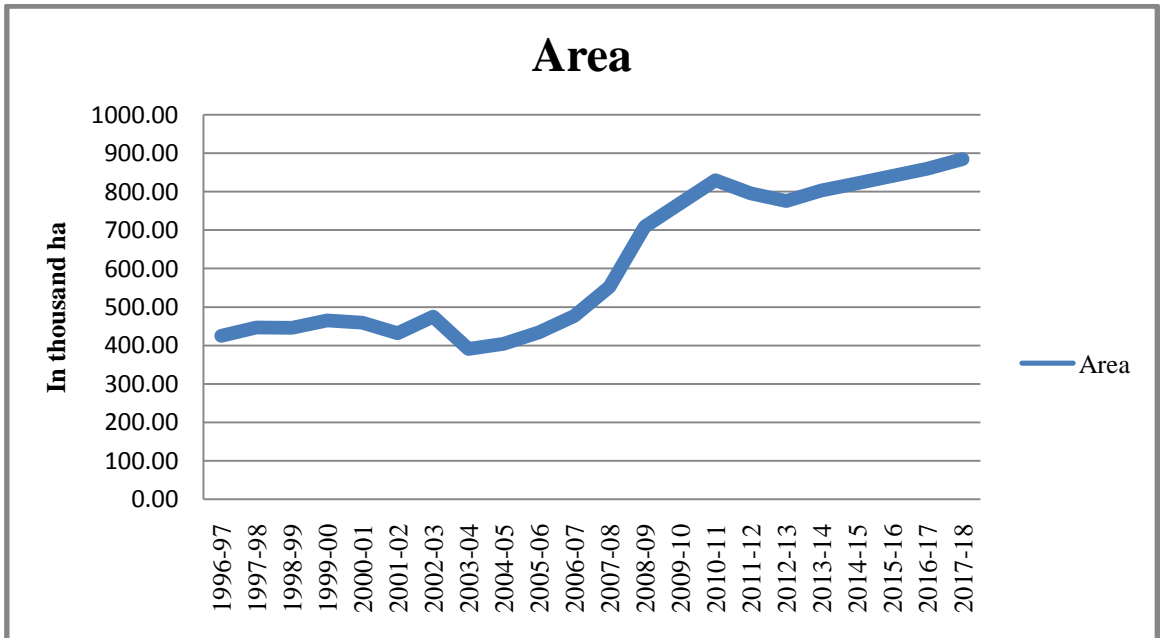


Fig.4.2. Time Sequence plot of Area of Banana in India

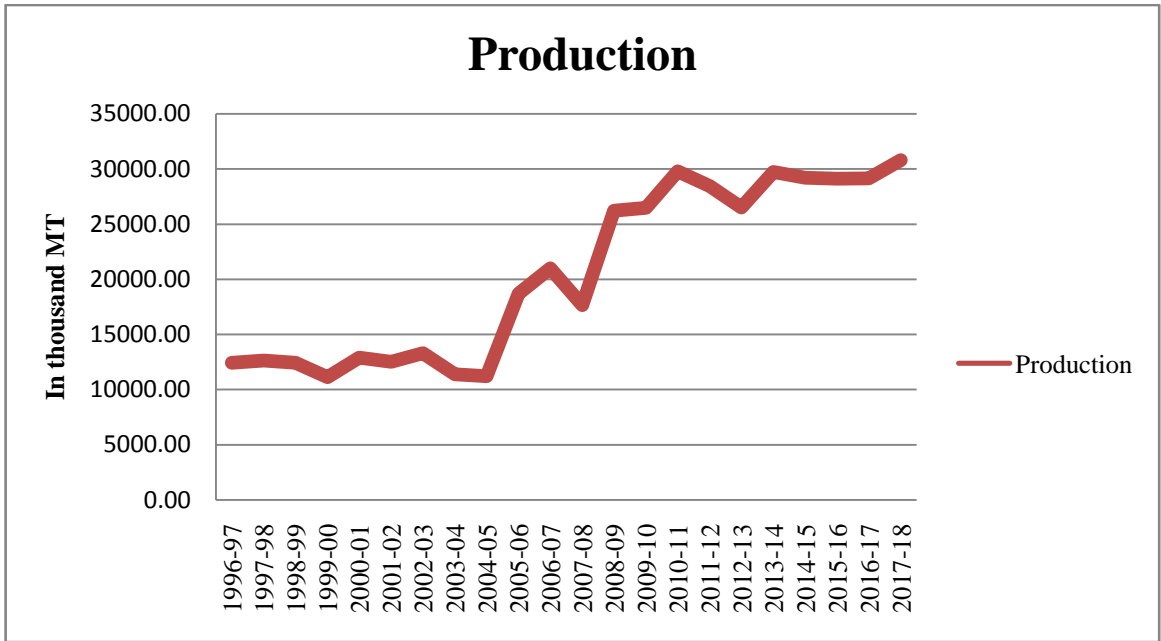


Fig.4.3. Time Sequence plot of Production of Banana in India

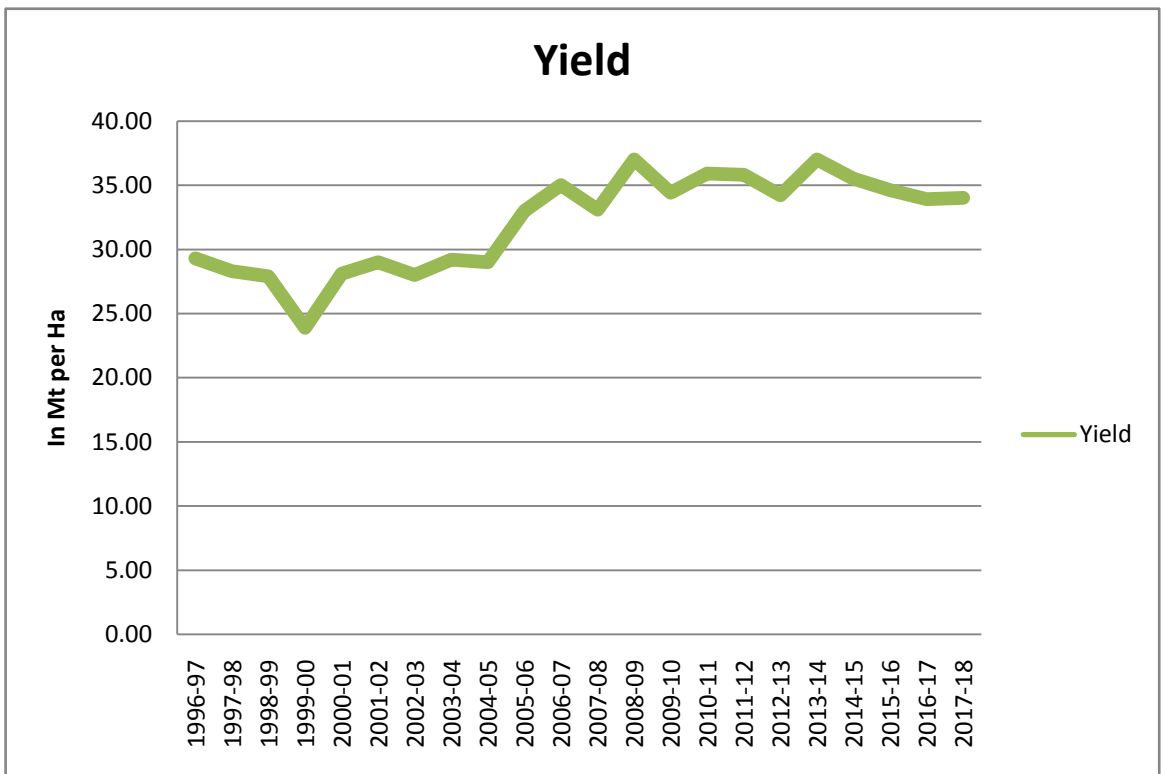


Fig 4.4 Time Sequence plot of Yield of Banana in India

instability in area, production and yield of banana in India. Instability will explain the irregular fluctuations in area, production and yield during the study period.

To estimate the instability in area, production and yield of banana coefficient of variation and Cuddy- Della Valle instability index was used. In table (4.2) Coefficient of Variation of area was found to be 0.306 and Cuddy- Della Valle instability Index was 0.132. The coefficient of variation of banana production and yield were 0.382 and 0.115 respectively. Cuddy- Della Valle instability index for production and yield were 0.149 per cent and 0.069 per cent respectively. The results revealed that, highest instability was recorded in production series as compared to area and yield of banana during the study period. Instability in area and yield of banana was low whereas instability in production of banana was moderate. Results of Nayak and Singh (2018) observed that instability in area, production and productivity of banana was low to moderate which indicate some stability.

Table 4.2: Instability in Area, Production and Yield of Banana in India

Particulars	Area	Production	Yield
CV	0.306	0.382	0.115
CDI	0.132	0.149	0.069

4.3 Export profile of Banana from India

In terms of quantity from India:

India ranks first in area (15 per cent), production (29 per cent) of Banana in the world. India is exporting banana to 43 countries of the world and its proportion to total production is much lower as banana is regarded one of the important aspects of fruits consumption in domestic markets with conformity of result Verma and Singh (2004). The most of Indian banana is exported to West Asia, even though UK and France consume Indian banana. For suitability of study we can select only major 10 countries and remaining specified as other. The major banana importing countries selected on the basis of quantity and per cent share of banana import from India. For this purpose data should be selected from 1996-97 to 2017-18 i.e. post WTO period.

It is observed from the Table (4.3) that, India has exported on an average 37722.89 thousand MT of banana per year to more than 40 countries in the world. Out of the total quantity, maximum i.e. (24.88 per cent) banana was exported

to UAE, followed by Nepal (21.69 per cent), Iran (11.13 per cent), Saudi Arab (10.80 per cent), Oman (7.81 per cent), Kuwait (6.21 per cent), Baharain (4.46 per cent), Qatar (3.91per cent), Maldives (1.57 per cent), USA (0.34 per cent) and other countries i.e. (7.20 per cent). UAE, Nepal, Iran, Saudi Arab, Oman, Kuwait and Baharain were remained the major importer of Indian banana during the last 22 years.

Table No. 4.3: Major Banana Importing countries from India in Value terms (In quantity) from India.

Sr.No	Name of the Country	Qty	Per Cent
1	USA	128.61	0.34
2	Maldives	591.89	1.57
3	Qatar	1474.87	3.91
4	Baharain	1681.34	4.46
5	Kuwait	2344.37	6.21
6	Other	2717.43	7.20
7	Oman	2946.87	7.81
8	Saudi Arab	4072.97	10.80
9	Iran	4197.40	11.13
10	Nepal	8180.74	21.69
11	UAE	9386.40	24.88
12	Total	37722.89	100.00

Note: Quantity in thousands

Figure 4.5 shows that, out of 10 destination of Indian banana export, UAE, Nepal and Saudi Arab were top major banana importing countries followed by Iran, Oman, Kuwait, Baharain, Qatar, Maldives, USA and other countries. UAE imported (24.88 per cent) i.e. 9386.40 thousand MT, Nepal (21.69 per cent) i.e. 8180.74 thousand MT, Saudi Arab (10.80 per cent) i.e. 4072.97 thousand MT followed by Iran (11.13 per cent), Oman (7.81 per cent), Kuwait (6.21 per cent), Baharain (4.46 per cent), Qatar (3.91 per cent), Maldives (1.57 per cent), USA (0.34 per cent) and other (7.20 per cent)

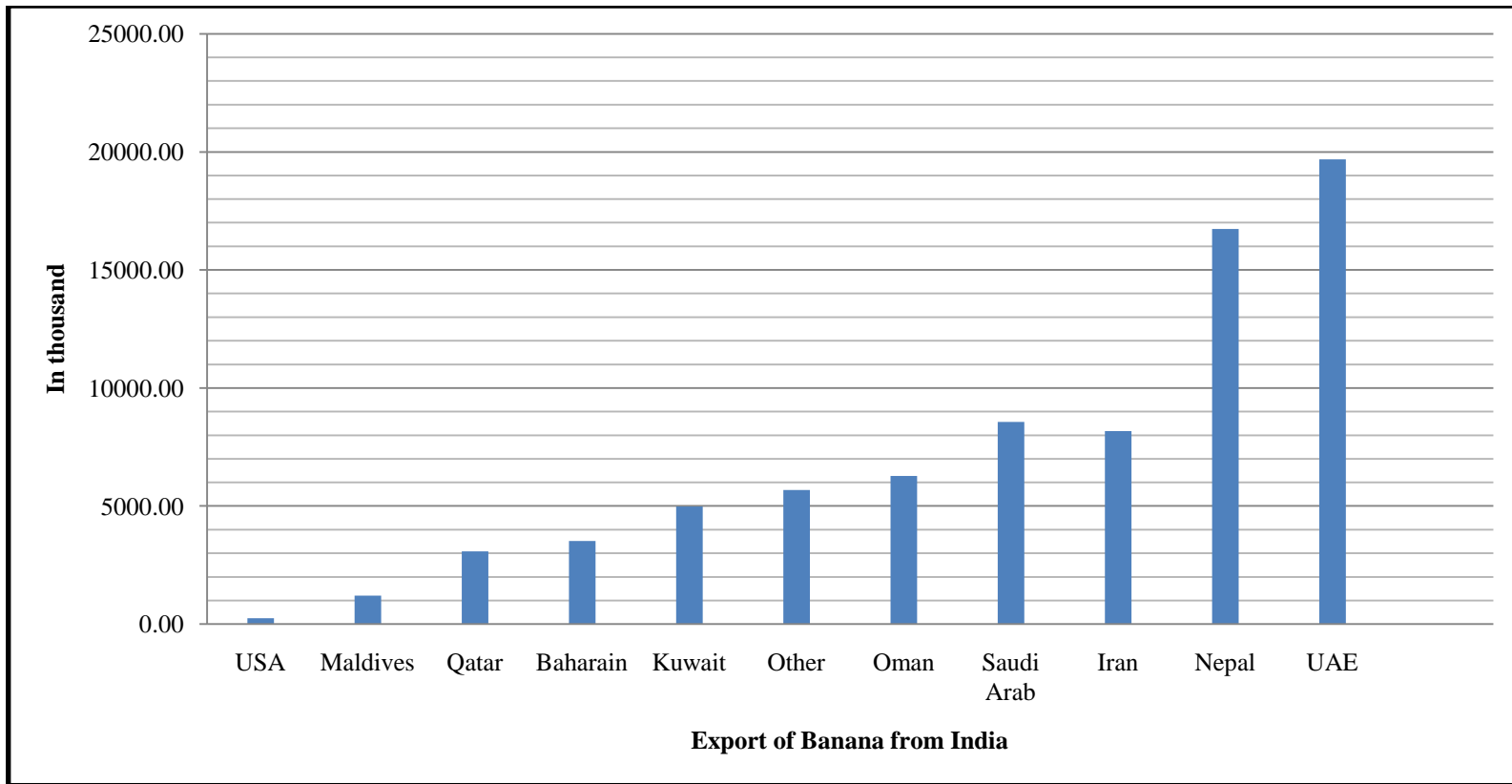


Fig. 4.5 Export of Banana to various countries from India during study period in quantity

In term of Value (rupees) from India:

The major banana importing countries from India in Value terms (In rupees) are represented in Table 4.4. It is observed from the table that, India has exported on an average 10348.61 lacks rupees of banana per year to more than 40 countries in the world. Out of the total value, maximum i.e. 33.02 per cent banana was exported to UAE followed by Saudi Arab (14.68), Iran (12.57), Oman (9.53 per cent), Kuwait (8.24 per cent), Nepal (6.30 per cent), Qatar (5.81 per cent), Baharain (4.42 per cent), Maldives (1.34 per cent), USA (0.32 per cent) and all other countries (3.76 per cent). UAE, Saudi Arab, Iran, Oman, Kuwait were remained the major importers of Indian banana during last 22 years measured in terms of Indian rupees.

Table No. 4.4: Major Banana Importing countries from India in Value terms (In Indian rupees) from India.

Sr. No.	Name of the Country	Value in Rupees	Per cent
1	USA	33.22	0.32
2	Maldives	138.47	1.34
3	Other	389.57	3.76
4	Baharain	457.91	4.42
5	Qatar	601.11	5.81
6	Nepal	652.01	6.30
7	Kuwait	852.88	8.24
8	Oman	986.32	9.53
9	Iran	1301.17	12.57
10	Saudi Arab	1518.98	14.68
11	UAE	3416.97	33.02
12	Total	10348.61	100.00

Figure 4.6 shows the total value earn in terms of rupees from export of banana. Out of ten destination of Indian banana export, UAE, Saudi Arab, Iran, Oman and Kuwait were top major banana importing countries followed by Nepal, Qatar, Baharain, Maldives, USA and other countries. UAE contribute (33.02 per cent) followed by Saudi Arab (14.68), Iran (12.57), Oman (9.53 per cent), Kuwait (8.24 per cent), Nepal (6.30 per cent), Qatar (5.81 per cent), Baharain (4.42 per cent), Maldives (1.34 per cent), USA (0.32 per cent) and all other countries (3.76 per cent).

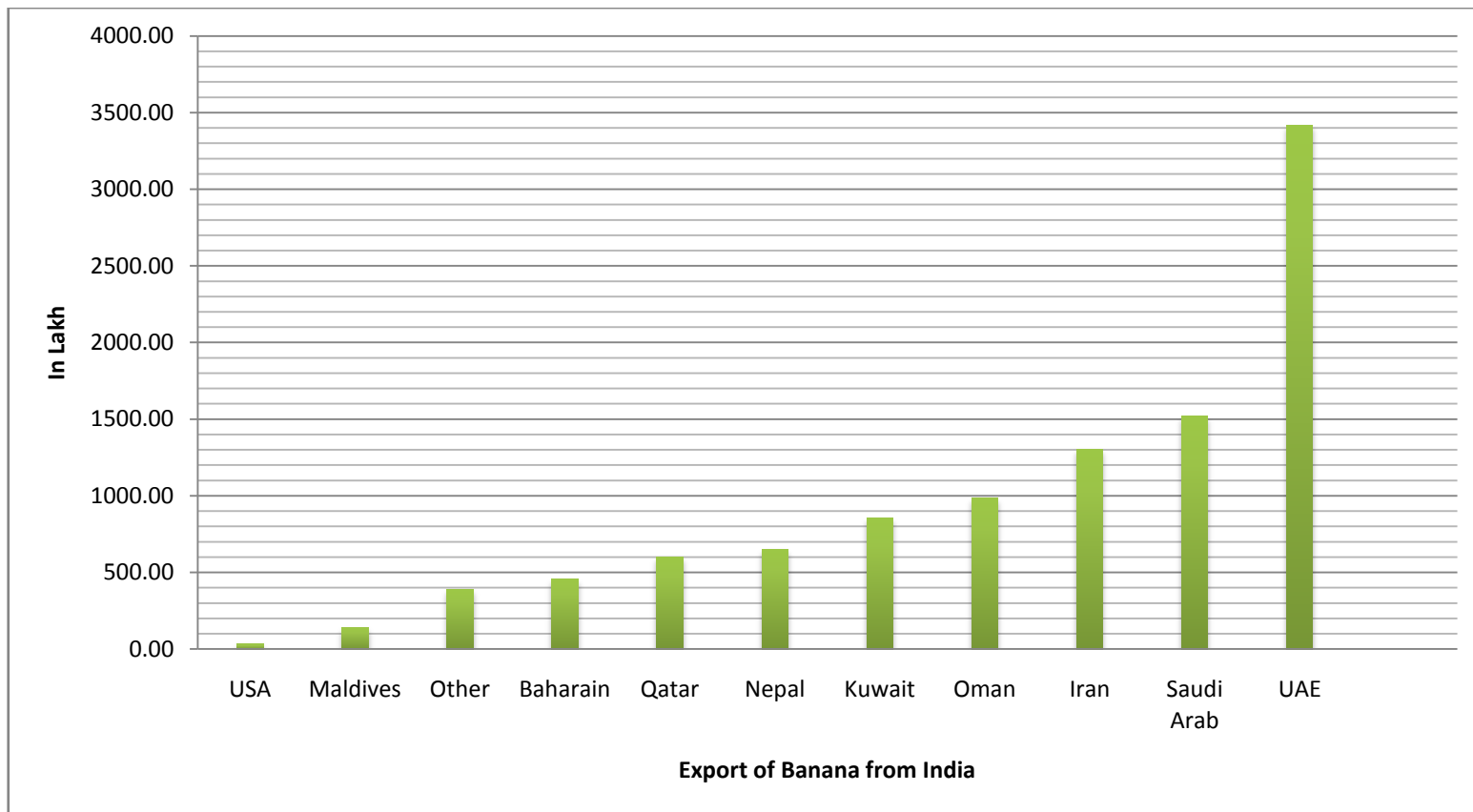


Fig. No. 4.6 Export of Banana to various countries from India during study period in Value measures in rupees.

In term of Value (dollar) from India:

The major banana importing countries from India in Value terms (In dollar) were represented in Table 4.5. It is observed from the table that, India has exported on an average 17.961 US millions dollar of banana per year to more than 40 countries in the world. Out of the total value, maximum i.e. (32.67 per cent) banana was exported to UAE followed by Saudi Arab (15.02 per cent), Iran (11.97 per cent), Oman (8.99 per cent), Kuwait (8.21 per cent), Nepal (6.12 per cent), Qatar (5.80 per cent), Baharain (4.68 per cent), Maldives (1.36 per cent), USA (0.37 per cent) and other countries (4.77 per cent). UAE, Saudi Arab, Iran, Oman and Kuwait were remained the major importers of Indian banana during last 22 years.

Table No. 4.5: Major Banana Importing countries from India in Value terms (In US dollar) from India.

Sr.No	Name of the Country	Value in US Dollar	Per Cent
1	USA	0.067	0.37454
2	Maldives	0.244	1.360057
3	Baharain	0.841	4.68428
4	Other	0.857	4.770323
5	Qatar	1.042	5.802839
6	Nepal	1.100	6.126886
7	Kuwait	1.475	8.214572
8	Oman	1.615	8.99149
9	Iran	2.152	11.97937
10	Saudi Arab	2.699	15.02462
11	UAE	5.868	32.67102
12	Total	17.961	100

Note: Dollars are in Millions

Figure 4.7 shows the total value earn in terms of dollar from export of banana. Out of ten destination of Indian banana export, UAE, Saudi Arab, Iran, Oman and Kuwait were top major banana importing countries followed by Nepal, Qatar, Baharain, Maldives, USA and other countries. UAE contribute (32.67 per cent) followed by Saudi Arab (15.02 per cent), Iran (11.97 per cent), Oman (8.99 per cent), Kuwait (8.21 per cent), Nepal (6.12 per cent), Qatar (5.80 per cent), Baharain (4.68 per cent), Maldives (1.36 per cent), USA (0.37 per cent) and other countries (4.77 per cent).

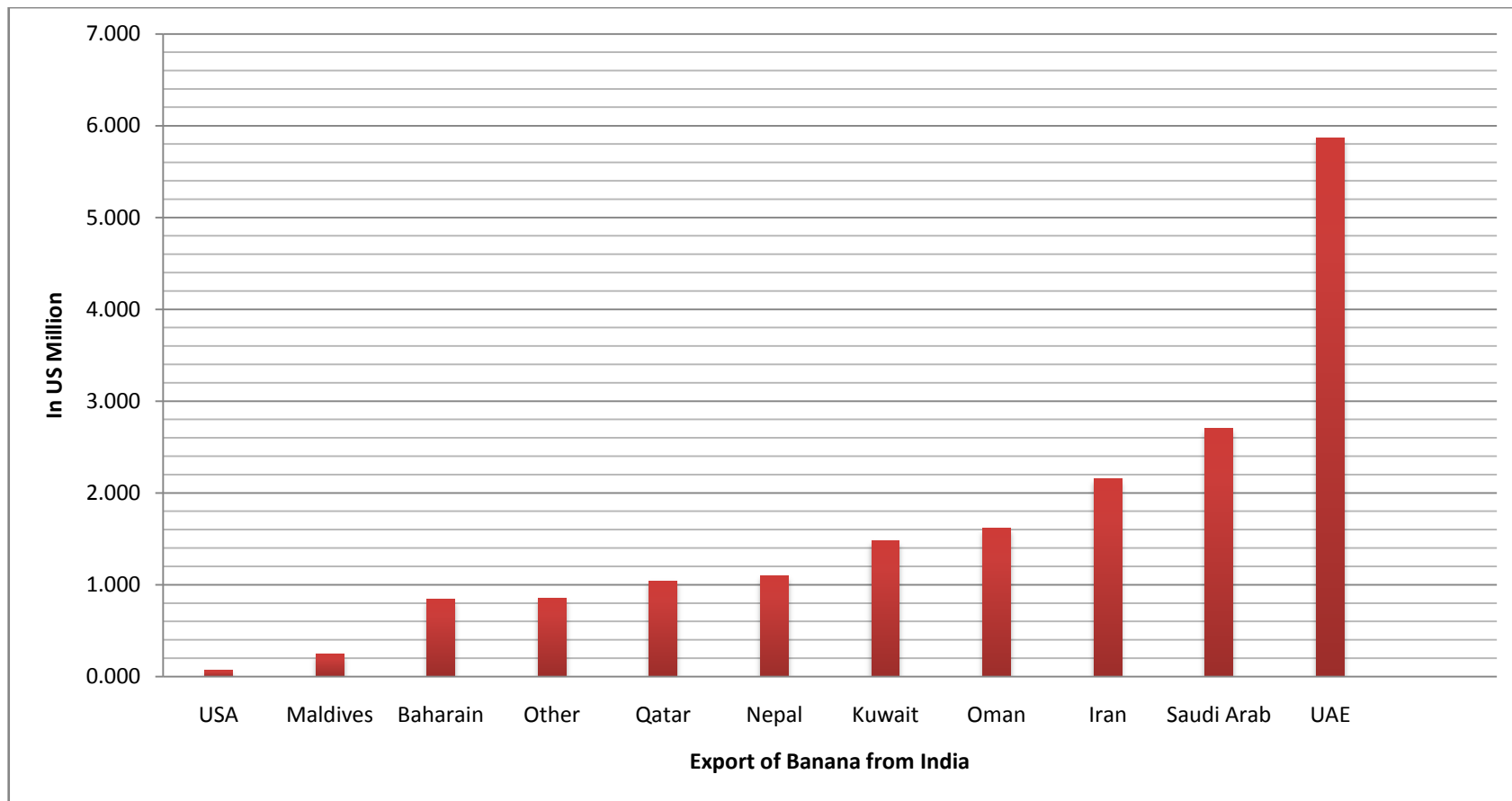


Fig. 4.7 Export of Banana to various countries from India during study period in Value measures in US dollar.

4.3.1 Top Five Banana Importing Countries from India during 1996-97 to 1999-2000

Top five banana importing countries during the period 1996-97 to 1999-2000 measured in quantity, value in rupee and value in dollar were identified and reported in the Table 4.6. The results revealed that, top five banana importing countries during the study period measured in quantity were UAE, Saudi Arab, Baharain, Qatar and Oman, their contribution in banana export was (41.56), (15.48), (7.97), (7.82) and (4.13) per cent respectively.

In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (42.13 per cent), Saudi Arab (16.03 per cent), Baharain (8.20 per cent), Qatar (7.86 per cent) and Kuwait (4.74 per cent) respectively. Whereas in term of value measured in dollar to top five banana importing countries and their contribution to that banana export were UAE (30.79 per cent), Saudi Arab (16.30 per cent), Baharain (8.20 per cent), Qatar (7.82 per cent) and Kuwait (4.67 per cent) respectively.

Results of Table 4.6 also revealed that, in quantity term and value term, top banana importing countries were different. Such different may be due to unit price realization from export of banana to different countries.

Table No. 4.6: Top Five Bananas Importing Countries from India during 1996-97 to 1999-2000

Quantity			Value in Rupees			Value in Us \$		
Country	Mean	Per Cent	Country	Mean	Per Cent	Country	Mean	Per Cent
UAE	2257.08	41.56	UAE	450.75	42.13	UAE	0.81	30.79
Saudi Arab	840.47	15.48	Saudi Arab	171.52	16.03	Saudi Arab	0.43	16.30
Baharain	432.59	7.97	Baharain	87.72	8.20	Baharain	0.22	8.20
Qatar	424.73	7.82	Qatar	84.09	7.86	Qatar	0.21	7.82
Oman	224.21	4.13	Kuwait	50.67	4.74	Kuwait	0.12	4.67

4.3.2 Top Five Banana Importing Countries from India during 2000-01 to 2004-05

Top five banana importing countries during the period 2000-01 to 2004-05 measured in quantity, value in rupee and value in dollar were identified and

reported in the Table 4.7. The results revealed that, top five banana importing countries during the study period measured in quantity were Nepal, UAE, Saudi Arab, Oman and Baharain, their contribution in banana export was, (32.21), (28.73), (8.66), (4.91) and (4.82) per cent respectively.

In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (41.85 per cent), Saudi Arab (13.77 per cent), Baharain (6.99 per cent), Qatar (6.77 per cent) and Kuwait (5.75 per cent) respectively. Where as in term of value measured in dollar to top five banana importing countries and their contribution to that banana export were UAE (30.77 per cent), Saudi Arab (15.79 per cent), Baharain (7.95 per cent), Qatar (7.59 per cent) and Kuwait (4.90 per cent) respectively.

Results of Table 4.7 also revealed that, in quantity term and value term, top banana importing countries were different. Such different may be due to unit price realization from export of banana to different countries.

Table No. 4.7: Top Five Bananas Importing Countries from India during 2000-01 to 2004-05

Quantity			Value in Rupess			Value in Us \$		
Country	Mean	Per Cent	Country	Mean	Per Cent	Country	Mean	Per Cent
Nepal	3161.65	32.21	UAE	480.19	41.85	UAE	3.60	30.77
UAE	2819.81	28.73	Saudi Arab	158.02	13.77	Saudi Arab	1.85	15.79
Saudi Arab	849.67	8.66	Baharain	80.25	6.99	Baharain	0.93	7.95
Oman	481.52	4.91	Qatar	77.68	6.77	Qatar	0.89	7.59
Baharain	473.00	4.82	Kuwait	65.95	5.75	Kuwait	0.57	4.90

4.3.3 Top Five Banana Importing Countries from India during 2005-06 to 2009-10

Top five banana importing countries during the period 2005-06 to 2009-10 measured in quantity, value in rupee and value in dollar were identified and reported in the Table 4.8. The results revealed that, top five banana importing countries during the study period measured in quantity were UAE, Nepal, Saudi Arab,

Kuwait, Baharain their contribution in banana export was (31.35 per cent), (23.71 per cent), (14.23 per cent), (7.34 per cent) and (5.04 per cent) respectively.

In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (40.35 per cent), Saudi Arab (16.05 per cent), Kuwait (8.54 per cent), Baharain (7.70 per cent) and Qatar (6.42 per cent) respectively. Where as in term of value measured in dollar to top five banana importing countries and their contribution to that banana export were UAE (32.22 per cent), Saudi Arab (16.30 per cent), Baharain (7.92 per cent), Qatar (7.30 per cent) and Kuwait (5.80 per cent) respectively.

Results of Table 4.8 also revealed that, in quantity term and value term, top banana importing countries were different. Such different may be due to unit price realization from export of banana to different countries.

Table No. 4.8 Top Five Banana Importing Countries from India during 2005-06 to 2009-10

Quantity			Value in Rupees			Value in Us \$		
Country	Mean	Per Cent	Country	Mean	Per Cent	Country	Mean	Per Cent
UAE	7976.54	31.35	UAE	873.77	40.35	UAE	5.31	32.22
Nepal	6031.75	23.71	Saudi Arab	347.63	16.05	Saudi Arab	2.69	16.30
Saudi Arab	3620.36	14.23	Kuwait	184.83	8.54	Baharain	1.31	7.92
Kuwait	1868.17	7.34	Baharain	166.72	7.70	Qatar	1.20	7.30
Baharain	1281.51	5.04	Qatar	139.10	6.42	Kuwait	0.96	5.80

4.3.4 Top Five Banana Importing Countries from India during 2010-11 to 2014-15

Top five banana importing countries during the period 2010-11 to 2014-15 measured in quantity, value in rupee and value in dollar were identified and reported in the Table 4.9. The results revealed that, top five banana importing countries during the study period measured in quantity were UAE, Nepal, Saudi Arab, Baharain and Iran with their contribution in banana export was (29.34 per cent), (16.93 per cent), (12.78 per cent), (7.81 per cent) and (7.30 per cent) respectively.

In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (38.71 per cent), Saudi Arab (16.32 per cent), Kuwait (8.45 per cent), Baharain (6.27 per cent) and Qatar (6.31 per cent) respectively. Where as in term of value measured in dollar to top five banana importing countries and their contribution to that banana export were UAE (33.48 per cent), Saudi Arab (16.34 per cent), Baharain (7.35 per cent), Qatar (7.02 per cent) and Kuwait (6.45 per cent). respectively.

Results of Table 4.9 also revealed that, in quantity term and value term, top banana importing countries were different. Such different may be due to unit price realization from export of banana to different countries.

Table No. 4.9: Top Five Banana Importing Countries from India during 2010-11 to 2014-15

Quantity			Value in Rupees			Value in Us \$		
Country	Mean	Per Cent	Country	Mean	Per Cent	Country	Mean	Per Cent
UAE	14935.70	29.34	UAE	1765.00	38.71	UAE	7.30	33.48
Nepal	8617.73	16.93	Saudi Arab	744.32	16.32	Saudi Arab	3.56	16.34
Saudi Arab	6507.34	12.78	Kuwait	385.22	8.45	Baharain	1.60	7.35
Baharain	3973.46	7.81	Baharain	285.68	6.27	Qatar	1.53	7.02
Iran	3717.81	7.30	Qatar	287.82	6.31	Kuwait	1.41	6.45

4.3.5 Top Five Banana Importing Countries from India during 2015-16 to 2017-18

Top five banana importing countries during the period 2015-16 to 2017-18 measured in quantity, value in rupee and value in dollar were identified and reported in the table 4.10. The results revealed that, top five banana importing countries during the study period measured in quantity were Nepal, UAE, Iran, Oman and Saudi Arab with their contribution in banana export was (23.45 per cent), (19.56 per cent), Iran (14.29 per cent), Oman (11.59 per cent) and Saudi Arab (8.91 per cent) respectively.

In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (34.16 per cent), Saudi Arab (15.11 per cent), Iran (11.92 per cent), Oman 9.62 per cent and Kuwait (8.43 per cent) respectively. Where as in term of value measured in dollar to top five banana importing countries and their contribution to that banana export were UAE (32.63 per cent), Saudi Arab (15.83 per cent), Kuwait (6.74 per cent) Qatar (6.66 per cent) and other countries (6.84 per cent) respectively.

Results of Table 4.10 also revealed that, in quantity term and value term, top banana importing countries were different. Such different may be due to unit price realization from export of banana to different countries.

Table 4.10: Top Five Banana Importing Countries from India during 2015-16 to 2017-18

Quantity			Value in Rupess			Value in Us \$		
Country	Mean	Per Cent	Country	Mean	Per Cent	Country	Mean	Per Cent
Nepal	27497.00	23.45	UAE	2630.20	34.16	UAE	9.11	32.63
UAE	22937.42	19.56	Saudi Arab	1163.38	15.11	Saudi Arab	4.42	15.83
Iran	16756.65	14.29	Iran	917.72	11.92	Other	1.91	6.84
Oman	13588.53	11.59	Oman	740.90	9.62	Kuwait	1.88	6.74
Saudi Arab	10452.19	8.91	Kuwait	649.25	8.43	Qatar	1.86	6.66

4.3.6 Top Five Banana Importing Countries from India during 1996-97 to 2017-18

Top five banana importing countries during the period 1996-97 to 2017-18 measured in quantity, value in rupee and value in dollar were identified and reported in the Table 4.11. The results revealed that, top five banana importing countries during the study period measured in quantity were UAE, Nepal, Iran, Saudi Arab and Oman with their contribution in banana export was to (24.88 per cent), (21.69 per cent), (11.13 per cent), (10.80 per cent) and (7.81 per cent) respectively.

In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (33.02 per cent), Saudi Arab (14.68 per cent), Iran (12.57 per cent), Oman (9.13 per cent) and Kuwait (8.24 per cent)

respectively. Where as in term of value measured in dollar to top five banana importing countries and their contribution to that banana export were UAE (32.67 per cent), Saudi Arab (15.02 per cent), Iran (11.98 per cent), Oman (8.99 per cent) and Kuwait (8.21 per cent) respectively.

Results of Table 4.11 also revealed that, in quantity term and value term, top banana importing countries were different. Such different may be due to unit price realization from export of banana to different countries.

Table No. 4.11: Top Five Banana Importing Countries from India during 1996-97 to 2017-18

Quantity			Value in Rupees			Value in Us \$		
Country	Mean	Per Cent	Country	Mean	Per Cent	Country	Meabn	Per Cent
UAE	9386.40	24.88	UAE	3416.97	33.02	UAE	5.87	32.67
Nepal	8180.74	21.69	Saudi Arab	1518.98	14.68	Saudi Arab	2.70	15.02
Iran	4197.40	11.13	Iran	1301.17	12.57	Iran	2.15	11.98
Saudi Arab	4072.97	10.80	Oman	986.32	9.53	Oman	1.62	8.99
Oman	2946.87	7.81	Kuwait	852.88	8.24	Kuwait	1.48	8.21

Fig 4.8 concluded that export of banana in quantity and value. From period I (1996 to 2007) quantity line shows regular and smooth pattern of export of banana. But from period II (2008 to 2017) quantity line shows more fluctuations in export, from the year 2013-14 to 2016-17 sharply increases. The starting from period II, quantity of banana export will increase thoroughly. The value line i.e. Rupees shows smooth pattern in period I. But in period II the more fluctuations are observed, the line sharply increasing from the year 2011-12 to 2016-17 and then decreasing. The highest value in terms of rupees is obtained in two year that is 2009-10 and 2016-17. The third line that is value in terms of dollar shows more fluctuations in overall period, the line steadily increases from 2013-14 to 2016-17 and then decreases. The highest value in terms of dollar of banana export is obtained in the year 2016-17.

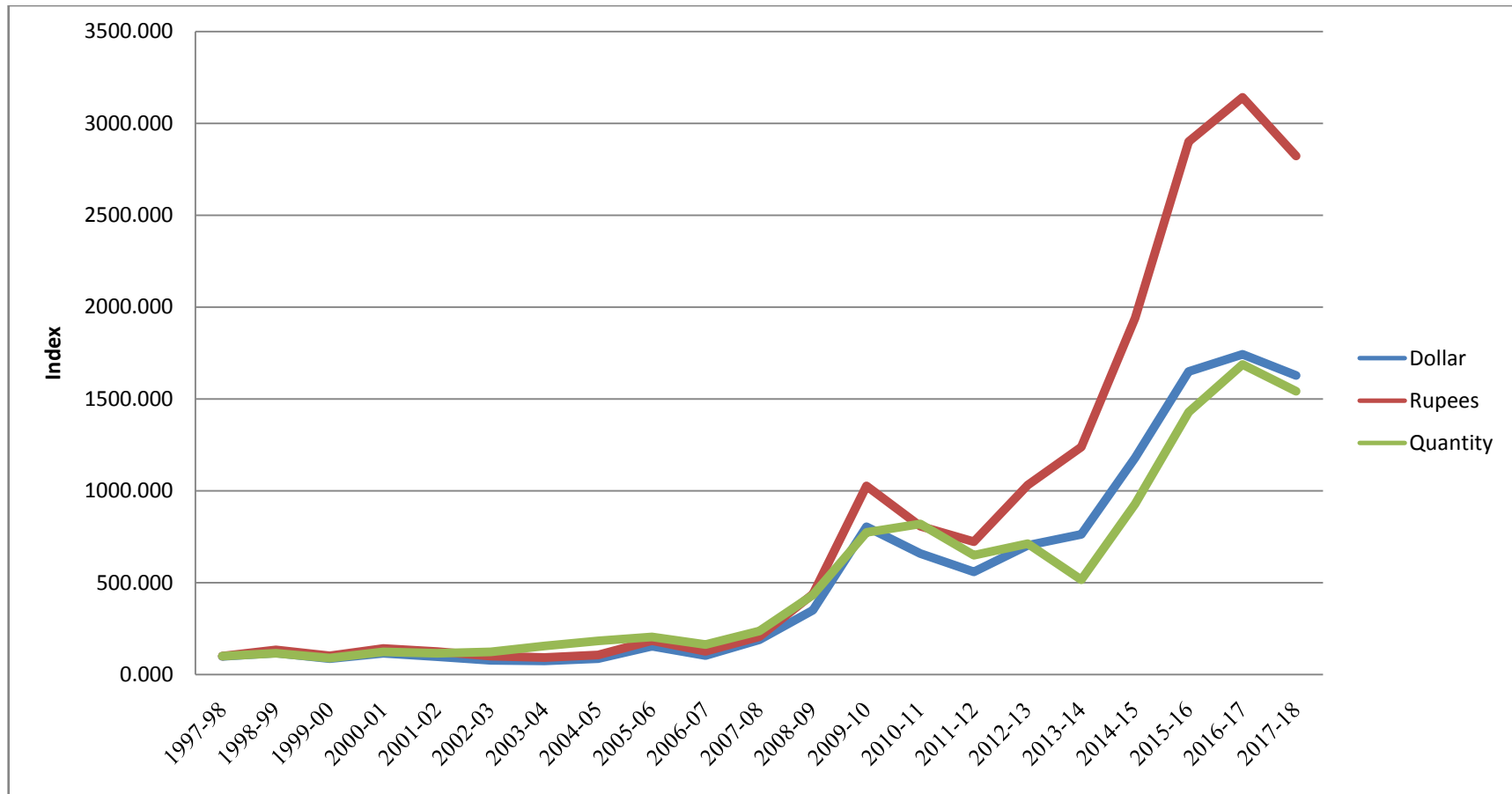


Fig. 4.8 Time Sequence plot of Export of Banana in quantity, Value in rupees and value in dollar from India

4.3.1.1 Descriptive Statistics of Banana Export in quantity, value in rupees and value in US dollar from India.

The main purpose of descriptive statistics to calculate the different statistical function related to present study. The descriptive statistics of export in quantity, value in US dollar and value in rupees of Banana in India shows that in Table 4.12. The data (1996-2018) 22 years reported that mean export in quantity, value in US dollar and value in rupees was 37109.78 thousand tones, 18.25 million dollar and 10553.92 lacks respectively and median 16662.55 thousand tones, 6.49 US million and 2607.95 lack. The maximum and minimum in quantity 118465.70 and 6289.73 and value in US dollar 59.41 and 2.55 and value and value in rupees 39819.53 and 1171.82 respectively. The other statistical function like Standard deviation (SD), Skewness, Kurtosis, Jarque-Bera test and probability of sample are systematically presented in Table no. (4.12).

Table 4.12 Descriptive Statistics of Banana Export in quantity, value in rupees and value in US dollar from India.

Descriptive Stat	Quantity	Value_in_US	Value_in_Rupees
	In Thousands	US Million	In Lakhs
Mean	37109.78	18.25	10553.92
Median	16662.55	6.49	2607.95
Maximum	118465.70	59.41	39819.53
Minimum	6289.73	2.55	1171.82
Std. Dev.	35695.53	19.46	12885.77
Skewness	1.09	1.07	1.29
Kurtosis	2.99	2.79	3.28
Jarque-Bera	4.16	4.03	5.94
Probability	0.12	0.13	0.05
Observations	21.00	21.00	21.00

4.3.1.2: Normalized Barry's Index of Banana Export in quantity and Value term from India

For the calculation of Normalized Barry's index represented in Table no. (4.13) for export of banana there are three periods, period I, II and overall period and there are three particulars quantity, value in rupees and value in US dollar. In terms of quantity for period-I are (0.685 per cent), period-II (0.819 per cent) and

overall period (0.756 per cent). In terms of value in rupees for period-I are (0.697 per cent), period-II (0.804 per cent) and overall period (0.748 per cent). In terms of value in US dollar for period-I are (0.4107) and period-II (0.7781) and overall period (0.5847).

Table No. 4.13: Normalized Barry's Index of Banana Export in quantity and Value term from India

Particulars	Period-I	Period-II	Overall
Quantity	0.685	0.819	0.756
Value in rupees	0.697	0.804	0.748
Value in US \$	0.4107	0.7781	0.5847

4.4 Growth and Instability of Banana Export from India

The export performance of banana from India with regards to export quantity, export value in terms rupees and dollar was assessed. Growth indicates the increase or decrease in banana export in terms of quantity, value in terms of rupees and dollar. The growth and instability of banana exports to top ten importing countries and remaining pooled under other were computed and results are presented in Table 4.15 to 4.26.

4.1 UAE

The growth and Instability in export of banana from India to UAE was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period viz; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.14. The growth rate and Instability in banana export was estimated for three parameters viz; quantity, value in rupees and value in dollar.

The results revealed that, during period-I, the average quantity of banana exported to UAE was 2626.61 thousand MT. The value realized from banana export to UAE in rupees and Dollar term was 573.38 Lacks and 1.03 million dollar, respectively. During period-II, export of banana to UAE was increased. In quantity term, average export of banana was 16146.18 thousand MT, whereas in value in rupees and dollar, it was 6260.55 Lacks and 10.70 million dollar, respectively. In

overall period of the study, export of banana to UAE measured in quantity was 9386.40 thousands MT. Value realized from the export in rupees and dollar was 3416.96 Lacks and 5.86 million dollar, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export decreased in quantity, value in rupee and value in dollar was highest in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -2.45, -0.25 and 2.34 per cent per annum respectively in period-I. During period-II, CGR of banana export measured in quantity was 11.29 per cent per annum. It was (21.25 per cent) and (15.91 per cent) per cent per annum for value in rupees and value in dollar respectively. All the growth rates were significant, except quantity in period-I. During overall period, compound growth rate of banana export was (14.10 per cent), (22.34 per cent) and (18.55 per cent) per annum for quantity, value in rupee and value in dollar, respectively. Here observed that, Value of rupee significant at 5 per cent and dollar at 1 per cent level of significance in period-I. In period-II, value of rupee significant at 5 per cent and dollar at 1 per cent level of significance. Overall Period reveals that quantity at 0.001 significance level and values in rupees significant at 5 per cent and values in dollar at 1 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.14. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.24 and 0.24 in period-I and 0.36 and 0.23 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.26 and 0.00, and in period-II, it was 0.59 and 0.24, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.65 and 0.00, respectively. Whereas it was 0.46 and 0.21 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.81 and 0.38, respectively. It was 1.09 and 0.54 for value measured in rupees and 0.98 and 0.43 for value measured in dollar respectively. The index reveals dissimilar trend in all the three parameter

Table No. 4.14: Growth and Instability of Banana Export to UAE from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	2626.61	573.38	1.03	16146.18	6260.55	10.70	9386.40	3416.96	5.86
	CGR	-2.45	-0.25	2.74	11.29	21.25	15.91	14.10	22.34	18.55
	SE	1.20	1.50	5.36	1.39	1.71	1.24	1.27	1.33	1.29
	“t” Value	-2.03	-0.17	0.51	8.10	12.42	12.83	11.03	16.75	14.31
Instability	CV	0.24	0.26	0.65	0.36	0.59	0.46	0.81	1.09	0.98
	CDI	0.24			0.23	0.24	0.21	0.38	0.54	0.43

4.2 Nepal

The growth and Instability in export of banana from India to Nepal was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.15. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to banana was 2699.49 thousand MT. The value realized from banana export to Nepal in rupees and dollars term was 89.68 Lacks and 0.19 million dollars, respectively. During period-II, export of banana to Nepal was increased. In quantity term, average export of banana was 13163.7 thousand MT, whereas in value in rupees and dollars, it was 1163.21 Lacks and 1.92 million dollars, respectively. In overall period of the study, export of banana to Nepal measured in quantity was 8180.74 thousands MT. Value realized from the export in rupees and dollar was 652.01 Lacks and 1.10 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export decreased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 40.39, 34.78 and 35.51 per cent per

annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 24.31 per annum. It was 35.67 and 28.92 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 20.60, 34.88 and 28.09 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.15. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.93 and 0.45 in period-I and 0.75 and 0.46 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.89 and 0.52, and in period-II, it was 0.91 and 0.40, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.90 and 0.52, respectively. Whereas it was 0.78 and 0.33 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.05 and 0.64 respectively. It was 1.37 and 0.84 for value measured in rupees and 1.22 and 0.68 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

Table No. 4.15: Growth and Instability of Banana Export to Nepal from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	2699.49	89.68	0.19	13163.7	1163.21	1.92	8180.74	652.01	1.10
	CGR	40.39	34.78	35.51	24.31	35.67	28.92	20.60	34.88	28.09
	SE	9.40	9.62	9.50	3.73	1.47	1.27	2.24	1.33	1.13
	“t” Value	4.30	3.62	3.74	6.51	24.25	22.62	8.45	26.19	24.75
Instability	CV	0.93	0.89	0.90	0.75	0.91	0.78	1.05	1.37	1.22
	CDI	0.45	0.52	0.52	0.46	0.40	0.33	0.64	0.84	0.68

4.3 Saudi Arab

The growth and Instability in export of banana from India to Saudi Arab was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.16. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to Saudi Arab was 849.15 thousand MT. The value realized from banana export to Saudi Arab in rupees and dollars term was 181.06 Lacks and 0.50 million dollars, respectively. During period-II, export of banana to Saudi Arab was increased. In quantity term, average export of banana was 7296.77 thousand MT, whereas in value in rupees and dollars, it was 2856.90 Lacks and 4.89 million dollars, respectively. In overall period of the study, export of banana to Saudi Arab measured in quantity was 4072.96 thousands MT. Value realized from the export in rupees and dollar was 1518.98 Lacks and 2.69 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -6.85, -5.51 and -4.71 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 10.89 per annum. It was 22.98 and 17.23 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 14.90, 24.36 and 19.00 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.16. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.29 and 0.26 in period-I and 0.44 and 0.38 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.29 and 0.29, and in period-II, it was 0.67 and 0.40, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.59 and 0.00 respectively. Whereas it was 0.55 and 0.37 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.93 and 0.54 respectively. It was 1.20 and 0.69 for value measured in rupees and 1.04 and 0.56 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

Table No. 4.16: Growth and Instability of Banana Export to Saudi Arab from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	849.15	181.06	0.50	7296.77	2856.90	4.89	4072.96	1518.98	2.69
	CGR	-6.85	-5.51	-4.71	10.89	22.98	17.23	14.90	24.36	19.00
	SE	1.21	1.33	3.33	2.84	3.23	2.78	2.13	2.29	1.90
	“t” Value	-5.67	-4.13	-1.41	3.82	7.10	6.19	6.98	10.63	10.0
Instability	CV	0.29	0.29	0.59	0.44	0.67	0.55	0.93	1.20	1.04
	CDI	0.26	0.29		0.38	0.40	0.37	0.54	0.69	0.56

4.4 Baharain

The growth and Instability in export of banana from India to Baharain was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.17. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to Baharain was 485.28 thousand MT. The value realized from banana export to Baharain in rupees and dollars term was 98.71 Lacks and 0.22 million dollars, respectively. During period-II, export of banana to Baharain was increased. In quantity term, average export of banana was 2877.39 thousand MT, whereas in value in rupees and dollars, it was 817.11 Lacks and 1.45 million dollars, respectively. In overall period of the study, export of banana to Baharain measured in quantity was 1681.34 thousands MT. Value realized from the export in rupees and dollar was 457.91 Lacks and 0.84 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as

compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -1.95, -0.71 and -3.24 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 0.42 per cent per annum. It was 11.05 and 6.43 per cent per annum for value in rupees and value in dollar. All the growth rates were non-significant in period-I. During overall period, compound growth rate of banana export was 8.03, 14.69 and 11.61 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.17. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.20 and 0.00 in period-I and 0.95 and 0.00 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.29 and 0.00, and in period-II, it was 0.38 and 0.26, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.31 and 0.00 respectively. Whereas it was 0.31 and 0.29 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.29 and 0.1.20 respectively. It was 0.88 and 0.41 for value measured in rupees and 0.79 and 0.43 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

Table No.4.17: Growth and Instability of Banana Export to Baharain from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	485.28	98.71	0.22	2877.39	817.11	1.45	1681.34	457.91	0.84
	CGR	-1.95	-0.71	-3.24	0.42	11.05	6.43	8.03	14.69	11.61
	SE	1.15	1.81	2.00	6.05	1.73	1.97	3.61	1.55	1.77
	“t” Value	-1.68	-0.39	-1.62	0.07	6.36	3.26	2.22	9.46	6.55
Instability	CV	0.20	0.29	0.31	0.95	0.38	0.31	1.29	0.88	0.79
	CDI					0.26	0.29	1.20	0.41	0.43

4.5 Kuwait

The growth and Instability in export of banana from India to Kuwait was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.19. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to Kuwait was 386.71 thousand MT. The value realized from banana export to Kuwait in rupees and dollars term was 92.20 Lacks and 0.20 million dollars, respectively. During period-II, export of banana to Kuwait was increased. In quantity term, average export of banana was 4302.02 thousand MT, whereas in value in rupees and dollars, it was 1613.55 Lacks and 2.74 million dollars, respectively. In overall period of the study, export of banana to Kuwait measured in quantity was 2344.37 thousands MT. Value realized from the export in rupees and dollar was 852.88 Lacks and 1.47 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as

compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 7.98, 7.84 and 6.21 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 14.54 per cent per annum. It was 25.67 and 18.77 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 17.58, 26.46 and 20.71 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.18. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.36 and 0.27 in period-I and 0.63 and 0.51 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.46 and 0.40, and in period-II, it was 0.75 and 0.46, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.45 and 0.41 respectively. Whereas it was 0.64 and 0.43 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.12 and 0.69 respectively. It was 1.30 and 0.77 for value measured in rupees and 1.15 and 0.66 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

Table No. 4.18: Growth and Instability of Banana Export to Kuwait from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	386.71	92.20	0.20	4302.02	1613.55	2.74	2344.37	852.88	1.47
	CGR	7.98	7.84	6.21	14.54	25.67	18.77	17.58	26.46	20.71
	SE	1.58	2.60	2.49	4.05	3.62	3.43	2.68	2.24	2.31
	“t” Value	5.04	3.01	2.49	3.59	7.09	5.47	6.56	10.93	8.96
Instability	CV	0.36	0.46	0.45	0.63	0.75	0.64	1.12	1.30	1.15
	CDI	0.27	0.40	0.41	0.51	0.46	0.43	0.69	0.77	0.66

4.6 Oman

The growth and Instability in export of banana from India to Oman was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.19. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to Oman was 388.03 thousand MT. The value realized from banana export to Oman in rupees and dollars term was 77.74 Lacks and 0.17 million dollars, respectively. During period-II, export of banana to Oman was increased. In quantity term, average export of banana was 5505.69 thousand MT, whereas in value in rupees and dollars, it was 1894.89 Lacks and 3.05 million dollars, respectively. In overall period of the study, export of banana to Oman measured in quantity was 2946.86 thousands MT. Value realized from the export in rupees and dollar was 986.31 Lacks and 1.61 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 6.30, 5.81 and 5.39 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 42.40 per cent per annum. It was 46.30 and 40.38 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 41.92, 46.17 and 40.19 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.19. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.39 and 0.00 in period-I and 1.03 and 0.51 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.48 and 0.00, and in period-II, it was 1.09 and 0.49, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.48 and 0.00 respectively. Whereas it was 1.00 and 0.44 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.55 and 1.05 respectively. It was 1.67 and 1.13 for value measured in rupees and 1.55 and 1.01 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

Table No. 4.19: Growth and Instability of Banana Export to Oman from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	388.03	77.74	0.17	5505.69	1894.89	3.05	2946.86	986.31	1.61
	CGR	6.30	5.81	5.39	42.40	46.30	40.38	41.92	46.17	40.19
	SE	3.74	4.15	3.94	2.14	1.06	0.90	1.90	1.04	1.02
	“t” Value	1.68	1.40	1.37	19.73	43.33	44.67	21.99	43.38	39.30
Instability	CV	0.39	0.48	0.48	1.03	1.09	1.00	1.55	1.67	1.55
	CDI				0.51	0.49	0.44	1.05	1.13	1.01

4.7 Qatar

The growth and Instability in export of banana from India to Qatar was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.20. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to Qatar was 409.54 thousand MT. The value realized from banana export to Qatar in rupees and dollars term was 90.30 Lacks and 0.20 million dollars, respectively. During period-II, export of banana to Qatar was increased. In quantity term, average export of banana was 2540.19 thousand MT, whereas in value in rupees and dollars, it was 1111.92 Lacks and 1.88 million dollars, respectively. In overall period of the study, export of banana to Qatar measured in quantity was 1474.86 thousands MT. Value realized from the export in rupees and dollar was 601.11 Lacks and 1.04 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -4.73, -1.69 and -3.83 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 12.22 per cent per annum. It was 24.96 and 19.24 per cent per annum for value in rupees and value in dollar. All the growth rates were significant except period-I. During overall period, compound growth rate of banana export was 14.51, 25.51 and 20.43 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and dollar was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.20. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.33 and 0.31 in period-I and 0.43 and 0.21 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.33 and 0.00, and in period-II, it was 0.69 and 0.23, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.35 and 0.00 respectively. Whereas it was 0.57 and 0.21 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.86 and 0.41 respectively. It was 1.19 and 0.63 for value measured in rupees and 1.04 and 0.52 for value measured in dollar respectively.

Table No. 4.20: Growth and Instability of Banana Export to Qatar from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	409.54	90.30	0.20	2540.19	1111.92	1.88	1474.86	601.11	1.04
	CGR	-4.73	-1.69	-3.83	12.22	24.96	19.24	14.51	25.51	20.43
	SE	1.53	1.92	2.00	1.23	1.54	1.27	1.23	1.26	1.20
	“t” Value	-3.08	-0.88	-1.91	9.86	16.19	15.14	11.74	20.17	17.02
Instability	CV	0.33	0.33	0.35	0.43	0.69	0.57	0.86	1.19	1.04
	CDI	0.31			0.21	0.23	0.21	0.41	0.63	0.52

4.8 Maldives

The growth and Instability in export of banana from India to Maldives was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.21. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to Maldives was 170.55 thousand MT. The value realized from banana export to Maldives in rupees and dollars term was 25.33 Lacks and 0.05 million dollars, respectively. During period-II, export of banana to Maldives was increased. In quantity term, average export of banana was 974.92 thousand MT, whereas in value in rupees and dollars, it was 241.32 Lacks and 0.41 million dollars, respectively. In overall period of the study, export of banana to Maldives measured in quantity was 591.89 thousands MT. Value realized from the export in rupees and dollar was 138.46 Lacks and 0.2 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 17.93, 10.73 and 8.59 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 2.73 per cent per annum. It was 25.05 and 15.93 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 11.70, 25.81 and 18.71 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, dollar and rupees was significant at 5 per cent and quantity was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.21. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.57 and 0.26 in period-I and 0.43 and 0.40 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.44 and 0.30, and in period-II, it was 0.73 and 0.39 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.41 and 0.31 respectively. Whereas it was 0.58 and 0.36 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.86 and 0.49 respectively. It was 1.20 and 0.69 for value measured in rupees and 1.03 and 0.55 for value measured in dollar respectively.

Table No. 4.21: Growth and Instability of Banana Export to Maldives from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	170.55	25.33	0.05	974.92	241.32	0.41	591.89	138.46	0.2
	CGR	17.93	10.73	8.59	2.73	25.05	15.93	11.70	25.81	18.71
	SE	1.74	2.18	2.01	2.85	3.21	2.86	2.05	1.92	1.67
	“t” Value	10.29	4.91	4.27	0.96	7.78	5.56	5.71	13.43	11.16
Instability	CV	0.57	0.44	0.41	0.43	0.73	0.58	0.86	1.20	1.03
	CDI	0.26	0.30	0.31	0.40	0.39	0.36	0.49	0.69	0.55

4.9 USA

The growth and Instability in export of banana from India to USA was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.22. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to USA was 216.09 thousand MT. The value realized from banana export to USA in rupees and dollars term was 40.25 Lacks and 0.09 million dollars, respectively. During period-II, export of banana to USA was decreased. In quantity term, average export of banana was 41.12 thousand MT, whereas in value in rupees and dollars, it was 26.17 Lacks and 0.04 million dollars, respectively. In overall period of the study, export of banana to USA measured in quantity was 128.61 thousands MT. Value realized from the export in rupees and dollar was 33.21 Lacks and 0.06 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export decreased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 18.73, 17.05 and 16.21 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was -4.55 per cent per annum. It was 29.34 and 13.82 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was -4.47, -0.70 and -2.25 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, dollar and rupees was significant at 5 per cent and quantity was non-significant at 1 per cent level of significance. During overall period in quantity and both values revealed negative and non-significant.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.22. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.85 and 0.82 in period-I and 0.88 and 0.00 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.68 and 0.60 and in period-II, it was 0.99 and 0.81 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.69 and 0.63 respectively. Whereas it was 0.99 and 0.81 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.26 and 1.18 respectively. It was 0.83 and 0.00 for value measured in rupees and 0.85 and 0.00 for value measured in dollar respectively.

Table No. 4.22: Growth and Instability of Banana Export to USA from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	216.09	40.25	0.09	41.12	26.17	0.04	128.61	33.21	0.06
	CGR	18.73	17.05	16.21	-4.55	29.34	13.82	-4.47	-0.70	-2.25
	SE	3.81	3.55	3.92	5.94	10.73	7.48	3.02	2.23	2.20
	“t” Value	4.91	4.80	4.13	-0.77	2.73	1.85	-1.48	-0.31	-1.02
Instability	CV	0.85	0.68	0.69	0.88	0.99	0.88	1.26	0.83	0.85
	CDI	0.82	0.60	0.63		0.81	0.81	1.18		

4.10 Iran

The growth and Instability in export of banana from India to Iran was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.23. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to Iran was 201.66 thousand MT. The value realized from banana export to Iran in rupees and dollars term was 45.29 Lacks and 0.1 million dollars, respectively. During period-II, export of banana to Iran was increased. In quantity term, average export of banana was 6740.14 thousand MT, whereas in value in rupees and dollars, it was 2100.36 Lacks and 3.45 million dollars, respectively. In overall period of the study, export of banana to Iran measured in quantity was 4197.40 thousands MT. Value realized from the export in rupees and dollar was 1301.16 Lacks and 2.15 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 35.79, 39.28 and 41.15 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 39.17 per cent per annum. It was 51.24 and 41.96 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 38.86, 50.98 and 41.57 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.23. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.99 and 0.65 in period-I and 1.05 and 0.80 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 1.08 and 0.78 and in period-II, it was 1.16 and 0.80 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 1.09 and 0.78 respectively. Whereas it was 1.06 and 0.77 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.51 and 1.13 respectively. It was 1.64 and 1.23 for value measured in rupees and 1.52 and 1.12 for value measured in dollar respectively.

Table No. 4.23: Growth and Instability of Banana Export to Iran from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	201.66	45.29	0.1	6740.14	2100.36	3.45	4197.40	1301.16	2.15
	CGR	35.79	39.28	41.15	39.17	51.24	41.96	38.86	50.98	41.57
	SE	6.96	7.04	7.01	10.21	10.19	9.92	6.80	6.93	6.63
	“V” Value	5.14	5.57	5.87	3.84	5.02	4.23	5.71	7.35	6.26
Instability	CV	0.99	1.08	1.09	1.05	1.16	1.06	1.51	1.64	1.52
	CDI	0.65	0.78	0.78	0.80	0.80	0.77	1.13	1.23	1.12

4.11 Others

The growth and Instability in export of banana from India to other countries was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.24. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to other countries was 690.87 thousand MT. The value realized from banana export to other countries in rupees and dollars term was 112.40 Lacks and 0.58 million dollars, respectively. During period-II, export of banana to other countries was increased. In quantity term, average export of banana was 4743.98 thousand MT, whereas in value in rupees and dollars, it was 666.72 Lacks and 1.12 million dollars, respectively. In overall period of the study, export of banana to other countries measured in quantity was 2717.42 thousands MT. Value realized from the export in rupees and dollar was 389.56 Lacks and 0.85 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -7.33, -9.16 and -14.46 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 47.45 per cent per annum. It was 22.00 and 18.66 per cent per annum for value in rupees and value in dollar. All the growth rates were significant except period-I. During overall period, compound growth rate of banana export was 44.90, 20.61 and 5.83 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was non-significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.24. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.34 and 0.17 in period-I and 1.95 and 1.70 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.47 and 0.28 and in period-II, it was 1.16 and 0.93 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.79 and 0.00 respectively. Whereas it was 1.11 and 0.93 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 2.41 and 2.20 respectively. It was 1.51 and 1.25 for value measured in rupees and 1.09 and 1.03 for value measured in dollar respectively.

Table No. 4.24: Growth and Instability of Banana Export to Other countries from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	690.87	112.40	0.58	4743.98	666.72	1.12	2717.42	389.56	0.85
	CGR	-7.33	-9.16	-14.46	47.45	22.00	18.66	44.90	20.61	5.83
	SE	1.45	2.28	4.16	13.80	5.47	5.36	10.09	3.46	2.38
	“t” Value	-5.05	-4.02	-3.47	3.44	4.02	3.48	4.45	5.95	2.45
Instability	CV	0.34	0.47	0.79	1.95	1.16	1.11	2.41	1.51	1.09
	CDI	0.17	0.28		1.70	0.93	0.93	2.20	1.25	1.03

4.12 Growth and Instability of total Banana Export from India

The growth and Instability in export of banana from India to all countries was estimated to assess the performance of banana export. The growth and instability in export of banana was estimated for the year 1996-97 to 2017-18. The performance of banana export was also estimated for the sub period *viz*; period-I (1996-97 to 2006-07) and period-II (2007-08 to 2017-18). The results are reported in Table 4.25. The growth rate and instability in banana export was estimated for three parameters *viz*; quantity, value in rupees and value in dollars.

The results revealed that, during period-I, the average quantity of banana exported to all countries was 8789.76 thousand MT. The value realized from banana export to all countries in rupees and dollars term was 1399.46 Lacks and 3.15 million dollars, respectively. During period-II, export of banana to all countries was decreased. In quantity term, average export of banana was 62083.71 thousand MT, whereas in value in rupees and dollars, it was 18752.74 Lacks and 31.70 million dollars, respectively. In overall period of the study, export of banana to all countries measured in quantity was 35436.73 thousands MT. Value realized from the export in rupees and dollar was 10076.1 Lacks and 17.42 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export decreased in quantity, increased in value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 8.31, 1.62 and -0.41 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 16.73 per cent per annum. It was 26.54 and 20.33 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 17.72, 26.95 and 21.42 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was non-significant whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The instability in export of banana was estimated with the help of coefficient of variation and Cuddy-Della Valle instability Index and result were presented in the Table 4.25. The instability in export of banana was measured on important parameters *viz*; export of banana measured in quantity, value in rupee and value in dollars.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.27 and 0.14 in period-I and 0.53 and 0.28 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.22 and 0.00 and in period-II, it was 0.70 and 0.27 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.23 and 0.00 respectively. Whereas it was 0.58 and 0.23 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.96 and 0.46 respectively. It was 1.22 and 0.65 for value measured in rupees and 1.06 and 0.52 for value measured in dollar respectively.

Table No. 4.25: Growth and Instability of total Banana Export from India

Particulars		Period-I			Period-II			Overall		
		Qty	Rs.	US \$	Qty	Rs.	US \$	Qty	Rs.	US \$
Growth	Mean	8789.76	1399.46	3.15	62083.71	18752.74	31.70	35436.73	10076.1	17.42
	CGR	8.31	1.62	-0.41	16.73	26.54	20.33	17.72	26.95	21.42
	SE	1.00	1.16	1.27	2.33	1.93	1.71	1.41	1.40	1.31
	“t” Value	8.26	1.40	-0.32	7.18	13.74	11.83	12.51	19.16	16.30
Instability	CV	0.27	0.22	0.23	0.53	0.70	0.58	0.96	1.22	1.06
	CDI	0.14			0.28	0.27	0.23	0.46	0.65	0.52

Table No. 4.26 Country wise compound growth rate of Banana export from India during 1996-97 to 2017-18

Sr. N.	Country	Quantity	Rupees	Dollar
1	UAE	14.10	22.34	18.55
2	Nepal	20.60	34.88	28.09
3	Saudi Arab	14.90	24.36	19.00
4	Baharain	8.03	14.69	11.61
5	Kuwait	17.58	24.46	20.71
6	Oman	41.92	46.17	40.19
7	Qatar	14.51	25.51	20.43
8	Maldives	11.70	25.81	18.71
9	USA	00.00	00.00	00.00
10	Iran	38.86	50.98	41.57
11	Total	17.72	26.95	21.42

Fig.4.9 concluded that the compound growth rate of banana export from India in terms of quantity. A figure shows that, maximum CGR was recorded in Oman followed by Iran and Nepal. Least CGR was recorded in USA, Baharain and Maldives.

Fig. 4.10 concluded that the compound growth rate of banana export from India in terms of rupees. A figure shows that, maximum CGR was recorded in Iran followed by Oman and Nepal. Least CGR was recorded in USA, Baharain and Kuwait.

Fig. 4.11 concluded that the compound growth rate of banana export from India in terms of dollar. A figure shows that, maximum CGR was recorded in Iran followed by Oman and Nepal. Least CGR was recorded in USA, Baharain and Maldives.

Table No. 4.27 Country wise instability in Banana export from India during 1996-97 to 2017-18

Sr. No.	Country	Quantity	Rupees	Dollar
1	UAE	0.38	0.54	0.43
2	Nepal	0.64	0.84	0.68
3	Saudi Arab	0.54	0.69	0.56
4	Baharain	1.20	0.41	0.43
5	Kuwait	0.69	0.77	0.66
6	Oman	1.05	1.13	1.01
7	Qatar	0.41	0.63	0.52
8	Maldives	0.49	0.69	0.55
9	USA	1.18	0.0	0.0
10	Iran	1.13	1.23	1.12
11	Total	0.46	0.65	0.52

Fig. 4.12 concluded that the instability of banana export from India in terms of quantity. A figure shows that, maximum instability was recorded in Baharain followed by USA and Iran. Least instability was recorded in UAE, Qatar and Maldives.

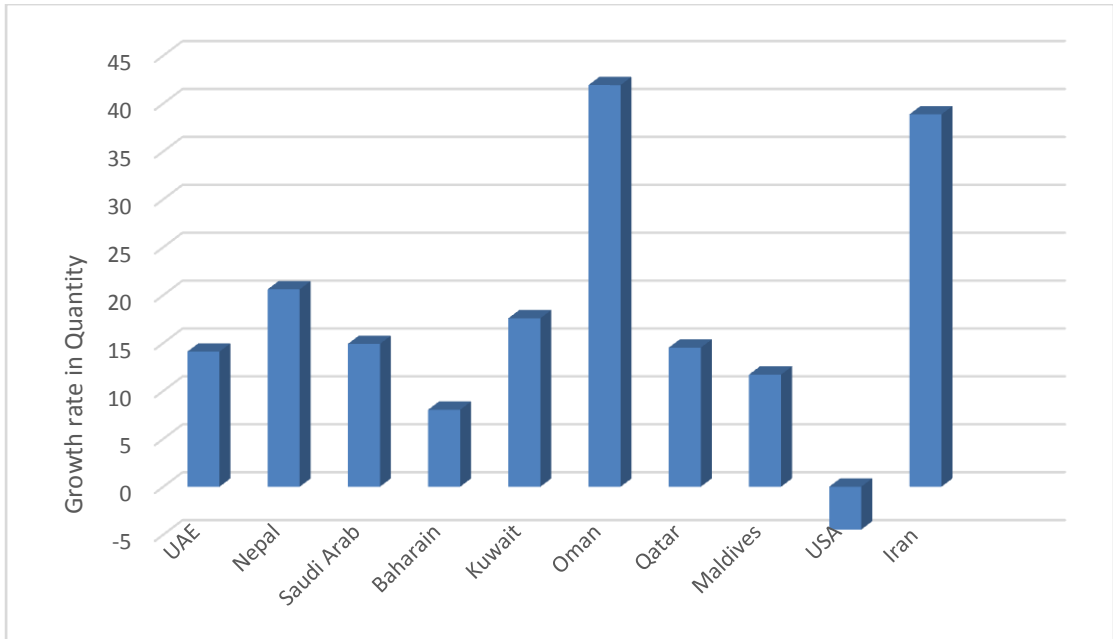


Fig.4.9 Compound Growth Rate of Banana Export from India in quantity

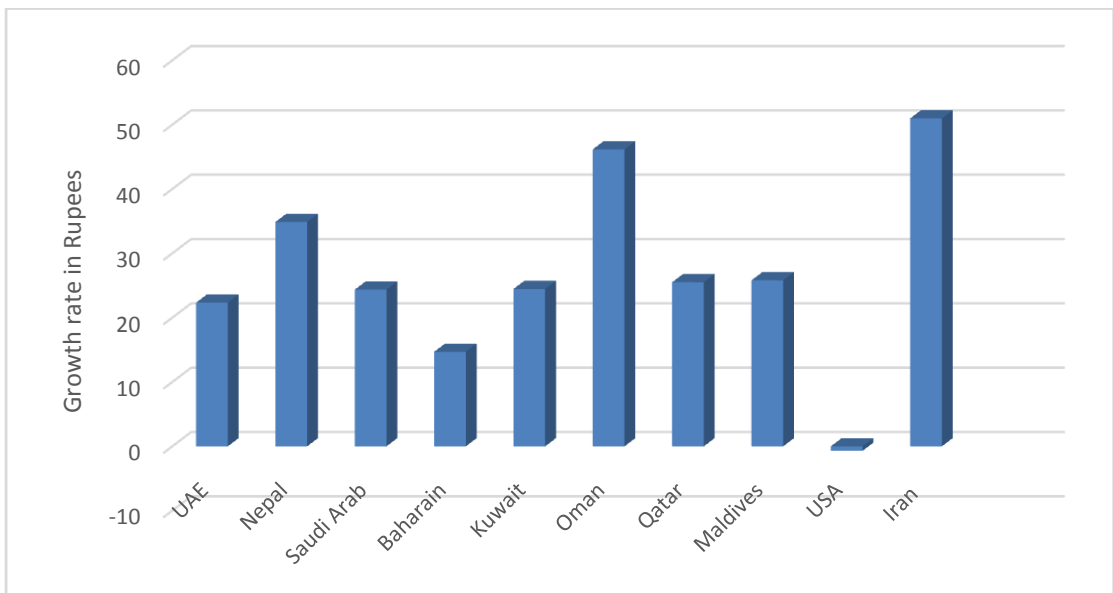


Fig. 4.10 Compound Growth Rate of Banana Export from India in Value measured in rupees

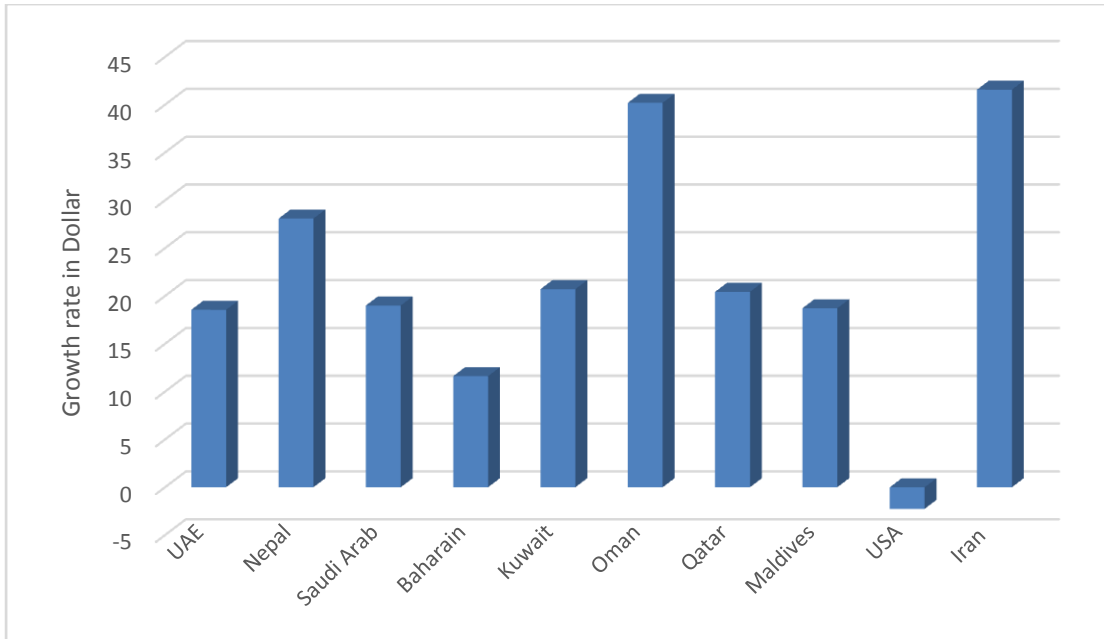


Fig. 4.11 Compound Growth Rate of Banana Export from India in Value measured in dollar.

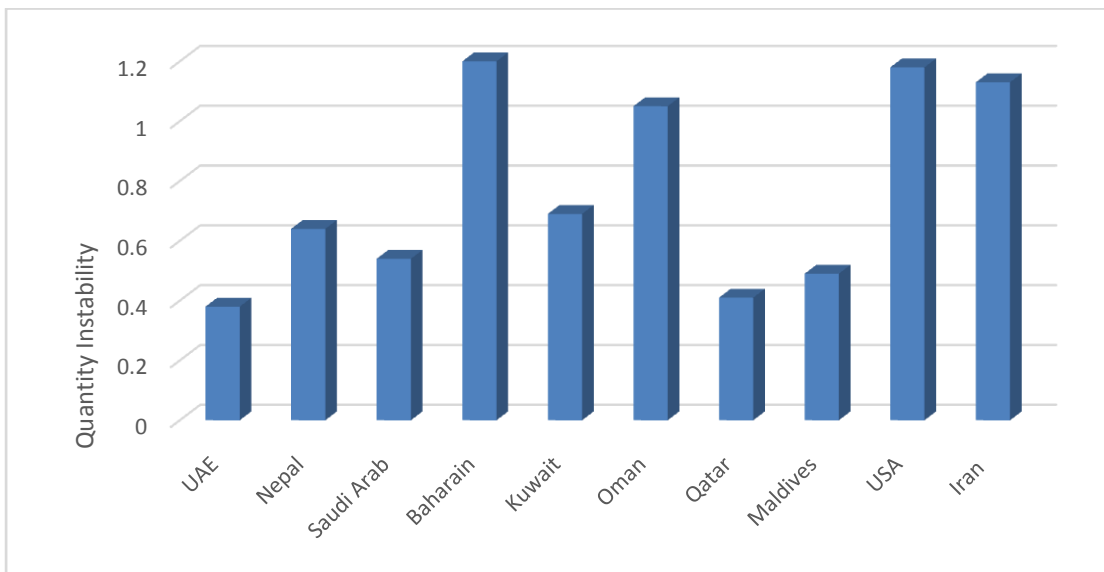


Fig. 4.12 Instability in Banana Export from India in terms of quantity

Fig. 4.13 concluded that the instability of banana export from India in terms of rupees. A figure shows that, maximum instability was recorded in Iran followed by Oman and Nepal. Least instability was recorded in USA, Baharain and UAE.

Fig. 4.14 concluded that the instability of banana export from India in terms of dollar. A figure shows that, maximum instability was recorded in Iran followed by Oman and Nepal. Least instability was recorded in USA, UAE and Baharain.

4.5 Direction of trade and changing export pattern of Banana

4.5.1 Trade direction of Banana export from India to major destinations during first period of the study

The structural change in export of Indian banana was examined by estimating the transition probability metrics using Markov chain model. According to Dent (1967), in Markov chain analyzes the structural change in any system whose progress through time can be measured in terms of single outcome variable. The transitional probability matrix was obtained for the study period-I (1995-96 to 2006-07) by using the actual proportion of exports to different importing countries. The year wise export quantity of top 9 countries *viz.*, U.A.E, Nepal, Saudi Arabia, Bahrain, Kuwait and Oman, Qatar, Maldives, Iran and pooling all other countries export as 'other countries'. The matrix gives a broad indication of direction of trade of Indian banana export. The row elements in the transitional probability matrix provide the information of the extent of loss in trade, on account of competing countries. The column element indicates the probability of gains in volume of trade from other competing countries and the diagonal element indicates probability of retention of the previous year's trade volume by the respective country. The transition probability matrix for banana export from India to major importing countries is shown in Table no. 4.28.

It is clear from the table that, Nepal was the most stable market with the high probability retention of 0.7981 of the export quantity that is, the probability that Nepal retains the export share over the study was 79.8 per cent. Followed by UAE (59.27 per cent) and Kuwait (18.56 per cent) and all remaining countries that is Saudi Arab, Baharain, Oman, Qatar, Maldives, Iran and other countries had a zero probability retention hence these countries had most unstable market for banana

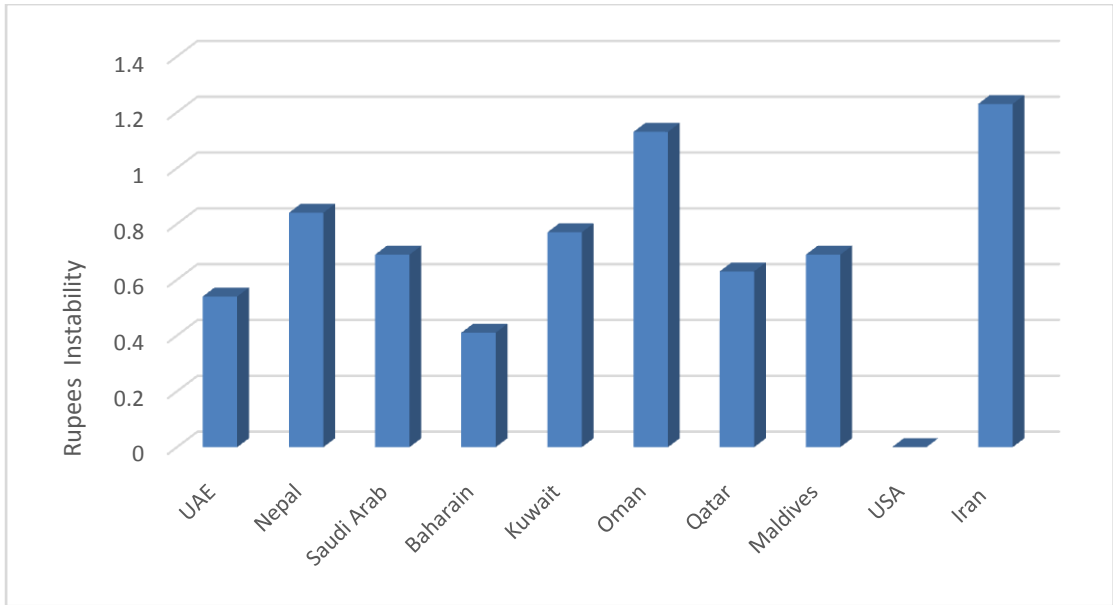


Fig. 4.13 Instability in Banana Export from India in terms value measured in rupees

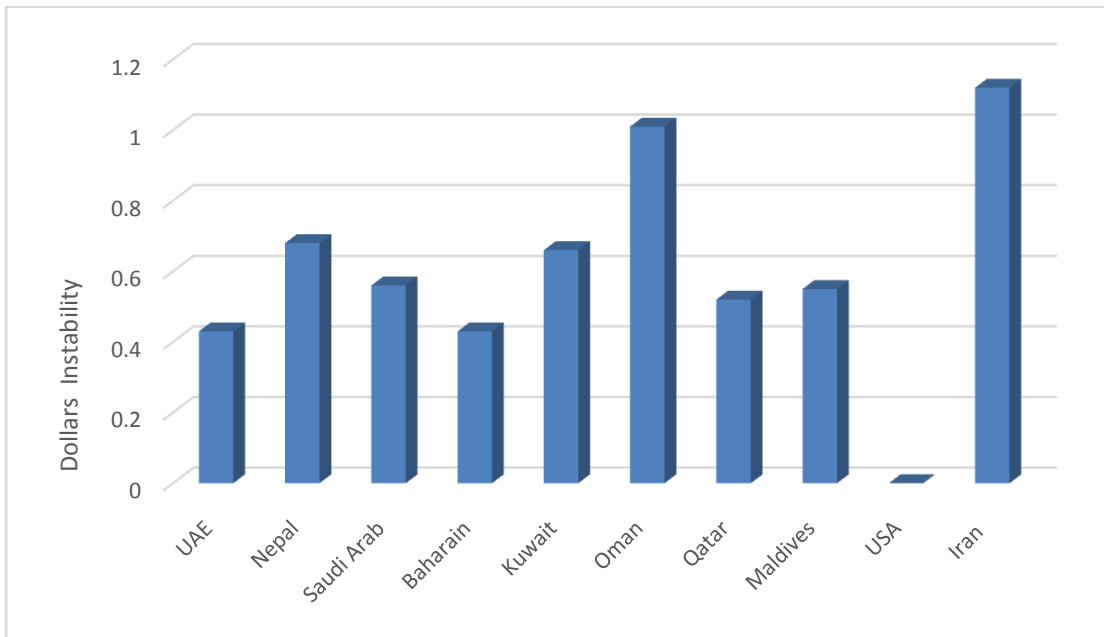


Fig. 4.14 Instability in Banana Export from India in terms of value measured in dollar

export. During the period-I Nepal and UAE was most loyal market for banana export from India and Kuwait was moderately stable market for banana export from India.

UAE retained 59.27 per cent of its previous market share. But it lost 16.77 per cent market share to other countries, 10.44 per cent market share to Baharain, 9.07 per cent market share to Oman, 4.46 per cent market share to Kuwait and all other countries that is Nepal, Saudi Arab, Qatar, Maldives and Iran had zero per cent market share. UAE gained 69.03 per cent market share from other countries, 46.02 per cent market share from Saudi Arab, 9.75 per cent market share from Baharain, 7.53 per cent market share from Nepal and all other countries that is Kuwait, Oman, Qatar, Maldives, Iran had zero per cent market share.

Nepal retained 7.53 per cent of its previous market share. But it lost 3.85 per cent market share from Baharain, 2.30 per cent market share from Saudi Arab, 2.01 per cent market share from Kuwait, 1.63 per cent market share from Qatar, 1.43 per cent from Maldives, 1.12 per cent from other, 0.31 per cent from Iran. Nepal gained 100 per cent market share from Maldives and Iran.

Saudi Arab retained 46.02 per cent of its previous market share. But it lost 46.06 per cent market share to Qatar, 7.92 per cent market share to Baharain. Saudi Arab gained 90.25 per cent market share from Baharain, 22.39 per cent market share from other, 17.43 per cent market share from Qatar, 2.30 per cent market share from Nepal.

Baharain retained 9.75 per cent of its previous market share. But it lost 90.25 per cent market share to Saudi Arab, 9.75 per cent market share to UAE. Baharain gained 20.71 per cent market share from Qatar, 10.44 per cent market share from UAE, 7.92 per cent from Saudi Arab, 3.85 per cent market share from Nepal.

Kuwait could not retain its previous market share. But it lost 58.27 per cent market share to Oman, 23.16 per cent market share to Maldives. Kuwait gained 14.50 per cent market share from Oman, 8.57 per cent market share from other countries, 4.46 per cent from UAE, 2.01 per cent market share from Nepal.

Oman could not retain its previous market share. But it lost 31.01 per cent market share to other countries, 24.86 per cent market share to Nepal, 23.03 per cent to Iran, 14.50 per cent market share to Kuwait, 6.60 per cent to Maldives. Oman gained 58.27 per cent market share from Kuwait, 9.07 per cent market share from UAE.

Qatar could not retain its previous market share. But it lost 61.86 per cent market share to other countries, 20.71 per cent market share Baharain, 17.43 per cent market share to Saudi Arab. Qatar gained 46.06 per cent market share from Saudi Arab and 1.63 per cent market share from Nepal.

Maldives could not retain its previous market share. But it lost 100 per cent market share to Nepal. Maldives gained 23.16 per cent market share from Kuwait, 6.60 per cent market share from Oman, 1.43 per cent market share from Nepal.

Iran could not retain its previous market share. But it lost 100 per cent market share to Nepal. Iran gained 23.03 per cent market share from Oman, 0.31 per cent market share from Nepal.

Other countries retained 69.03 per cent of its previous market share. But it lost 22.39 per cent to Saudi Arab and 8.57 per cent market share to Kuwait. Other countries gained 61.86 per cent market share from Qatar, 31.01 per cent market share from Oman, 16.77 per cent market share from UAE, 1.12 per cent market share from Nepal.

Table No.4.28: Trade direction of Banana export from India to major destinations during first period of the study

Countries	UAE	Nepal	Saudi Arab	Baharain	Kuwait	Oman	Qatar	Maldives	Iran	Other
UAE	0.5927	0.0000	0.0000	0.1044	0.0446	0.0907	0.0000	0.0000	0.0000	0.1677
Nepal	0.0753	0.7981	0.0230	0.0385	0.0201	0.0000	0.0163	0.0143	0.0031	0.0112
Saudi Arab	0.4602	0.0000	0.0000	0.0792	0.0000	0.0000	0.4606	0.0000	0.0000	0.0000
Baharain	0.0975	0.0000	0.9025	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Kuwait	0.0000	0.0000	0.0000	0.0000	0.1856	0.5827	0.0000	0.2316	0.0000	0.0000
Oman	0.0000	0.2486	0.0000	0.0000	0.1450	0.0000	0.0000	0.0660	0.2303	0.3101
Qatar	0.0000	0.0000	0.1743	0.2071	0.0000	0.0000	0.0000	0.0000	0.0000	0.6186
Maldives	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Iran	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other	0.6903	0.0000	0.2239	0.0000	0.0857	0.0000	0.0000	0.0000	0.0000	0.0000

4.5.2 Trade direction of Banana export from India to major destinations during second period of the study

The transitional probability matrix was obtained for the study period-II (2008-09 to 2017-18) by using the actual proportion of exports to different importing countries. The year wise export quantity of top 9 countries viz., U.A.E, Nepal, Saudi Arabia, Bahrain, Kuwait and Oman, Qatar, Maldives, Iran and pooling all other countries export as 'other countries'. The matrix gives a broad indication of direction of trade of Indian banana export. The row elements in the transitional probability matrix provide the information of the extent of loss in trade, on account of competing countries. The column element indicates the probability of gains in volume of trade from other competing countries and the diagonal element indicates probability of retention of the previous year's trade volume by the respective country. The transition probability matrix for banana export from India to major importing countries was reported in Table no.4.29.

It is clear from the table that, Baharain was the most stable market with the high probability retention of 0.1134 of the export quantity that is, the probability that Baharain retains the export share over the study was 11.34 per cent followed by Kuwait (8.25per cent) and other countries (1.31 per cent) and all remaining countries viz. UAE, Nepal, Saudi Arab, Oman, Qatar, Maldives, Iran had a zero probability retention hence these countries had most unstable market for banana export. During the period-I Baharain and Kuwait was most loyal market for banana export from India and other countries was moderately stable market for banana export from India.

Baharain could not retain its previous market share. Baharain could not lose its market share to any other countries. Baharain gained 8.19 per cent market share from UAE and 6.67 per cent market share.

Kuwait retained 21.25 per cent of its previous market share. But it lost 61.73 per cent to Oman, 21.15 per cent market share to Maldives, 5.91 per cent market share to Saudi Arab and other countries and 2.97 per cent market to Qatar. Kuwait gained 2.55 per cent market share from Saudi Arab, 2.46 per cent market share from Maldives, 1.57 per cent market share from Iran, 0.72 per cent market share from UAE.

Other countries retained 6.31 per cent of its previous market share. But it lost 6.31 per cent market share to Maldives, 1.31 per cent market share to Saudi Arab. Other countries gained 68.32 per cent market share from Oman, 17.14 per cent

market share from Nepal, 5.91 per cent market share from Kuwait, 4.43 per cent market share from Iran.

UAE could not retain its previous market share. But it lost 10.80 per cent market share to Nepal and also 10.80 per cent market share to Iran, 8.19 per cent market share to Baharain and 0.72 per cent market share to Kuwait. UAE gained 54.78 per cent market share from Qatar, 21.15 per cent market share from Kuwait, 9.82 per cent market share from Saudi Arab and 6.31 per cent market share from other countries.

Nepal could not retain its previous market share. But it lost 17.14 per cent market share to Saudi Arab and 17.14 per cent to other countries, 10.42 per cent market share to Qatar, 8.16 per cent market share to Oman and 6.67 per cent market share to Baharain. Nepal gained 31.04 per cent market share from Saudi Arab and 10.80 per cent market share from UAE.

Saudi Arab retained 9.82 per cent of its previous market share. But it lost 31.04 per cent market share to Nepal and 31.04 per cent to Iran, 26.21 per cent market share to Oman, 9.82 per cent market share to UAE and 9.82 per cent to Maldives and 2.55 per cent to Kuwait. Saudi Arab gained 68.32 per cent market share from Oman, 17.14 per cent market share from Nepal, 5.91 per cent market share from Kuwait, 4.43 per cent market share from Iran, 1.31 per cent market share from other countries.

Oman could not retain its previous market share. But it lost 68.32 per cent market share to Saudi Arab and 68.32 per cent to other countries and 4.68 per cent to Qatar. Oman gained 61.73 per cent from Kuwait, 26.21 per cent from Saudi Arab, 8.16 per cent market share from Nepal and 3.40 per cent market share from Iran.

Qatar retained 54.78 per cent of its previous market share and whole was lost to Maldives. Qatar gained 10.42 per cent market share from Nepal, 4.68 per cent market share from Oman and 2.97 per cent market share from Kuwait.

Maldives could not retain its previous market share. But it lost 2.46 per cent market share to Kuwait.

Iran could not retain its previous market share. But it lost 4.43 per cent market to Saudi Arab and 4.43 per cent to other countries, 3.40 per cent market share to Oman and 1.57 per cent market share to Kuwait.

Table 4.29: Trade direction of Banana export from India to major destinations during second period of the study

Countries	UAE	Nepal	Saudi Arab	Baharain	Kuwait	Oman	Qatar	Maldives	Iran	Other
UAE	0.0000	0.1080	0.0000	0.0819	0.0072	0.0000	0.0000	0.0000	0.1080	0.0000
Nepal	0.0000	0.0000	0.1714	0.0667	0.0000	0.0816	0.1042	0.0000	0.0000	0.1714
Saudi Arab	0.0982	0.3104	0.0000	0.0000	0.0255	0.2621	0.0000	0.0982	0.3104	0.0000
Baharain	0.0000	0.0000	0.0000	0.1134	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Kuwait	0.2115	0.0000	0.0591	0.0000	0.0825	0.6173	0.0297	0.2115	0.0000	0.0591
Oman	0.0000	0.0000	0.6832	0.0000	0.0000	0.0000	0.0468	0.0000	0.0000	0.6832
Qatar	0.5478	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5478	0.0000	0.0000
Maldives	0.0000	0.0000	0.0000	0.0000	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000
Iran	0.0000	0.0000	0.0443	0.0000	0.0157	0.0340	0.0000	0.0000	0.0000	0.0443
Other	0.0631	0.0000	0.0131	0.0000	0.0000	0.0000	0.0000	0.0631	0.0000	0.0131



*Summary and
Conclusion*



CHAPTER-V

SUMMARY AND CONCLUSION

India is known as fruits and vegetable basket of the world. It ranks second in fruits and vegetables production in the world after China. India's contribution in the world production of fruits and vegetables was 14.3 % & 15.6% respectively during 2016-17. (National Horticulture Database 2016). India is the world's largest producer of mango (45%), bananas (29%), papaya (37%), pomegranate, sapota and acid lime in addition grape recording highest productivity (21.6 t/ha) in the world.

Banana is reported to be grown in 130 countries in the world with a total production of 113918.763 thousand tones and area 5637.508 thousand hectares in 2017. Bananas are the fifth largest agricultural commodity in world trade after cereals, sugar, coffee and cocoa. However, production as well as exports and imports of Banana is highly concentrated in a few countries. The top five banana producing countries are India, China, Philippines, Brazil, and Ecuador, alone produced more than 60 per cent of the total world Banana production. At the global perspective India is the largest banana producing country in the world followed by China and Philippines. India's share in the world banana production is about 24 per cent followed by China at 10 per cent and Philippines at 9 per cent. Besides these three countries, the other major banana producing countries are Ecuador, Brazil, Indonesia, Angola, Guatemala, Tanzania, Mexico, Costa Rica and Colombia.

Banana is an important fruit crop for subsistence farmers, and ensures year round security for food and income. Considering the year round availability of fruits, unlike the seasonal availability of other fruits, it has become an inevitable necessity in any household in India for all functions. Bananas are exceedingly good for students as the rich source of potassium can make a person very alert, the fruit is often called a brain tonic. For those suffering from depression, bananas are good as they contain a protein called serotonin which is also called the 'happy hormone'. Eating bananas helps people give up smoking as this fruit is rich in vitamin C, A, B6 and B12. Banana contains potassium and magnesium as well, which help the body recover from nicotine withdrawal. When you suffer from a hangover – a banana milkshake with honey can give you immense relief. Cold milk soothes the stomach

lining and bananas with honey build up depleted blood sugar levels. For pregnant women suffering from morning sickness, eating bananas in between meals helps immensely in settling the queasiness in the stomach. The peel of a banana fruit can be rubbed on a mosquito bite with good effect, the stinging sensation stops and the swelling also reduces.

India ranks first both in terms of area and production of Banana in the world contributing around 15 per cent of the total global area and about 29 per cent of the total world's production. The average productivity of banana in India is 37.90 Mt/ha. compared to the world average of 21.20 Mt./ha. (National Horticulture Board 2016). Jalgaon district known as the "Banana City of India", Jalgaon district in north Maharashtra contributes about half of Maharashtra's banana production and more than 16 per cent of the of the India. The five important Banana producing states in the country are Tamil Nadu, Maharashtra, Gujarat, Karnataka and Andhra Pradesh. These five states contribute more than 70 percent of total banana production in the country.

In view of importance of export trade of Banana, such a type of study was entitle "Export performance of Banana in India" made to know the status and prospects of with the following specific objectives.

1. To study growth and instability in area, production and productivity of banana in India
2. To study the export profile of banana in India
3. To estimate growth and instability in export of banana from India
4. To study the direction of trade and changing export pattern of banana in India

The required secondary data for the present study have been collected from Directorate General of Commercial Intelligence and Statistics (DGCIS), Government of India, National horticulture board. Similarly, area, production and productivity of banana were collected from Horticultural statistics at glance-2018 and websites such like www.apeda.com and www.indiaagrsta.com. Data on global prices, exporters and importers were collected from United States Department of Agriculture (USDA), FAO publication for international reference price, Agricultural prices in India for wholesale prices.

The data regarding export of banana was collected from 1996-97 to 2017-18. This includes 22 years data. For the purpose of comparison, the period of

study was divided into three periods i.e. Period-I: 1996-97 to 2006-07, Period-II: 2007-08 to 2017-18 and Overall Period: 1996-97 to 2017-18. The data regarding India's area, production and productivity of banana was collected from 1996-97 to 2017-18 i.e. 22 years data.

The different analytical techniques used in the study such as Tabular analysis, Growth analysis, Instability analysis, Normalized Barry's Index and Markov-chain analysis were employed. From the list of banana importers from India, top 10 countries, which were major and regular importers, were identified and remaining countries were grouped as unspecified countries. Thus, for top 10 countries trend analysis was carried out with different analytical tools and techniques were used in the study.

The CGR in area, production and productivity of banana in India from the period 1996-97 to 2017-18, there is more fluctuation in area production and yield. From period 1996-97 area of banana cultivation has lots of fluctuations and irregularly area increases up to the period of the study, from the period 1996-97 to the 2005-06 slow increase in area but during the period 2005-06 to 2010-11 sharp increase and then increases but slow rate to the period 2017-18. Production shows the lots of fluctuations; from period the 1996-97 to 2004-05 slow increase but later double the increase in number to the period 2007-08 then that productions increases more and more up to the period 2017-18. Production has more ups and downs as compared to area and productivity. The yield of banana for per hectare, yield has less fluctuations as compared to area and production but only two year indicate highest productivity that is 2008-09 and 2013-14 and very low in the year 1999-00, the productivity of banana lies between 23 to 37 tons per ha.

Instability in area, production and yield of banana coefficient of variation and Cuddy- Della Valle instability index was used. Coefficient of Variation of area was found to be 0.306 and Cuddy- Della Valle instability Index was 0.132. The coefficient of variation of banana production and yield were 0.382 and 0.115 respectively. Cuddy- Della Valle instability index for production and yield were 0.149 per cent and 0.069 per cent respectively. The results revealed that, highest instability was recorded in production series as compared to area and yield of banana during the

study period. Instability in area and yield of banana was low whereas instability in production of banana was moderate.

India has exported on an average 37722.89 thousand MT of banana per year to more than 40 countries in the world. Out of the total quantity, maximum i.e. (24.88 per cent) banana was exported to UAE, followed by Nepal (21.69 per cent), Iran (11.13 per cent), Saudi Arab (10.80 per cent), Oman (7.81 per cent), Kuwait (6.21 per cent), Baharain (4.46 per cent), Qatar (3.91per cent), Maldives (1.57 per cent), USA (0.34 per cent) and other countries i.e. (7.20 per cent). UAE, Nepal, Iran, Saudi Arab, Oman, Kuwait and Baharain were remained the major importer of Indian banana during the last 22 years.

The major banana importing countries from India in Value terms (In rupees). India has exported on an average 10348.61 lacks rupees of banana per year to more than 40 countries in the world. Out of the total value, maximum i.e. 33.02 per cent banana was exported to UAE followed by Saudi Arab (14.68), Iran (12.57), Oman (9.53 per cent), Kuwait (8.24 per cent), Nepal (6.30 per cent), Qatar (5.81 per cent), Baharain (4.42 per cent), Maldives (1.34 per cent), USA (0.32 per cent) and all other countries (3.76 per cent).UAE, Saudi Arab, Iran, Oman, Kuwait were remained the major importers of Indian banana during last 22 years measured in terms of Indian rupees.

The major banana importing countries from India in Value terms (In dollar). India has exported on an average 17.961 US millions dollar of banana per year to more than 40 countries in the world. Out of the total value, maximum i.e. (32.67 per cent) banana was exported to UAE followed by Saudi Arab (15.02 per cent), Iran (11.97 per cent), Oman (8.99 per cent), Kuwait (8.21 per cent), Nepal (6.12 per cent), Qatar (5.80 per cent), Baharain (4.68 per cent), Maldives (1.36 per cent), USA (0.37 per cent) and other countries (4.77 per cent). UAE, Saudi Arab, Iran, Oman and Kuwait were remained the major importers of Indian banana during last 22 years.

Top five banana importing countries during the period 1996-97 to 2017-18 measured in quantity, value in rupee and value in dollar. The results revealed that, top five banana importing countries during the study period measured in quantity were UAE, Nepal, Iran, Saudi Arab and Oman with their contribution in banana

export was to (24.88 per cent), (21.69 per cent), (11.13 per cent), (10.80 per cent) and (7.81 per cent) respectively. In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (33.02 per cent), Saudi Arab (14.68 per cent), Iran (12.57 per cent), Oman (9.13 per cent) and Kuwait (8.24 per cent) respectively. Where as in term of value measured in dollar to top five banana importing countries and their contribution to that banana export were UAE (32.67 per cent), Saudi Arab (15.02 per cent), Iran (11.98 per cent), Oman (8.99 per cent) and Kuwait (8.21 per cent) respectively. Results revealed that, in quantity term and value term, top banana importing countries were different. Such different may be due to unit price realization from export of banana to different countries.

The descriptive statistics of export in quantity, value in US dollar and value in rupees of Banana in India. The data (1996-2018) 22 years reported that mean export in quantity, value in US dollar and value in rupees was 37109.78 thousand tones, 18.25 million dollar and 10553.92 lacks respectively and median 16662.55 thousand tones, 6.49 US million and 2607.95 lack. The maximum and minimum in quantity 118465.70 and 6289.73 and value in US dollar 59.41 and 2.55 and value and value in rupees 39819.53 and 1171.82 respectively.

Normalized Barry's index for export of banana in terms of quantity for period-I are (0.685 per cent), period-II (0.819 per cent) and overall period (0.756 per cent). In terms of value in rupees for period-I are (0.697 per cent), period-II (0.804 per cent) and overall period (0.748 per cent). In terms of value in US dollar for period-I are (0.4107) and period-II (0.7781) and overall period (0.5847).

The average quantity of banana exported to UAE for period-I was 2626.61 thousand MT. The value realized from banana export to UAE in rupees and Dollar term was 573.38 Lacks and 1.03 million dollar, respectively. During period-II, export of banana to UAE was increased. In quantity term, average export of banana was 16146.18 thousand MT, whereas in value in rupees and dollar, it was 6260.55 Lakhs and 10.70 million dollar, respectively. In overall period of the study, export of banana to UAE measured in quantity was 9386.40 thousands MT. Value realized from the export in rupees and dollar was 3416.96 Lacks and 5.86 million dollar, respectively.

The compound growth rate of banana export to UAE measured in quantity, value in rupee and value in dollar was -2.45, -0.25 and 2.34 per cent per annum respectively in period-I. During period-II, CGR of banana export measured in quantity was 11.29 per cent per annum. It was (21.25 per cent) and (15.91 per cent) per cent per annum for value in rupees and value in dollar respectively. All the growth rates were significant, except quantity in period-I. During overall period, compound growth rate of banana export was (14.10 per cent), (22.34 per cent) and (18.55 per cent) per annum for quantity, value in rupee and value in dollar, respectively. Here observed that, Value of rupee significant at 5 per cent and dollar at 1 per cent level of significance in period-I. In period-II, value of rupee significant at 5 per cent and dollar at 1 per cent level of significance. Overall Period reveals that quantity at 0.001 significance level and values in rupees significant at 5 per cent and values in dollar at 1 per cent significance level.

The instability in banana export from UAE measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.24 and 0.24 in period-I and 0.36 and 0.23 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.26 and 0.00, and in period-II, it was 0.59 and 0.24, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.65 and 0.00, respectively. Whereas it was 0.46 and 0.21 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.81 and 0.38, respectively. It was 1.09 and 0.54 for value measured in rupees and 0.98 and 0.43 for value measured in dollar respectively. The index reveals dissimilar trend in all the three parameter.

The average quantity of banana exported to Nepal for period-I was 2699.49 thousand MT. The value realized from banana export to Nepal in rupees and dollars term was 89.68 Lacks and 0.19 million dollars, respectively. During period-II, export of banana to Nepal was increased. In quantity term, average export of banana was 13163.7 thousand MT, whereas in value in rupees and dollars, it was 1163.21 Lacks and 1.92 million dollars, respectively. In overall period of the study, export of banana to Nepal measured in quantity was 8180.74 thousands MT. Value realized from the export in rupees and dollar was 652.01 Lakhs and 1.10 million dollars, respectively.

The compound growth rate of banana export to Nepal measured in quantity, value in rupee and value in dollar was 40.39, 34.78 and 35.51 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 24.31 per annum. It was 35.67 and 28.92 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 20.60, 34.88 and 28.09 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

Instability in banana export to Nepal measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.93 and 0.45 in period-I and 0.75 and 0.46 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.89 and 0.52, and in period-II, it was 0.91 and 0.40, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.90 and 0.52, respectively. Whereas it was 0.78 and 0.33 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.05 and 0.64 respectively. It was 1.37 and 0.84 for value measured in rupees and 1.22 and 0.68 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

The average quantity of banana exported to Saudi Arab for period-I was 849.15 thousand MT. The value realized from banana export to Saudi Arab in rupees and dollars term was 181.06 Lacks and 0.50 million dollars, respectively. During period-II, export of banana to Saudi Arab was increased. In quantity term, average export of banana was 7296.77 thousand MT, whereas in value in rupees and dollars, it was 2856.90 Lacks and 4.89 million dollars, respectively. In overall period of the study, export of banana to Saudi Arab measured in quantity was 4072.96 thousands MT. Value realized from the export in rupees and dollar was 1518.98 Lacks and 2.69 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -6.85, -5.51 and -4.71 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 10.89 per annum. It was 22.98 and 17.23 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 14.90, 24.36 and 19.00 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export to Saudi Arab measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.29 and 0.26 in period-I and 0.44 and 0.38 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.29 and 0.29, and in period-II, it was 0.67 and 0.40, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.59 and 0.00 respectively. Whereas it was 0.55 and 0.37 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.93 and 0.54 respectively. It was 1.20 and 0.69 for value measured in rupees and 1.04 and 0.56 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

The average quantity of banana exported to Baharain for period-I was 485.28 thousand MT. The value realized from banana export to Baharain in rupees and dollars term was 98.71 Lacks and 0.22 million dollars, respectively. During period-II, export of banana to Baharain was increased. In quantity term, average export of banana was 2877.39 thousand MT, whereas in value in rupees and dollars, it was 817.11 Lacks and 1.45 million dollars, respectively. In overall period of the study, export of banana to Baharain measured in quantity was 1681.34 thousands MT.

Value realized from the export in rupees and dollar was 457.91 Lacks and 0.84 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -1.95, -0.71 and -3.24 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 0.42 per cent per annum. It was 11.05 and 6.43 per cent per annum for value in rupees and value in dollar. All the growth rates were significant except in period-I. During overall period, compound growth rate of banana export was 8.03, 14.69 and 11.61 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.20 and 0.00 in period-I and 0.95 and 0.00 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.29 and 0.00, and in period-II, it was 0.38 and 0.26 , respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.31 and 0.00 respectively. Whereas it was 0.31 and 0.29 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.29 and 0.1.20 respectively. It was 0.88 and 0.41 for value measured in rupees and 0.79 and 0.43 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

The average quantity of banana exported to Kuwait for period-I was 386.71 thousand MT. The value realized from banana export to Kuwait in rupees and dollars term was 92.20 Lacks and 0.20 million dollars, respectively. During period-II, export of banana to Kuwait was increased. In quantity term, average export of banana was 4302.02 thousand MT, whereas in value in rupees and dollars, it was 1613.55

Lacks and 2.74 million dollars, respectively. In overall period of the study, export of banana to Kuwait measured in quantity was 2344.37 thousands MT. Value realized from the export in rupees and dollar was 852.88 Lacks and 1.47 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 7.98, 7.84 and 6.21 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 14.54 per cent per annum. It was 25.67 and 18.77 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 17.58, 26.46 and 20.71 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.36 and 0.27 in period-I and 0.63 and 0.51 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.46 and 0.40, and in period-II, it was 0.75 and 0.46, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.45 and 0.41 respectively. Whereas it was 0.64 and 0.43 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.12 and 0.69 respectively. It was 1.30 and 0.77 for value measured in rupees and 1.15 and 0.66 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

The average quantity of banana export to Oman for period-I was 388.03 thousand MT. The value realized from banana export to Oman in rupees and dollars term was 77.74 Lacks and 0.17 million dollars, respectively. During period-II,

export of banana to Oman was increased. In quantity term, average export of banana was 5505.69 thousand MT, whereas in value in rupees and dollars, it was 1894.89 Lacks and 3.05 million dollars, respectively. In overall period of the study, export of banana to Oman measured in quantity was 2946.86 thousands MT. Value realized from the export in rupees and dollar was 986.31 Lacks and 1.61 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 6.30, 5.81 and 5.39 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 42.40 per cent per annum. It was 46.30 and 40.38 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 41.92, 46.17 and 40.19 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.39 and 0.00 in period-I and 1.03 and 0.51 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.48 and 0.00, and in period-II, it was 1.09 and 0.49, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.48 and 0.00 respectively. Whereas it was 1.00 and 0.44 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.55 and 1.05 respectively. It was 1.67 and 1.13 for value measured in rupees and 1.55 and 1.01 for value measured in dollar respectively. The index reveals similar trend in all the three parameter.

The average quantity of banana exported to Qatar for period-I was 409.54 thousand MT. The value realized from banana export to Qatar in rupees and dollars term was 90.30 Lacks and 0.20 million dollars, respectively. During period-II, export of banana to Qatar was increased. In quantity term, average export of banana was 2540.19 thousand MT, whereas in value in rupees and dollars, it was 1111.92 Lacks and 1.88 million dollars, respectively. In overall period of the study, export of banana to Qatar measured in quantity was 1474.86 thousands MT. Value realized from the export in rupees and dollar was 601.11 Lacks and 1.04 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -4.73, -1.69 and -3.83 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 12.22 per cent per annum. It was 24.96 and 19.24 per cent per annum for value in rupees and value in dollar. All the growth rates were significant except period-I. During overall period, compound growth rate of banana export was 14.51, 25.51 and 20.43 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and dollar was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.33 and 0.31 in period-I and 0.43 and 0.21 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.33 and 0.00, and in period-II, it was 0.69 and 0.23, respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.35 and 0.00 respectively. Whereas it was 0.57 and 0.21 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.86 and 0.41 respectively. It was

1.19 and 0.63 for value measured in rupees and 1.04 and 0.52 for value measured in dollar respectively. The index reveals dissimilar trend in all the three parameter.

The average quantity of banana exported to Maldives for period-I was 170.55 thousand MT. The value realized from banana export to Maldives in rupees and dollars term was 25.33 Lacks and 0.05 million dollars, respectively. During period-II, export of banana to Maldives was increased. In quantity term, average export of banana was 974.92 thousand MT, whereas in value in rupees and dollars, it was 241.32 Lacks and 0.41 million dollars, respectively. In overall period of the study, export of banana to Maldives measured in quantity was 591.89 thousands MT. Value realized from the export in rupees and dollar was 138.46 Lacks and 0.2 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 17.93, 10.73 and 8.59 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 2.73 per cent per annum. It was 25.05 and 15.93 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 11.70, 25.81 and 18.71 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, dollar and rupees was significant at 5 per cent and quantity was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.57 and 0.26 in period-I and 0.43 and 0.40 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.44 and 0.30, and in period-II, it was 0.73 and 0.39 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.41 and 0.31 respectively. Whereas it was 0.58 and 0.36 for value

measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.86 and 0.49 respectively. It was 1.20 and 0.69 for value measured in rupees and 1.03 and 0.55 for value measured in dollar respectively.

The average quantity of banana export to USA for period-I was 216.09 thousand MT. The value realized from banana export to USA in rupees and dollars term was 40.25 Lacks and 0.09 million dollars, respectively. During period-II, export of banana to USA was decreased. In quantity term, average export of banana was 41.12 thousand MT, whereas in value in rupees and dollars, it was 26.17 Lacks and 0.04 million dollars, respectively. In overall period of the study, export of banana to USA measured in quantity was 128.61 thousands MT. Value realized from the export in rupees and dollar was 33.21 Lacks and 0.06 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export decreased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 18.73, 17.05 and 16.21 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was -4.55 per cent per annum. It was 29.34 and 13.82 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was -4.47, -0.70 and -2.25 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was significant at 1 per cent level whereas, in period-II, dollar and rupees was significant at 5 per cent and quantity was non-significant at 1 per cent level of significance. During overall period in quantity and both values revealed negative and non-significant.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.85 and 0.82 in period-I and 0.88 and 0.00 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.68 and 0.60 and in period-II, it was 0.99 and 0.81 respectively. The CV and CDI estimate of banana export measured in value in dollar

in period-I was 0.69 and 0.63 respectively. Whereas it was 0.99 and 0.81 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.26 and 1.18 respectively. It was 0.83 and 0.00 for value measured in rupees and 0.85 and 0.00 for value measured in dollar respectively.

The average quantity of banana export to Iran for period-I was 201.66 thousand MT. The value realized from banana export to Iran in rupees and dollars term was 45.29 Lacks and 0.1 million dollars, respectively. During period-II, export of banana to Iran was increased. In quantity term, average export of banana was 6740.14 thousand MT, whereas in value in rupees and dollars, it was 2100.36 Lacks and 3.45 million dollars, respectively. In overall period of the study, export of banana to Iran measured in quantity was 4197.40 thousands MT. Value realized from the export in rupees and dollar was 1301.16 lakhs and 2.15 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 35.79, 39.28 and 41.15 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 39.17 per cent per annum. It was 51.24 and 41.96 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 38.86, 50.98 and 41.57 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was significant at 5 per cent and value measured in rupees was significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.99 and 0.65 in period-I and 1.05 and 0.80 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 1.08 and 0.78 and in period-II, it was 1.16 and 0.80

respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 1.09 and 0.78 respectively. Whereas it was 1.06 and 0.77 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 1.51 and 1.13 respectively. It was 1.64 and 1.23 for value measured in rupees and 1.52 and 1.12 for value measured in dollar respectively.

The average quantity of banana exported to other countries for period-I was 690.87 thousand MT. The value realized from banana export to other countries in rupees and dollars term was 112.40 Lacks and 0.58 million dollars, respectively. During period-II, export of banana to other countries was increased. In quantity term, average export of banana was 4743.98 thousand MT, whereas in value in rupees and dollars, it was 666.72 Lacks and 1.12 million dollars, respectively. In overall period of the study, export of banana to other countries measured in quantity was 2717.42 thousands MT. Value realized from the export in rupees and dollar was 389.56 Lacks and 0.85 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export increased in quantity, value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was -7.33, -9.16 and -14.46 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 47.45 per cent per annum. It was 22.00 and 18.66 per cent per annum for value in rupees and value in dollar. All the growth rates were significant except period-I. During overall period, compound growth rate of banana export was 44.90, 20.61 and 5.83 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in dollar was non-significant at 5 per cent and value measured in rupees was non-significant at 1 per cent level whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.34 and 0.17 in period-I and 1.95 and 1.70

in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.47 and 0.28 and in period-II, it was 1.16 and 0.93 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.79 and 0.00 respectively. Whereas it was 1.11 and 0.93 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 2.41 and 2.20 respectively. It was 1.51 and 1.25 for value measured in rupees and 1.09 and 1.03 for value measured in dollar respectively.

The average quantity of banana exported to all countries for period-I was 8789.76 thousand MT. The value realized from banana export to all countries in rupees and dollars term was 1399.46 Lacks and 3.15 million dollars, respectively. During period-II, export of banana to all countries was decreased. In quantity term, average export of banana was 62083.71 thousand MT, whereas in value in rupees and dollars, it was 18752.74 Lacks and 31.70 million dollars, respectively. In overall period of the study, export of banana to all countries measured in quantity was 35436.73 thousands MT. Value realized from the export in rupees and dollar was 10076.1 Lacks and 17.42 million dollars, respectively.

The result of compound growth rate (CGR) revealed that, the growth in banana export decreased in quantity, increased in value in rupee and value in dollar in period-II as compared to period-I. The compound growth rate of banana export measured in quantity, value in rupee and value in dollar was 8.31, 1.62 and -0.41 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 16.73 per cent per annum. It was 26.54 and 20.33 per cent per annum for value in rupees and value in dollar. All the growth rates were significant. During overall period, compound growth rate of banana export was 17.72, 26.95 and 21.42 per cent per annum for quantity, value in rupee and value in dollar respectively. In period-I, quantity and value measured in rupees was significant at 5 per cent and value measured in dollar was non-significant whereas, in period-II, quantity and rupees was significant at 5 per cent and dollar was significant at 1 per cent level of significance. During overall period in quantity and both values revealed 5 per cent significance level.

The result revealed that, instability in banana export measured in quantity was high during period-II compared to period-I. The coefficient of variation and CDI value measured in quantity was 0.27 and 0.14 in period-I and 0.53 and 0.28 in period-II, respectively. The CV and CDI estimate of banana export measured in value in rupees in period-I was 0.22 and 0.00 and in period-II, it was 0.70 and 0.27 respectively. The CV and CDI estimate of banana export measured in value in dollar in period-I was 0.23 and 0.00 respectively. Whereas it was 0.58 and 0.23 for value measured in dollar in period-II, respectively. In overall period, instability of C.V and CDI in banana export measured in quantity was 0.96 and 0.46 respectively. It was 1.22 and 0.65 for value measured in rupees and 1.06 and 0.52 for value measured in dollar respectively.

The compound growth rate of banana export from India in terms of quantity, maximum CGR was recorded in Oman followed by Iran and Nepal. Least CGR was recorded in USA, Baharain and Maldives. The compound growth rate of banana export from India in terms of rupees, maximum CGR was recorded in Iran followed by Oman and Nepal. Least CGR was recorded in USA, Baharain and Kuwait. The compound growth rate of banana export from India in terms of dollar, maximum CGR was recorded in Iran followed by Oman and Nepal. Least CGR was recorded in USA, Baharain and Maldives.

The instability of banana export from India in terms of quantity, maximum instability was recorded in Baharain followed by USA and Iran. Least instability was recorded in UAE, Qatar and Maldives. The instability of banana export from India in terms of rupees, maximum instability was recorded in Iran followed by Oman and Nepal. Least instability was recorded in USA, Baharain and UAE. The instability of banana export from India in terms of dollar, maximum instability was recorded in Iran followed by Oman and Nepal. Least instability was recorded in USA, UAE and Baharain.

Trade direction of Banana export from India to major destinations during first period of the study that is 1996-97 to 2006-07. It is clear from the study, Nepal was the most stable market with the high probability retention of 0.7981 of the export quantity that is, the probability that Nepal retains the export share over the study was 79.8 per cent. Followed by UAE retained (59.27 per cent) and Kuwait

retained (18.56 per cent) and all remaining countries that is Saudi Arab, Baharain, Oman, Qatar, Maldives, Iran and other countries had a zero probability retention hence these countries had most unstable market for banana export. During the period-I, it is revealed that Nepal and UAE was most loyal market for banana export from India and Kuwait was moderately stable market for banana export from India.

Trade direction of Banana export from India to major destinations during second period of the study that is 2007-08 to 2017-18. It is clear from the study. Baharain was the most stable market with the high probability retention of 0.1134 of the export quantity that is, the probability that Baharain retains the export share over the study was 11.34 per cent. Followed by Kuwait retained (8.25 per cent) and other countries retained (1.31 per cent) and all remaining countries that is UAE, Nepal, Saudi Arab, Oman, Qatar, Maldives, Iran had a zero probability retention hence these countries had most unstable market for banana export. During the period-I, it is revealed that Baharain and Kuwait was most loyal market for banana export from India and other countries was moderately stable market for banana export from India.

CONCLUSION

The following conclusions were emerged from the present study.

1. The production and area of banana cultivation was increased but yield was decreased due to varietal difference and only some states of India given importance to banana cultivation.
2. The growth rate of area, production and yield was positive.
3. Highest instability was recorded in production series as compared to area and yield of banana.
4. India exported highest quantity of banana and earned highest values rupees and dollar from UAE, Nepal, Saudi Arab, Baharain, Kuwait, Oman, Qatar, Maldives, USA, Iran and other countries during the study period.
5. India majorly exported banana to top five countries viz; UAE, Nepal, Iran, Saudi Arab and Oman.
6. High diversification observed in banana export in period-I (1996-97 to 2006-07) than period-II (2007-08 to 2017-18).

7. The compound growth rate of banana export to all countries found higher and positive, whereas instability recorded high.
8. In exported quantity, high growth rate observed in Oman and low in USA, while high instability in Baharain and low in UAE.
9. Saudi Arab, Baharain, Oman, Qatar, Maldives, Iran found most unstable importers of the banana in period-I and Nepal, UAE and Kuwait found most stable importers.
10. UAE, Nepal, Saudi Arab, Oman, Qatar, Maldives, Iran are found most unstable importers in period-II and Baharain and Kuwait found most stable importers.
11. In overall trade direction UAE and Kuwait found the most stable market, followed by Nepal and Baharain and Iran found most unstable country in importers of Indian banana.

Policy Implication

1. The yield of banana cultivation is decreasing day by day which has adverse effect on production which ultimately influences export. So government may frame appropriate policy to sustain the yield under banana cultivation.
2. Instability in banana export was serious concerns which affect the prices of banana in domestic market and reduce foreign earning. So export of banana may stabilize by proving appropriate support.
3. Government should help to entrepreneurs by initiate incentives & policies, helping by subsidies, proper documentation and procedure for banana export, proper export duties on exportable commodities and encouragement to new start ups.
4. There is need for better infrastructure, transportations and cold storage facilities to banana growers for export.
5. Government should make easier documentation for export policies.
6. There is large number of small importers for Indian fresh banana like USA, Iran, Maldives etc. therefore attempts should be made to exploit these potential markets and develop protocol to increase the banana exports.

There was no stability in export of banana from India throughout the study period. Therefore encouragement should be given to banana producers for export their produce to get export stability and remunerative benefit.



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*Thesis
Abstract*



ABSTRACT

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Banana (*Musa paradisiaca* L.) is an important fruit of tropical countries like India, China, Brazil, Philippines etc, belongs to **Musaceae** family and *Musa* genus to the order **Zingiberales**. Banana is also known as *Apple of paradise*. Banana is native to tropical south and south East Asia. It is the most popular fresh fruit all over the world and its name comes from the Arabic word ‘banan’, which means finger. Banana is the national fruit of Central African Republic. The banana were grown in southern Asia even before the prehistoric periods and the world’s largest diversity in banana population is found in this area. Owing to its greater socio-economic significance and multifaceted uses banana is popularly known as **Kalpataru** (a plant with virtues).

Banana is reported to be grown in 130 countries in the world with a total production of 113918.763 thousand tones and area of 5637.508 thousand hectares in 2017 (Food and Agriculture Organization). Banana is the fifth largest agricultural commodity in world trade after cereals, sugar, coffee and cocoa. India ranks first both in terms of area and production of Banana in the world contributing around 15 per cent of the total global area and about 29 per cent of the total world’s

production. The average productivity of banana in India is 37.90 Mt/ha. compared to the world average of 21.20 Mt/ha. (National Horticulture Board 2016).The five important Banana producing states in the country are Tamil Nadu, Maharashtra, Gujarat, Karnataka and Andhra Pradesh. These five states contribute more than 70 percent of total banana production in the country.

The required secondary data for the present study have been collected from Directorate General of Commercial Intelligence and Statistics (DGCIS), Government of India, National horticulture board. Similarly, area, production and productivity of banana were collected from Horticultural statistics at glance-2018 and viz;www.apeda.com and www.indiaagrista.com. The data regarding export of banana was collected from 1996-97 to 2017-18. This includes 22 years data. For the purpose of comparison, the period of study was divided into three periods i.e. Period-I: 1996-97 to 2006-07, Period-II: 2007-08 to 2017-18 and Overall Period: 1996-97 to 2017-18. The data regarding India's area, production and productivity collected from 1996-97 to 2017-18 i.e. 22 years data. The different analytical techniques used in the study such as Tabular analysis, Growth analysis, Instability analysis, Normalized Barry's Index and Markov-chain analysis were employed.

Compound growth rate for area was 4.478 percent, 5.673 percent for production and 1.475 percent for yield obtained under banana which recorded statistically positive and significant compound growth rate at one per cent level. Coefficient of Variation of area was found to be 0.306 and Cuddy- Della Valle instability Index was 0.132. The coefficient of variation of banana production and yield were 0.382 and 0.115 respectively. Cuddy- Della Valle instability index for production and yield were 0.149 per cent and 0.069 per cent respectively. The results revealed that, highest instability was recorded in production series as compared to area and yield of banana.

Top five banana importing countries during the study period measured in quantity were UAE, Nepal, Iran, Saudi Arab and Oman with their contribution in banana export was to (24.88 per cent), (21.69 per cent), (11.13 per cent), (10.80 per cent) and (7.81 per cent) respectively. In terms of value measured in rupees, top five banana importing countries with their contribution were UAE (33.02 per cent), Saudi Arab (14.68 per cent), Iran (12.57 per cent), Oman (9.13 per cent) and Kuwait (8.24 per cent) respectively. Where as in term of value measured in dollar to top five banana

importing countries and their contribution to banana export were UAE (32.67 per cent), Saudi Arab (15.02 per cent), Iran (11.98 per cent), Oman (8.99 per cent) and Kuwait (8.21 per cent) respectively.

The compound growth rate of banana export to all countries measured in quantity, value in rupee and value in dollar was 8.31, 1.62 and -0.41 per cent per annum, respectively in period-I. During period-II, CGR of banana export measured in quantity was 16.73 per cent per annum. It was 26.54 and 20.33 per cent per annum for value in rupees and value in dollar respectively. During the overall period, compound growth rate of banana export was 17.72, 26.95 and 21.42 per cent per annum for quantity, value in rupee and value in dollar respectively.

High instability in banana export in terms of quantity was recorded in Baharain i.e. 1.20 per cent followed by USA 1.18, Iran 1.13 per cent and Kuwait 0.69 per cent. Iran revealed highest instability in export of banana measured in dollar and rupees i.e. 1.12 per cent and 1.23 per cent, followed by Oman 1.01 per cent and 1.13 per cent, and Nepal 0.64 per cent and 0.84 per cent respectively.

The countries Saudi Arab, Baharain, Oman, Qatar, Maldives, Iran found most unstable importers of the banana in period-I and Nepal, UAE and Kuwait found most stable importers. UAE, Nepal, Saudi Arab, Oman, Qatar, Maldives, Iran are found most unstable importers in period-II and Baharain and Kuwait found most stable importers. In overall trade direction UAE and Kuwait found the most stable market, followed by Nepal. Baharain and Iran found most unstable country in importers of Indian banana.



Appendix



APPENDIX

1. Area, Production and Yield of Banana in India

Year	Area	Production	Productivity
	(In '000' Ha)	(In '000' MT)	(In MT/Ha)
1996-97	425	12440	29.3
1997-98	447	12643	28.3
1998-99	446	12425	27.9
1999-00	465	11124	23.9
2000-01	459	12899	28.1
2001-02	432	12519	29
2002-03	475	13304	28
2003-04	391	11388	29.2
2004-05	404	11210	29
2005-06	434	18702	33
2006-07	477	20998	35
2007-08	553	17,647.00	33.1
2008-09	709	26217	37
2009-10	770	26,470.00	34.4
2010-11	830	29,780.00	35.9
2011-12	796	28,455.00	35.8
2012-13	776	26,509.00	34.2
2013-14	803	29,725.00	37
2014-15	822	29221	35.5
2015-16	841	29135	34.6
2016-17	860	29,163.00	33.90
2017-18	885	30809	34

2. Country-wise Export of Banana in quantity from India. (Quantity in thousands MT)

Year	UAE	Nepal	Saudi Arab	Baharain IS	Kuwait	Oman	Qatar	Maldives	USA	Iran	other	Total
1996-97	27.14	114.44	13.51	12.57	2.07	1.05	40.8		27.74		63.41	302.73
1997-98	2905.73	134.56	1409.54	617.81	274.89	79.36	488.24	50.67	44.43	0.42	1011.99	7017.64
1998-99	3664.58	0.01	1249.33	602.86	311.72	489.87	768.68	81.59	90.88	0.6	851.33	8111.45
1999-00	2430.85		689.5	497.1	244.55	326.56	401.21	54.49	461.47		1184	6289.73
2000-01	4037.07	186.3	1216.44	484.66	513.3	641.95	414.84	205.47	29.28		900.12	8629.43
2001-02	3431.32	450.3	658.78	573.23	473.89	624.66	529.28	154.07	120.66	139.09	944.33	8099.61
2002-03	2067.14	3143.93	746.41	336.7	335.86	389.28	247.57	132.49	298.53	299.54	658.07	8655.52
2003-04	2104.51	5395.79	796.42	514.6	329.79	370.8	316.97	201.96	118.85	124.8	602.28	10876.77
2004-05	2458.99	6631.91	830.29	455.82	427.72	380.89	414.84	189.36	597.71		430.23	12817.76
2005-06	3477.04	5442.95	1059.87	746.89	729.16	582.6	552.28	286.87	435.97	565.6	531.88	14411.11
2006-07	2288.42	5494.71	670.63	495.89	610.93	381.41	330.23	348.59	151.49	281.6	421.99	11475.62
2007-08	5264.92	4867.29	1911.81	1011.78	916.21	683.49	784.19	830.14	18.88	22	351.84	16662.55
2008-09	10208.13	7855.55	5123.12	1262.52	1532.77	947.23	1347.45	1242.01	46.06	22.95	787.69	30402.48
2009-10	18644.19	6498.24	9336.38	2890.46	5551.79	1977.01	2684.23	648.03	105.44	5237.63	699.7	54273.1
2010-11	11674.24	5928.58	8953.67	10965.05	5473.75	1537.17	1801.78	981.29	113.73	9352	758.03	57539.29
2011-12	15133.61	9765.99	5013.96	2436.68	3195.58	2228.15	2053.14	912.55	11.41	4126.12	664.64	45581.83
2012-13	14801.7	11206.14	4403.46	2566.37	2219.51	3924.68	2809.15	644.59	15.11	790.36	6622.55	50003.62
2013-14	13999.56	6081.05	4809.1	2073.94	2148.72	3521.27	1933.84	310.21	11.8	942.95	423.14	36255.58
2014-15	19069.41	10106.88	9356.49	1825.24	4699.9	4978.07	3212.57	665.32	27.16	3377.6	7882.28	65200.92
2015-16	25296.18	20568.91	12896.79	1941.27	4990.71	9389.73	2950.75	1273.92	16.99	20358.6	581.75	100265.6
2016-17	24425.25	34334.96	10492.6	2609.45	10460.43	13164.06	3757.68	1506.92	49.48	15815.93	1848.94	118465.7
2017-18	19090.83	27587.14	7967.18	2068.61	6132.95	18211.8	4607.34	1709.22	36.35	14095.43	31563.25	108270.1

3. Country-wise Export of Banana in Value from India (values in Rs. Lacks)

Year	UAE	Nepal	Saudi Arab	Baharain IS	Kuwait	Oman	Qatar	Maldives	USA	Iran	other	Total
1996-97	3.04	3.27	2.07	1.55	0.25	0.16	4.96		8.58		18.03	41.91
1997-98	548.73	4.06	262.41	103.99	54.09	15.44	85.39	10.26	15.86	0.1	167.49	1267.82
1998-99	758.01	4.32	276.58	134.03	81.2	101.71	154.15	17.89	15.95	0.15	145.41	1689.4
1999-00	493.23		145.01	111.3	67.14	66.48	91.87	11	74.08		220.69	1280.81
2000-01	850.6	4.36	265.22	94.07	135.99	126.67	100.06	35.31	12.44		175.58	1800.3
2001-02	734.8	13.88	145.85	114.77	117.47	134.96	120.97	29.72	34.11	13.14	124.27	1583.94
2002-03	463.44	164.14	159.99	61.39	66.03	61.91	52.62	18.5	25.5	74.67	124.18	1272.37
2003-04	405.05	176.83	138.64	80.19	61.12	57	55.26	25.04	43.29	39.16	90.24	1171.82
2004-05	532.28	204.56	154.86	85.58	86.7	51.78	97.3	24.3	71.89		33.51	1342.76
2005-06	893.91	177.37	262.96	178.13	199.1	144.11	143.47	38.89	100.84	136.56	60.85	2336.19
2006-07	624.13	144.06	178.16	120.88	145.15	94.99	87.26	42.39	40.31	53.28	76.17	1606.78
2007-08	1185.84	169.1	389.92	215.81	185.71	147.87	172.55	79.79	4.81	3.44	53.11	2607.95
2008-09	2475.51	304.02	1089.6	445.51	383.77	224.62	318.21	139.85	8.15	2.65	153.87	5545.76
2009-10	4744.37	336.49	2,426.74	1070.67	1616.17	526.21	843.32	104.87	30.58	1166.97	148.31	13014.7
2010-11	2774.08	332.05	2,139.77	655.56	1213.2	347.38	449.9	135.92	40.41	1957.99	185.94	10232.2
2011-12	3794.21	514.39	1,246.03	583.62	717.65	485.05	493.4	177.98	3.59	950.94	188.07	9154.93
2012-13	5353.61	934.81	1,516.23	792.88	701.26	1055.89	906.48	142.30	3.3	207.98	1448.86	13063.6
2013-14	6768.95	1016.46	2,505.16	973.04	1229.41	1515.89	1023.83	146.76	6.53	321.6	185.77	15693.4
2014-15	8792.14	1129.76	4579.7	961.47	2248.61	2032.78	1672.53	207.53	13.77	1246.5	1714.41	24599.2
2015-16	11892.13	2095.69	6407.7	1054.2	2487.9	3504.46	1782.81	450.92	33.18	6794.74	265.27	36769
2016-17	11,926.40	3265.43	5,290.08	1307.24	4,308.37	4,702.04	2246.19	467.10	75.99	5,512.44	718.22	39819.5
2017-18	9158.85	2697.16	3834.95	928.24	2657.09	6301.61	2321.98	601.53	67.66	4938.74	2272.19	35780

4. Country-wise Export of Banana in Value from India (values in USS Million)

Year	U. A. E.	Nepal	Saudi Arab	Baharain IS	Kuwait	Oman	Qatar	Maldives	USA	Iran	other	Total
1996-97	0.01	0.01	0.01	0	0	0	0.01		0.02		0.06	0.12
1997-98	0.28	0.01	0.71	0.28	0.15	0.04	0.23	0.03	0.04	0	1.64	3.41
1998-99	1.8	0.01	0.66	0.32	0.19	0.24	0.37	0.04	0.04	0	0.34	4.01
1999-00	1.14		0.33	0.26	0.15	0.15	0.21	0.03	0.17		0.51	2.95
2000-01	1.86	0.01	0.58	0.21	0.3	0.28	0.22	0.08	0.03		0.37	3.94
2001-02	1.54	0.03	0.31	0.24	0.25	0.28	0.25	0.06	0.07	0.03	0.26	3.32
2002-03	0.05	0.34	0.33	0.13	0.14	0.13	0.11	0.04	0.05	0.15	1.16	2.63
2003-04	0.09	0.38	0.3	0.17	0.13	0.12	0.12	0.05	0.09	0.09	1.01	2.55
2004-05	1.18	0.46	0.34	0.19	0.19	0.12	0.22	0.05	0.16		0.08	2.99
2005-06	2.02	0.4	0.59	0.4	0.45	0.33	0.32	0.09	0.23	0.31	0.14	5.28
2006-07	1.37	0.31	1.37	0.26	0.32	0.21	0.19	0.09	0.09	0.12	0.9	3.52
2007-08	2.95	0.42	0.97	0.54	0.46	0.37	0.43	0.2	0.01	0.01	0.13	6.49
2008-09	5.31	0.67	2.36	0.95	0.83	0.49	0.7	0.31	0.02	0.01	0.31	11.96
2009-10	10	0.71	5.11	2.26	3.38	1.11	1.77	0.22	0.06	2.48	0.31	27.41
2010-11	6.09	0.73	4.69	1.44	2.67	0.76	0.99	0.3	0.09	4.29	0.4	22.45
2011-12	7.84	1.09	2.63	1.2	1.52	1	1.02	0.37	0.01	1.99	0.4	19.07
2012-13	9.85	1.72	2.79	1.46	1.29	1.95	1.66	0.26	0.01	0.39	2.67	24
2013-14	11.2	1.68	4.13	1.63	2.03	2.52	1.69	0.24	0.01	0.57	0.32	26.02
2014-15	14.35	1.86	7.48	1.57	3.67	3.32	2.74	0.34	0.02	2.01	2.86	40.22
2015-16	18.18	3.21	9.84	1.61	3.78	5.32	2.73	0.70	0.05	10.38	0.4	56.2
2016-17	17.78	4.88	7.89	1.95	6.44	7.01	3.35	0.70	0.11	8.24	1.06	59.41
2017-18	14.21	4.18	5.95	1.44	4.12	9.78	3.6	0.93	0.1	7.66	3.52	55.49



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