EXPORT PERFORMANCE OF POMEGRANATE FROM INDIA

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DISSERTATION

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CANDIDATE'S DECLARATION

I hereby declare that the dissertation or
Part there has not been previously
Submitted by me to any other
University or institution
For a degree or
diploma

Place : Parbhani
Date :31/05/ 2019

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CERTIFICATE I

This is to clarify that the dissertation entitled **"EXPORT PERFORMANCE OF POMEGRANATE FROM INDIA"** submitted to Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S.) in partial fulfillment of the requirement for the degree of **MASTER OF SCIENCE** in the subject of **AGRICULTURAL ECONOMICS** embodies the result of a bonafied research carried out by **Mr. AWARE MAYUR RAMDAS** under my guidance and supervision. No part of this dissertation has been submitted for any other degree of any university or institution.

Place : Parbhani
Date :31/05/ 2019

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CERTIFICATE II

This is to certify that the dissertation entitled **"EXPORT PERFORMANCE OF POMEGRANATE FROM INDIA"** submitted by **Mr. AWARE MAYUR RAMDAS** to the Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S.) in partial fulfillment of the requirement for the degree of **MASTER OF SCIENCE** in subject of **AGRICULTURAL ECONOMICS** has been approved by the Student's Advisory Committee after oral examination in collaboration with the External Examiner.

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CHAPTER– I

INTRODUCTION

Pomegranate (*Punica granatum* L.) belongs to family *Punicaceae* and is a favoritetable fruit of the tropical and sub-tropical regions of the world. Pomegranate cultivation was started since ancient time. The fruit is native of Iran and extensively cultivated in Mediterranean countries like Spain, Egypt, Iran, Burma, China and India. In India, pomegranate is cultivated in the states of Maharashtra, Gujarat, Karnataka, Tamil Nadu, UttarPradesh, Haryana and Andhra Pradesh. The most promising cultivars grown in India are Bhagwa, Alandi, Dholka, Kabul, Kandhari, Muskat red, Vellode, Ganesh, G-137, Jyoti, Mridula and Phule Araktha. Today, it is widely cultivated throughout the Middle East and Caucasus region, north and tropical Africa, South Asia, Central Asia, the drier parts of southeast Asia and parts of the Mediterranean Basin. It is also cultivated in parts of Arizona and California. In the 20^{th} and 21^{st} centuries, it has become more common in the shops and markets of Europe and the Western Hemisphere.

Pomegranate is a sub-tropical fruit. It can adapt itself to a wide range of climatic conditions can grow up to 1800 meters above mean sea level. The fruit tree grows well in semi-arid climate where cool winter and hot dry summer prevail. The tree requires hot and dry climate during the period of fruit development and ripening. The optimum temperature for fruit development is 38°C. The tree cannot produce sweet fruits unless the temperature is high for sufficiently long period. Under tropical and sub-tropical climate, it behaves as an ever green or partially deciduous tree. Under humid conditions, the sweetness of fruit is adversely affected. Therefore, it is considered that pomegranate is a hardy tree and can thrive well under drought conditions, though yield is low. The plant bear well only under irrigation in areas of low temperature, the tree behaves as deciduous in nature and sheds its leaves during winter months. It is also rated as winter

hardy fruit tree. The crop is not very particular about its soil requirement. It can be grown on diverse types of soil. The deep loamy or alluvial soils are ideal for its cultivation. It can tolerate soils which are loamy and slightly alkaline. It can thrive well on comparatively poor soils where other fruits fail to grow. This can also be grown in medium and black soils. It is rated as salt hardy fruit plant.

The pomegranate starts fruiting in the third year after planting and continues for about 15 years. Economic yield is generally obtained after third year of planting. To regulate flowering, water is withheld for about two months in advance of the normal flowering sea son. After two months, manures and fertilizers are applied and light irrigation is given. Three to four days later, heavy irrigations at normal intervals are followed. The tree readily responds to this treatment by producing new growth and blooms and bears a good crop. A full grown pomegranate has a tendency to bear flowers and fruits throughout the year. To obtain higher fruit yield during a particular period, plants are given a resting period by which the natural tendency of the tree is altered with artificial means. It is done by without holding of water for about two months in advance of normal flowering, root exposure and also use of chemicals. By adopting such methods flowering can be induced in June-July (Mrig bahar) coinciding with the break of monsoon, February-March (Ambe bahar) and September-October (Hasth bahar). These practices are known as bahar treatment.

Nutrition

A 100-g serving of pomegranate seeds provides 12% of the Daily Value (DV) for vitamin C, 16% DV for vitamin K and 10% DV for foliate (table).Pomegranate seeds are a rich source of dietary fiber (20% DV) which is entirely contained in the edible seeds. People who choose to discard the seeds for feit nutritional benefits conveyed by the seed fiber and micronutrients. Pomegranate seed oil contains punicic acid (65.3%), palmitic acid (4.8%), stearic acid (2.3%), oleic acid (6.3%), and linoleic acid (6.6%).

World scenario

Pomegranate is an old, beloved plant and fruit. Traditional use of pomegranate as a medical remedy as all parts of this plant have several bioactive metabolites. Consequently, its demand has increased tremendously not only in the western world but also in other parts of the globe. It is claimed to have originated in Iran and perhaps surrounding areas from where it spread to different regions. However, N. I. Vavilov stated that it originated in the Near East. It was cultivated in ancient Egypt and in early Greece and Italy. The fruit was very popular in Iraq. Over time, it spread into Asia (Turkmenistan, Afghanistan, India, China, etc.), North Africa and Mediterranean Europe. Interestingly, its domestication process took place independently in various regions. It was probably introduced into Greece and the areas surrounding the Mediterranean Sea, as far west as Spain and Portugal by ancient sailors and traders. It is estimated that pomegranate was introduced into India and China over the Silk Road and ultimately into Japan.

However, it was introduced in the Indian Peninsula from Iran during the 1stcentury AD and found growing in Indonesia in 1416 AD. The Spanish sailors brought pomegranates to the New World and some missionaries introduced pomegranate in Mexico and California. The ability of pomegranate plants to adjust to variable climatic conditions is reflected in the wide distribution of the wild form throughout Eurasia to the Himalayas. The fruit which was described by the Greek botanist Theophrastus about 2350 years before the present (BP) and is mentioned in many Greek and Turkish myths. It is one of the first five domesticated edible fruit crops along with fig, date palm, grape and olive. It has been the symbol of health, fertility and rebirth as mentioned in many ancient cultures. This fruit crop is known to have been domesticated in the Middle East about 5000 years ago. The present scientific name *Punica granatum* is derived from the name Pomum (apple) granatus (grainy), or seeded apple. In ancient Egypt,

pomegranate received the name "Arhumani". The Romans first called this species "malum punicum" (punic apple or apple of Carthage) that evolved to "*Punicum granatum*". C. Von Linne finally gave the name *Punica granatum*. It is considered an excel-lent fruit crop for growing in arid zones for its tolerance to drought conditions. However, it is cultivated in Central Asia and to some extent in the USA (California), Russia, China and Japan for fruit production and is also developed as an ornamental tree in East Asia.

Indian scenario

The total production of pomegranate is concentrated mainly in the Western Maharashtra, Karnataka, Andhra Pradesh, Gujarat, Himachal Pradesh, Tamil Nadu and Rajasthan in India. Maharashtra is the leading State with 151.5 thousands hector area under pomegranate cultivation, followed by Karnataka and Gujarat with 29.1 thousand ha and 22.2 thousand ha respectively, Andhra Pradesh and Rajasthan stood at fourth and fifth position with 7.71 and 2.5 thousand ha of pomegranate cultivation in India.

The production of pomegranate in India during 2017-18 was 2670.67 (‘000 MT). 90 percent of production is estimated to have come from Maharashtra but other states such Andhra Pradesh, Karnataka, Gujarat etc. have also begun growing their market share. (Source National Research Center of Pomegranate)

India is the largest producer of pomegranates but export from India fresh fruit during 2017-18 was 1.85 per cent of the total share in world compared to Thailand and Vietnam soc rep which exports 28.37 and 23.73 per cent share in world, respectively of their production. To increase exports, it is necessary to improve the quality at various stages from production, post-harvest, processing and handling, storage and till it reaches the customers.

Export scenario

The fruit is exported to UAE, Saudi Arabia, Netherlands, Oman, Nepal, USA, Kuwait, UK, and Others country. India ranks first in area

(220,000 ha) with a production of 2670.67 (‘000 MT), but exports quantity 47.33 (MT), including 1.7 per cent export from India to rest of countries. The first season for harvesting pomegranates begins during July-September, while the second harvest season commences in January-February. The export season of the fruit starts in November every year and continues till March-end. During the current financial year, around 3,500 orchards of pomegranates in Nasik, Solapur, Pune, Aurangabad, Beed, Jalna and Latur were registered with the agriculture department for export.

Importance of the Study

India with diverse soil and climatic conditions spread across several agro-ecological regions provide ample opportunities to grow a variety of agricultural crops like fruits, vegetables, root and tuber crops, flowers, ornamental plants, medicinal and aromatic plants, spices, condiments, plantation crops and mushrooms. Horticultural crops are important from the point of nutritional and economic security of the households. Thus, cultivation of horticultural crops plays a vital role in the prosperity of our nation and is directly linked with the health and happiness of the people.

Exports are must for the economic growth of less developed economies and India is no exception to this. Agricultural exports have to be made the vital sectors of India’s exports as these are become for future growth. Looking into the importance of this crop for Indian economy and their problems in export front, the present study was undertaken with following specific objectives.

Objectives

1. To estimate the growth in production and export of Pomegranate
2. To work out the instability in production and export of Pomegranate

3. To study the trends in domestic and international price of Pomegranate
4. To study the export competitiveness of Pomegranate in India

Hypothesis

1. There is significant stable growth in production and export of Pomegranate in India
2. Indian Pomegranate have better competitiveness in International market

Scope of study

In India we produce and market Pomegranate and export them to more countries around the globe. India has natural comparative advantage in its exports on account of lower import needs of inputs, low level of cost and existence of diverse agro climatic conditions. India had a glorious export tradition, especially in agriculture and allied sectors. The expansion of export sector helped India to integrate into the world economy as a supplier of cheap agricultural commodities and raw materials. India being a net exporter of agricultural commodities, the foreign exchange earnings by way of exports will lead to the import of capital goods which will pave way for the increased investment resulting in technological advances, eventually leading to improved productivity and efficiency. Pomegranate is extremely important fruit crop not only for consumption but also as highest foreign exchange earner among the fruits and vegetables. The study focuses on growth performance, export performance and export competitiveness of Pomegranate in India may help in formulating alternative management strategies and policies to boost Pomegranate export in India.

Limitations of study

The present study is focused on a single crop Pomegranate. The study mostly based on 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 decisions. However, the limitations inherent in the secondary data are to be recognized.

REVIEW OF LITERATURE

CHAPTER– II

REVIEW OF LITERATURE

This chapter aims to represent some review of the past research works that are related to the present study. Researchers have been done on production and export of Pomegranate. Some important studies on Pomegranate production and export that have been conducted in the recent and past are discussed below in four sections, namely;

10.1 Estimate Growth and export

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 w as 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.

Mahesh *et al.* (2000) studied the performance of Indian tea with regard to growth in quantity, value and unit value of export for the period 1979-80 to 1997-97 using the exponential growth model. The results revealed that the export quantity of Indian tea exhibited a negative growth rate of 1.15 per cent per annum, whereas the export value and unit price recorded comparatively higher annual growth rates at 8.82 per cent and 7.65 per cent per annum respectively.

Angles (2001) assessed the growth performance of turmeric in important south Indian states over the periods from India 1979-80 to 1998-99 by using the exponential growth functions of the form Yt = abt. He reported that the growth rates in area, production and productivity of

turmeric in Andhra Pradesh, Tamil Nadu and Karnataka registered a positive and significant growth. While the growth rate of area was negative (-0.02%) in Kerala, the production and productivity of turmeric recorded a positive and significant growth.

The growth rates in area (2.07 %), production (6.57 %) and productivity (3.78 %) of turmeric in India were positive and significant. A negative growth rate of area was found (0.02%) in Kerala due to production of turmeric in small patches whereas, the plantation crops such as rubber, coconut etc., dominated and they were more profitable than turmeric. The other main problem was the labour requirement, wherein around 50 per cent of the cost of cultivation was spent on labour in turmeric production. But the labour availability was scarce and labour wage was very high. Hence, the farmers opted for plantation crops where there was no need of more labour throughout the year. As a consequence, the area under turmeric was reducing year after year.

Hyma and Raju (2005) studied the growth in export of tea and coffee from India. The quantity of tea exports from India during the period exhibited a negative growth rate of 0.61 per cent per annum whereas the export earnings and unit value of exports registered a high annual growth rate of 8.96 and 9.66 per cent per annum respectively.

Ramchandra (2006) studied the growth rate in area, production and productivity of sapota in Dharwad and Belgaum districts of Karnataka from 1994-95 to 2004-05. Growth rate in area (3.73 %) and production (4.77 %) of sapota were found to be highest in Dharwad district. Whereas, Belgaum district registered -3.07 per cent in case of area, -9.18 per cent in production and -6.30 per cent in productivity. On the contrary, higher growth rates were observed in the case of the State as a whole, with a positive growth rate in area (4.54%) and negative growth in both production (-1.98%) and productivity (-6.24 %) of sapota.

Saraswat and Rane (2006) conducted a study on production and marketing of peach fruit in Rajgarh area of Sirimour district in Himachal Pradesh. For the detailed study 50 farmers were randomly selected. The compound growth rate with respect to area and production showed that the area under peach increased at the rate of 4.31 per cent per annum. The highest area under peach was recorded in Sirimour district, whereas Mandi district registered the highest growth rate of production in the state i.e., 9.32 per cent per annum. The district wise production scenario indicated that there were variations. Out of 12 districts only 4 districts have registered a positive growth in production i.e., Solan (22.55 %) followed by Una, Bilapur and Mandi.

Shindgikar and Patil (2006) studied the trends in export of grapes from India. The compound growth rate for quantity of grapes exported was 12.05 per cent per annum. With respect to value obtained from export of grapes, the corresponding compound growth rate indicated an increase of 22 per cent per annum.

Thanuja (2006) analyzed the export performance and competitiveness of ginger from India for the period of 1985-86 to 2003-04. The study period was divided in to Pre-WTO period (1985-86) and Post-WTO period (1994-95).The findings indicated that area under ginger was increased at 0.73 per cent per annum and production increased at 2.07 per cent during pre-WTO (1985-86 to 1994-95) period. Whereas, during the post-WTO period the growth rate for area and production were increased at the rate of 1.356 per cent and 1.859 per cent respectively.

Kareemulla *et al.* (2007) conducted a study on production and marketing of Indian Gooseberry – Aonla in Pratapgarh district of Uttar Pradesh. He reported that the area occupied by aonla based farming system shown a growth rate of 4.02 per cent during the period 1995-2005. The production of aonla increased from 47,329 to 82,690 tons in the 19952005 at

a growth rate of 5.2 per cent and the average productivity increased from 5.7 to 6.5 tons per hectare.

Keerthi (2008) calculated the growth rates of area, production and productivity of pineapple from 1994 to 2004 for Shimoga district as well as for Karnataka State. The growth rate analysis revealed an increase of 3.95 per cent in area, 5.29 per cent in production and 1.31 per cent in productivity of pineapple in Shimoga district, whereas, growth rates for Karnataka State as a whole were 0.43 per cent, 17.76 per cent and 17.27 per cent respectively in that order. The increase in area was found to be the highest in Shimoga district followed by Karnataka State as a whole. On the contrary, the growth in production and productivity was considerably more in Karnataka State as compared to Shimoga district. As far as the variation in area, production and productivity of pineapple was concerned, it was less in Shimoga district as compared to the State as a whole.

Jose and Jayasekhar (2008) studied the growth trends in area, production and productivity of Arecanut in India during the period1971 to 2004. It revealed that the area and production of Arecanut in India increased tremendously at the rate of 2.2 per cent and 3.2 per cent respectively. The rate of increase in both area and production was mainly due to favourable price prevailed during the period.

Rauf *et al.* (2010) worked out the compound growth rate of area, production and productivity of apple in various districts of Jammu and Kashmir. The study reported that the area under apple showed a steady growth in all the districts except in Solon district.

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

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.

Veeranagouda *et al.* (2011) studied the growth rate scenario of chilli in northern Karnataka. The study revealed that northern Karnataka as a whole registered positive compound growth rate for area (13.76 per cent), production (13.88) and productivity (12.20). These registered values were non significant at both ten and five per cent level of significance.

Kusuma *et al.* (2014c) studied the computed Compound growth rate (C.G.R.) for grape production, area, yield, 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, Netherlands) and unstable markets (Germany, U.K.) based on the magnitude of transition probabilities.

Koujalagi *et al.* (2014) estimated the growth trends in area, production, productivity and export of pomegranate in Karnataka. The production of pomegranate showed a significant growth of 2.60 per cent per annum at one per cent level of significance followed by growth in area with 2.29 per cent at 5 per cent level of significance for Karnataka. The significant increase in growth in area (24.00 %) and production (25.35 %) for Koppal district was due to implementation of NHM and NHB schemes by the Govt. of India. 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 %).

Tirlapur *et al. (*2014) conducted study on status of Indian mangoes a trend analysis. The study revealed that, India is having positive and significant growth in area (4.45%) and production (3.07%) whereas, productivity showed negative and significant growth (-0.72%). Analysis of trade direction revealed that, UAE was most reliable and loyal market for Indian mango which is having high probability of retention of 63.41 per cent followed by UK (30.05%), Kuwait (30.03%) and Bangladesh (23.92%). It is concluded from the study that there is an increasing growth in production (15.86%) and productivity (8.30%) of mango in India but it is not in line with growth rate of export of mango from India (6.33%) So, there is a scope for increasing the export rate. Trade direction for Indian mango is diverted more towards UAE, Saudi Arabia, UK, Kuwait, Bahrain and Bangladesh.

Rekhapriyadarshini (2015) studied the export performance of fresh mangoes from India. The study revealed that, the value of mango exports in the total exports from the India is 0.0161 in year 2013-14. It also shows that, the export value of fresh mangoes to top 10 countries in the year 2013-14. The data exports were highest to UAE followed by UK, Saudi Arabia, Kuwait, Qatar, Singapore, Bahrain, Bangladesh and Nepal. India produces 50 per cent of the total mango produced in the world but we have a low export share. More emphasize should be given to production and export of mangoes.

Shinde *et al.* (2016) studied on Economics of production, marketing and export of pomegranate. There is tremendous potential for exports of pomegranate from India. Export of pomegranate has decreased in quantity from 35175.17 tons in 2007-08 to 30158.59 tons in 2011-12, whereas in value term it shows an increase trend during the same period.

Singh *et al.* (2018) estimated growth in the area, production and productivity of top ten major mangos producing states of India, using the compound annual growth rate function. The results revealed that the area

under mango cultivation has registered a statistical non significant positive compound growth rate of 3.78 per cent per annum, while its production registered growth rate of 3.00 per cent during the same period of time.

10.2 Instability of Production and Export

Growth rates are generally used to measure the performance of economic variables. They are commonly used as summaries of trends in time series data. They are developed to describe the trends in the variable over time.

Ananthi (2000) studied the instability in export value and export unit value of basmati and non-basmati rice for the period from 1990-91 to1997 -98. The coefficient of variation was 90.76 per cent for export quantity, 55.77 per cent for export value and 24.35 per cent for export unit value. She concluded that the instability was relatively high in the case of export quantity value of basmati rice.

Girma (2002) studied the instability and its sources in cotton production in Karnataka. The results showed that the instability increased from 14.8 % to 27.8% in the second period, the coefficient of variation was 40.66 %. All the study districts except Belgaum and Gulbarga showed maximum instability in cotton production.

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 and FFN. (FFN – Fruits Fresh Not elsewhere stated).

Sujatha *et al.* (2003) studied export scenario of mangoes from India. The study revealed that, the growth rate in quantity and value of export (7.92 % and 12.26 %, respectively) was lower during post-WTO period in case of fresh mangoes compared to pre-WTO period (6.81% and

11.625 %, respectively). In contrast, the growth rates of mango pulp decreased during post-WTO period compared to pre-WTO period. They also observed that, during post-WTO period, the instability was higher than pre-WTO period, both in case of quantity and value of fresh mango and pulp. The fluctuations were seen more in mango pulp during post-WTO period. They also observed that, during pre-WTO period under study, the export quantity and value index increased about 1.5 and 1.9 times, respectively over the base period where as increase of mango pulp the increased about 2.3 and 4.4 times during pre WTO period. As regards the post WTO period, the quantity and value index of fresh mango increased from 93.79 and 92.23 to 187.14 and 193.89, respectively. Also, though the export quantity and value index of mango pulp increased from 140.46 and 164.55 to 299.21 and 469.35, respectively over the base period. They also observed that the mango export is increasing at faster rate during post WTO period as compared to pre-WTO period in case of fresh mangoes. In contrast, the growth rate is rather low during post-WTO period in case of mango pulp.

Sharma and Kalita (2008) studied the variation and instability in area, production and productivity of major fruit crops in Jammu and Kashmir for the period from 1974-75 to 1999-2000. It revealed that growing of pear, cherry and almond were more risky compared to other fruit crops in the state as revealed by higher coefficient of variation. The coefficient of area production and productivity of these were more than78 per cent. The raising of apple in the state was less risky, which had a coefficient of variation of less than 35 per cent.

Kumar *et al*. (2010) conducted study on export performance and potential of mango in mango export zone Lucknow (UP). It has been observed that, the mango export was only 4.00 MT during 2002 and increases to 4.05 (2003), 5.96 (2004), 10.77 (2005), 12.94 (2006), 14.23 (2007) and 23.00 MT in 2008, while the revenue from mango export has increased from Rs. 90000.00 in 2002 to Rs. 586960.00 in 2008. The mango

export zone Lucknow, exported Dashehari, Chousa and Langra varieties to the different countries and the share of Dashehari was highest (74%) followed by Chousa (22%) during 2008. During the period 2002-08 highest quantity at Dasheri was exported to Malaysia followed by China, Saudi Arabia and Dubai whereas highest (6.75 MT) of Chousa was exported to China followed by Japan and Dubai Authors also observed that Malaysia was market for Langra variety.

Patil and Nirban (2010) studied the growth in area, production and yield of mango and analyse the trend in the export of mango from India. They observed that, there was increase in area by 7.78 lakh ha. From 2000-01 to 2010-11 there was no increase in productivity. The productivity was highest in 2002-03 (7.84 MT/ha) and lowest in 2008-09 (5.52 MT/ha). There was a significant growth in export of mango in terms of quantity and value. In India, Maharashtra is having highest area under mango, with lowest productivity. Growth rate of mango production was non-significant is in case of Maharashtra and it was significant in case of India.

Patil (2011a) 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 is 26.12 per cent, pomegranate it is 42.11 per cent and Sapota it is 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 is 32.46 per cent, pomegranate it is 35.95 per cent and Sapota it is 7.14 per cent for the same period. The compound growth rate of export quantity of mango, grapes, and pomegranate to Oman is significant while export of sapota is 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 is 33.69 per cent, Peas it is 19.32per cent and Green chilli it is 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 is 35.26 per cent, Peas it is 27.63 per cent and Green chilli it is 66.20 per cent for the same period. The compound growth rate of export value of onion, potato, peas and green chilli to Bahrain is significant.

Sachinkumar *et al.* (2011) studied that, in India Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh and Punjab are the leading producers of the grapes. The quantity of grape exported over the period 1996-97 to 2008-09 has achieved moderate CGR of 18.78 per cent. In comparison the value of grape export has grown at a CGR of 20.06 indicating the realization of better price in the international market over a period of time. India exports grapes mainly to Bangladesh (46% of total grape exports) but European countries namely, Netherlands and U.K contributed about 55 per cent to the total export earnings from the grapes. The CGR for the quantity of grapes exported was the highest for Germany with 33.46 per cent followed by Netherlands with 31.29 per cent.

Bairwa (2012) studied economics of growth in fruit crops of India, the study revealed that, The variation in area was observed to be maximum in sapota (21.65 %), followed by citrus (7.82 %), apple (7.46 %), and lowest in pineapple (3.57 %). In case of production maximum variability was observed in banana (14.82 percent) followed by Papaya (13.97 %), litchi (13.76 %) and lowest in guava (6.95 %). As far as yield is concerned the variability was very high in litchi (17.85 %), followed by apple (14.08 %), grapes (10.53 %) and lowest in guava (4.00 %).

Pooja (2012a) studied export performance of Indian mangoes an economic analysis. The study revealed that, Annual increase in mango production was highest in Uttar Pradesh with a yearly increment of 91197 MT. In long run, on all India bases, country experienced an yearly increment of 28572 MT in mango production and this increment was fairly explained by the time variable (R2 value 0.79) during the study period.

Yeledhalli *et al.* (2012) conducted study on changing direction and magnitude of India's major fruit export to Middle East country. The study revealed that, compound annual growth rate of export quantity of mango, grapes and pomegranate to Oman was significant while export of sapota was non-significant. UAE has most stable market for fruits such as mango, grapes, pomegranate and sapota as reflected by high retention probabilities of 96.13, 93.62, 90.46 and 44.89 percent, respectively among the Middle East countries.

Kumaresh and Sekar (2013) studied the export performance and competitiveness of fresh mangoes in India. The growth of fresh mango for period II was lowers than period I which implies that, there was no standard in quality. For mango pulp growth in export remained no changes in two periods but export value and unit price was lowered during period II which implies demand was low in international market. The study advocates that, strategies for export may be oriented towards these countries for stabilizing the export of fresh mangoes as well as mango pulp.

Gade *et al. (*2014) studied the trends in production and exports of grapes in India. The study revealed that, the area, production and productivity of grapes since 2001-02, the area under grapes is increased from 47.50 thousand hector to 250 thousand hector during 2001-02 to 2012-13. Its growth rate was 46.60 per cent in 2001-02 and it decreased -1.51 per cent in 2006-07 but it was 114 in 2012-13, which is highest in the study period. The highest area under Grapes was observed in 2012-13. The production of grapes was 1184.20 thousand tons in 2001-02 and it increase 2220 thousand tons in 2012-13. The growth rate in production of grapes was increased 77.22 per cent in 2001-02 and it was 21.16 per cent in 2012-13. The highest growth rate (79.75%) was observed in the year 2011-12. The productivity of grapes is crucial for earning higher income from agriculture. The per hector productivity of grapes was observed 24 tons in 2001-02, it increased 25.90 tons in 2004-05 and 2006-07, later on it reduced at 8.3 t/he during 2009-10

and 10.75 tons in 2012-13, it showing decreasing trend in productivity of grapes due to unseasonal rains in study region. Maharashtra is the leading grapes producing state with production of 1810 thousand tons in the year 2011-12 followed by Karnataka state which has produced of 288.10 thousand tons. The grape production of Tamil Nadu is 55.1 thousand tons, followed by Andhra Pradesh and Mizoram i.e. 28.9 and 24.3 thousand tons, respectively.

They observed that, India is exporting grapes to different countries. The highest export of grapes is observed 172599 tons in 2012-13. There is phenomenal rise in export of grapes from India, as only 20647 tons were exported during 2001-02 which has increased to 172599 tons with a value of Rs. 1258.64 corers and accounted for 7.35 per cent of India's total grape production in 2012-13.

Kadli *et al.* (2014) studied on growth and instability analysis of fruits crops in India. They observed that, In India growth rate of fruits 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 fruits crops during this period were 5084.55 (‘000 hectares), 55364.64 (‘000 Tonnes) and 10.83 (Million ton/ha).

Kusuma and Basavaraja (2014a) studied export of fresh Indian grapes. They observed that area (9.25 %) was growing at a positive rate, while production (-0.31 %) and productivity (-8.75 %) of grapes were found to be decelerating. This negative growth in production and productivity of grapes may be due to poor management practices by the producers. The study also depicted the growth in the value of export that was increasing at 23.82 per cent per annum and quantity of export was increasing at 25.95 per cent per annum. Compared to production, export of grapes was growing at a

positive and significant growth. Growth in value of export was found to be very high indicating good potential and higher profit for Indian grapes. Production has increased from 11.84 lakh MT in 2001-02 to 18.78 lakh MT in 2008-09 with a growth rate of 6.32 per cent per annum but it has declined to 12.35 lakh MT in 2010-11.

The export of fresh grapes of about 14606 MT out of 11.84 lakh MT of fresh grapes produced was seen in 2001-02 in India. Thus, it was only 1.23 per cent of total grapes produced in 2001-02. Thereafter the export of fresh grapes from India grew at the compound growth rate of 25.95 per cent and the extent of fresh grapes export in India also has been increasing continuously. At present (2010-11) 93,685 MT of fresh grapes are exported from the production of 12.35 lakh MT, which accounts 7.59 per cent of fresh grapes produced. In 2009-10, the share was the all time highest in, which was of about 13.50 per cent.

Mokashi *et al.* (2014) conducted the 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.

Kumar *et al.* (2015) studied the Export performance of Indian cashew. The variation in area, production, and productivity of cashew was observed at 3.84 per cent, 6.29 per cent and 8.09 per cent, respectively. Results on variability in export revealed that in quantity terms it was 7.64 per cent, in value terms it was 12.23 per cent and in terms of unit value it worked out to be 14.23 per cent, which is the highest.

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%).

Gowri and Shanmugam (2015) conducted study on an economic analysis of production and marketing of banana in India. They observed that 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.

Kuthe and More (2015) studied export performance of other processed fruits and vegetables from India. The study revealed that 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.

Patil *et al.* (2018) Studied on growth and export performance of mango in India. Positive and significant growth of area, production and productivity of mango was observed. Highest variation was observed in case of production i.e. 15.88 per cent. Highest growth rates in case of area and production were found in Odisha state, where as highest variation in case of area and production was observed in Maharashtra. Highest growth i.e. 23.79 per cent of mango exported from India to Kuwait was observed. It was also observed that, Bangladseh was most stable importer of Indian mango followed by UAE, Baharain and other countries respectively.

Above reviews represented growth and instability in production and export of Grapes. Patil revealed that, the instability of export quantity of grapes to Oman is significant. Sachinkumar concluded that, the quantity of grapes exported over the period 1996-97 to 2008-09 has achieve moderate CGR of 18.78 per cent. Kusuma and Basavaraja concluded that, negative growth in production and productivity of grapes may be due to poor management practices by the producer.

10.3 Trend in domestic and international prices of Pomegranate

Guledgudda (2005) studied trend in wholesale prices of raw cashewnut. The trend analysis revealed that, the linear growth in wholesale prices of raw cashewnut in different markets of India were found to be increasing trend and also shows highly significant at one per cent level of probability. Among the markets the increase in wholesale price trend was found highest in Goa market followed by Kerala, Andhra Pradesh, Karnataka and Tamil Nadu.

Murthy *et al.* (2014) examined the trend in prices and arrivals of Grapes in Hyderabad market. It has been observed that, the analysis of data on prices and arrivals of grapes coming to Hyderabad market for the period from 1991-92 to 2000-01 indicated that the prices were growing at rate of 8.67 per cent per annum and arrivals at the rate of 22.04 per cent annum.

Prasad *et al*. (2014) studied the trends in area, production and productivity of mangoes in India. The result indicates annual increase in mango production was highest in Uttar Pradesh with a yearly increment of 91197 MT The country experienced a yearly increment of 28572 MT in mango production and this increment was fairly explained by the time variable during the study period. The productivity of mango was noticed to increase only in the states of Karnataka and Kerala.

Priyanka (2014) analyzed Trends in India’s exports: A comparative study of pre and post reform period. Compound growth rate of

India's exports is found to be 7.9 per cent during the pre-reform period but it is found to be almost double (14.8 %) during the post-reform period. This implies that India's exports exhibited a sharp turnaround during the post-reform period. The compound growth rate of volume indices of India's exports is found to be 6.18 percent during the pre-reform period but it is found to be almost double 11.18 per cent during the post-reform period. It implies that the volume indices of exports have registered an upward trend during the post-reform period.

Kusuma and Basavaraj (2014b) 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 Rs 35.2 crores in 1991-92 to Rs 162 crores in 2010-11. The paper attempts to quantify the changing structure of Indian mango exports. The major export markets for Indian mangoes are Bangladesh (46.22%), U.A.E (33.26%), Nepal (6.06%), Saudi Arabia (3.63%) and UK (3.06%). Efforts are also needed to improve the efficiency of production and quality in order to stabilize the markets and also to make the product acceptable and price competitive in other importing countries.

Asha *et al.* (2015) studied the export of fruits from India. The study revealed that, in case of Mangoes export has showed significant growth rate of 6.5 per cent per annum in terms of quantity. Export value showed significant growth rate of 8.75 per cent per annum while export price showed significant growth rate of 2.25 per cent per annum. Bananas export has also shown significant positive growth rate of 21.91 per cent per annum. At the same time export value and export price showed significant growth of 25.8 per cent per annum and 3.89 per cent per annum respectively. Growth rate in export quantity, value and price of Grapes was found 12.7, 16.77 and 4.08 per cent respectively during 1990-91 to 2011-12. UAE was found more stable market in case of Grapes and in case of mangoes; Saudi Arabia and Bangladesh were more stable market. 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.

Deshmukh *et al.* (2015) studied the Economics analysis of marketing and export of Pomegranate from Maharashtra, examined the trends in arrivals and prices, the impact of lagged year arrivals or prices on current year arrivals and prices, nature and relationship between arrivals and prices of grapes over the period of 12 year from 2001 to 2013 in Agricultural Produce Market Committee, Mumbai, Nashik, Nagpur, Pune and Sangli.

Chandra *et al.* (2015) studied the trend in the export of Indian mango. The study revealed that, the export of mango in 2000 -01 was 37,109 M.T. and it increased to 58, 863M.T. in 2010-11. The value of exported mango was Rs. 16481 lakh in 2010-11. Though India is having world's more than 40 per cent mango production, Indian share in international market is comparatively very less. It was 5.97 per cent in volume and 3.96 per cent in value in the year 2000. In the year 2010-11, India's share was 4.36 per cent in terms of volume and 3.11 per cent in terms of value. Thus, there is very vast scope for increasing export of mango from India.

Dastagiri (2015) studied international market signals for Indian horticultural export market. The export growth rates of fruits such as Banana, Mango, Pomegranate, Grapes are 19.6%, 5.8%, 19%, 14.4% respectively. Mango and Grapes exports are stable as their coefficient of variation is less than 100 percent whereas Banana and pomegranate are instable as their coefficient of variation is more than 100 percent. The price growth rates of fruits such as Mango, Pomegranate, Grapes, Banana are 3.5, 6.7, 6.2 and 1.7 per cent, respectively. Similarly, vegetables price growth rates are Onion 6.1 per cent, Gherkin 3.7 per cent, Green chillies 0.8 per cent, Potato 3.7 per cent, and Mushrooms 5.4 per cent. The Rose price growth rate is 30.6 per cent and walnut is 6.5 per cent. The study found that the price growth rates of all fruits are positive and high. The study concludes

that all commodities quantity export growth rates more than price growth rates except walnut.

Above review represented trend in domestic and international prices of Grapes. Murthy was workout trend in prices and arrival of grapes. He shows that export of grapes increase over a decade.

10.4 Export Competitiveness

Tammana *et al.* (1999) conducted study on identification of niche markets for some export competitive Indian fruits. The author examined that, the export competitiveness, which is the ratio of domestic prices. On an average the NPC value in mango (0.87), grape (0.59) and banana (0.49) were lower than one indicating their competitiveness in international market.

Desai (2001) examined the export potentialities of mango from India by using nominal protection coefficients, which is the ratio of domestic price to the border price. The findings of the study indicated that on an average, the nominal protection coefficients value in fresh mango (0.89), and mango slices (0.45) were lower than one indicating their competitiveness in international market.

Phuke *et al.* (2004) analyzed the export potential of banana in India. Nominal Protection Coefficient (NPC), NPC = used to measure the export competitiveness of banana. India did not enjoy comparative advantage in the total banana export in 1991-92 as NPC is more than unity. India enjoyed comparative advantage in export of banana in the new world trade order (after LPG) to all the countries expect Nepal.

Reddy (2005) studied mango export trends and strategies. The author studied that, India is having comparative advantage in exporting mangoes to Dubai and UK. The mango pulp exports are faced with stringent regulations such as Hazard Analysis Critical Control Point (HACCP), India needs to adopt these standards in an organized manner to meet the high value export demand. The recent development of Agro-Export Zones (AEZs)

performance is also examined in this study. The study finds out that out of the ten mango AEZs performance, some of them are not up to the mark. The performance on the side of government agencies is quite good, but the participation of entrepreneurs and farmers is lagging the overall performance of these AEZs. There is a greater need to encourage entrepreneurs and farmers to participate in AEZs activities through development of India unique processed products, which add value to the farmers' produce at international markets.

Gireesh (2009) studied the export competitiveness of cashew. The study revealed that, The nominal protection coefficient was less than unity (0.98) indicating that cashew kernels was competitive for its export to other countries from India, while NPC of raw cashewnut imports by India from abroad (East and West African countries) was also less than unity (0.88) reveals that raw cashewnut was a efficient import substitute. USA, Australia and Netherlands were found to be highly loyal markets for Indian cashew kernel as indicated by the retention of their previous shares of cashew kernel exports from India by more than 70, 50 and 30 per cents, respectively. In case of cashew nut shell liquid, USA, Japan and Korea Rep. were found to be most loyal markets.

Vaishali (2010b) conducted study on competitiveness of major agricultural commodities among SAARC countries. She observed that, India was in a competitive position in rice, mango and onion with the NPCs values of 0.98, 0.975 and 0.893 respectively for the period 2008-09. India did not comparative advantage in export of wheat as its value is equal to unity for the period 2008-09. The study of competitiveness indicating NPC less than unity shows that Indian rice, mango and onion are more competitive among the SAARC countries.

Siddaya and Atteri (2010) examined the export competitiveness under the cost compliance horticultural commodities. The NPC, Effective

Protection Coefficient (EPC), DRC and Effective Subsidy Co-efficient (ESC)were computed under cost compliance as well as without cost compliance. Except for grapes, NPC, ESC and ORCs were found to be less than unity for fresh and processed fruits and vegetables, implying that the Indian horticultural sector has a comparative advantage in the selected fruits and vegetables. The EPC was more than unity for various fresh and processed fruits and vegetables because the relation between domestic and international input and output prices were not uniform.

Parmar and Leua (2011) studied an export competitiveness and marketing channel for fresh grapes at Maharashtra. The study revealed that the NPC for fresh grapes remained below 1.00 under the study period. This indicates that there was wide scope for increasing the export of fresh grapes. The NPC for the countries like UK, Netherlands, and Belgium has more competitive market for Indian Grapes. The countries like United Arab Emirates (UAE), Saudi Arabia were moderately competitive. Only Bangladesh was less competitive for fresh grapes export from India.

Patil (2011b) conducted study on competitiveness of export of fruits and vegetables Middle East countries. The study revealed that, India was in a competitive position in mango, grapes, pomegranate and sapota with the NPCs values of 0.97, 0.95, 0.92 and 0.98 respectively for the period 2009-10. He was observed that India was in a competitive position in onion, potato, peas and green chilli with the NPCs values of 0.97, 0.95, 0.97 and 0.89 respectively for the period2009-10. Tariff barriers, non tariff barrier, political conflicts, informal trade, border disputes, lack of communication and Infrastructural facilities, etc., these are major constraints which influence the intra-regional trade among the Middle East countries.

Mokashi (2012) studied that, trade competitiveness of grapes from northern Karnataka. Karnataka has a comparative advantage in grapes production and competitiveness in grapes exports as indicated by average value of NPCs (0.67) during the study period (1992-93 to 2010-11).

Pooja (2012b) studied the export competitiveness of Indian mangoes in international market. The study revealed that, Malaysia and Thailand which are potential mango exporters and are geographically located very close to Singapore making Singapore moderately competitive for Indian mangoes. Likewise Saudi Arabia, Bahrain and Qatar are non competitive and Kuwait is moderately competitive in absorption of Indian mangoes as they would be depending on Pakistan rather than India to meet there mango demand. Exports to Bangladesh and Nepal are very high as it is convenient to export to these markets due to geographical proximity with loose or no quality control specifications for mango. But the low prices received by Indians on mango export to these markets make it non competitive.

Guledgudda *et al.* (2014) studied the export performance of cashew nut. The study revealed that, the NPC for the period 2014 under exportable hypothesis was 0.98, which also revealed that the domestic prices received by the farmers were lower than the international prices, which also implies that the domestic producers were disprotected or rather taxed compared to situation prevailing under free trade condition. USA was one of the most stable countries among major importers of Indian cashew kernel as indicated by the high retention probability of 70.49 per cent. India could not retain the previous export share to Singapore. The major competitors for India in the world market are Vietnam, Brazil, Indonesia and Tanzania.

Sarkar (2014) conducted the study raises the issue of export competitiveness of Indian tea over the last three decades. The study revealed that, the changing institutional architecture governing world tea market in a liberalized world economy. During the last two decades, institutional landscape affecting the export competitiveness environment has changed considerably both globally and locally. Formation of WTO in 1995, various multilateral and bilateral trade agreements, imposition of environment and labour standards, exchange rate fluctuation all have an impact on export competitiveness of Indian tea. The author analyses the different aspects of

export competitiveness of Indian tea in the context of changing institutional architecture. It takes into account aspects like existence of huge domestic market and increasing domestic consumption, relative price of Indian tea in global market, changing product mix, multilateral trade agreement and free trade zones, quality of Indian tea in view emergence of small growers, institutional interventions etc.

Deshmukh and Satpute (2016) studied export competitiveness of grapes. The study revealed that, the NPC for UK, UAE, Saudi Arabia, were less than 0.50 which indicates that Indian grapes are price competitive for international market and scope to enhance the export these nations. Netherlands was also one of the major importers of the world. It also preferred Chilean and South African grapes as compared to the Indian and other nation. To get the benefits of price competitiveness the India should meet the quality standards from European other nations.

METHODOLOGY

CHAPTER-III

METHODOLOGY

The object of any investigation is to draw the useful conclusion in the light of objectives of the study in order to arrive the meaningful conclusion, it is essential to the investigator to adopt appropriate method and procedure, keeping this in view, this chapter has devoted to explain the methodology adopted to fulfill the objectives of the study. The present investigation was undertaken to study the "Production and Export of Pomegranate: Trends and Competitiveness". This chapter deals with the source of data, period of study and analytical procedure used to draw the interferences.

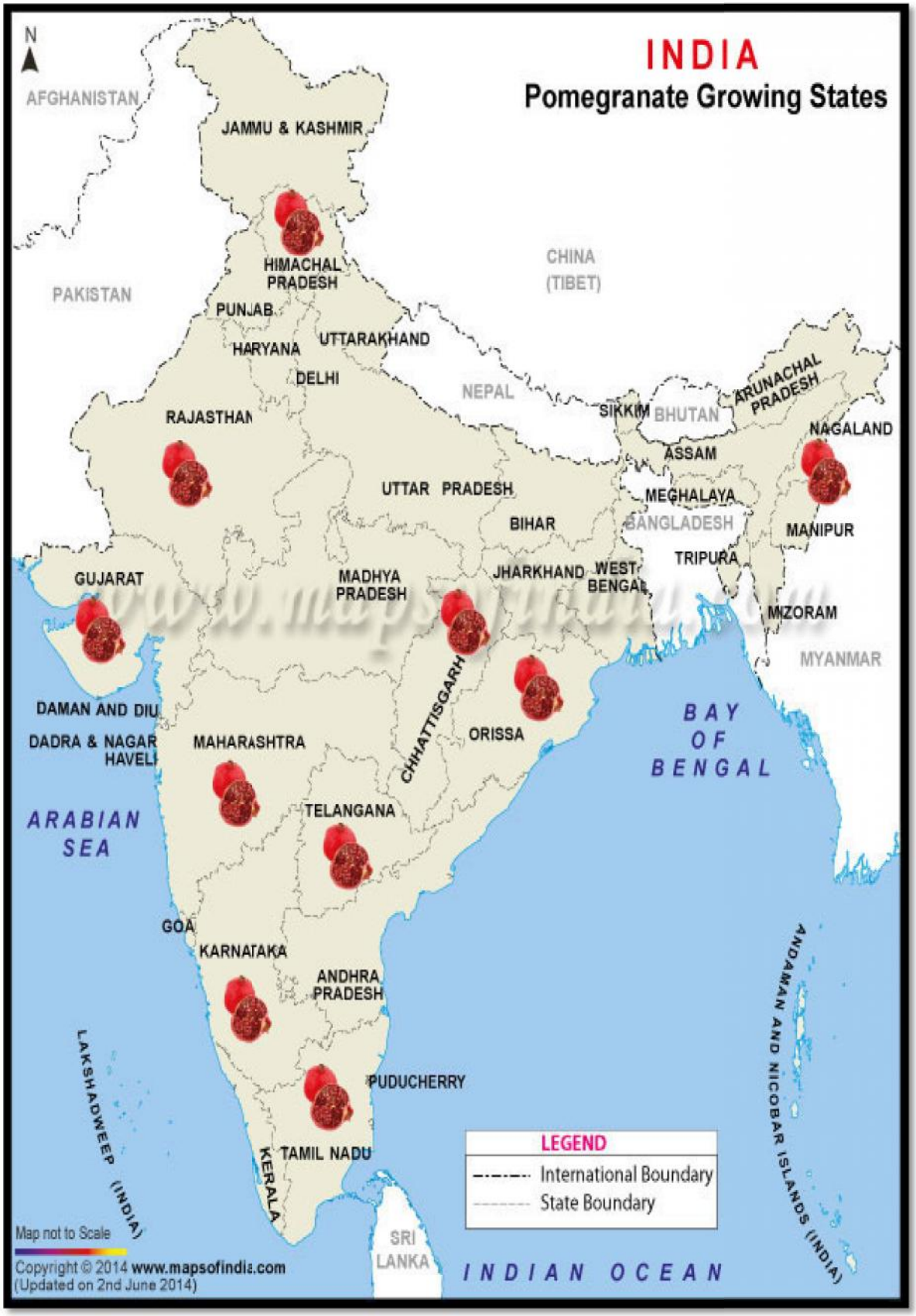
3.1 Nature and source of data

In the view of Pomegranate emerging as an important crop and its increased utilization in the industrial application, is traded in domestic and also international market. This market has become more speculative and hence Pomegranate was purposively selected for the study. The nature of data used for the study is entirely based on secondary source of data. The annual data on export quantity, export value, domestic prices and international prices were compiled from Agricultural and Processed Food Products Export Development Authority (APEDA), Agricultural Produce Marketing Committee (APMC) and Food and Agriculture Organisation (FAO).

3.2 Period of study

The data regarding production and export of Pomegranate in India was collected from 2003-04 to 2017-18, which includes 15 years data. The time series data has been divided into three sub periods and overall period.

- Period I (2003-04 to 2007-2008)
- Period II (2008-09 to 2012-13)


INDIA
Pomegranate Growing States
N
AFGHANISTAN
PAKISTAN
CHINA
(TIBET)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRI
LANKA
JAMMU & KASHMIR
HIMACHAL
PRADESH
PUNJAB
HARYANA
UTTARAKHAND
DELHI
RAJASTHAN
UTTAR PRADESH
BIHAR
SIKKIM
ARUNACHAL
PRADESH
NAGALAND
ASSAM
MEGHALAYA
MANIPUR
TRIPURA
MIZORAM
WEST
BENGAL
JHARKHAND
ORISSA
CHHATTISGARH
MADHYA
PRADESH
GUJARAT
DAMAN AND DIU
DADRA & NAGAR
HAVELI
MAHARASHTRA
TELANGANA
GOA
KARNATAKA
ANDHRA
PRADESH
PUDUCHERRY
TAMIL NADU
KERALA
BAY
OF
BENGAL
ARABIAN
SEA
INDIAN OCEAN
LAKSHADWEEP (INDIA)
ANDAMAN AND NICOBAR ISLANDS (INDIA)
LEGEND
International Boundary
State Boundary
Map not to Scale
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(Updated on 2nd June 2014)

- Period III (2013-14 to 2017-18)
- Overall period (2003-04 to 2017-18)

3.3 Analytical Tools and Techniques

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

3.3.1 Tabular Presentation

3.3.2 Growth Rates

3.3.3 Instability Analysis

3.3.4 Trend Analysis

3.3.5 Nominal Protection Coefficient

3.3.1 Tabular Presentation

The data collected were presented in tabular form to facilitate easy comparisons. The data were summarized with the aid of statistical tools like, per cent share to obtain the meaningful results.

3.3.1 Growth Rates Analysis

The growth rates were used to measure the past performance of the economic variables. The growth in production, quantity exported and export value realized from export was analysed by using exponential growth function using following formula.

$$Y = a.b^t$$

Where,

Y = Production/Export quantity/Export value of pomegranate

t = Time variable

b = Regression Coefficient

Pomegranate Packaging for export

Packed pomegranate for export in cart of container

Pomegranate Shipping Port

Plate 3.2. Various Stages of Pomegranates for Exporting

a = Intercept

The compound growth rates 'r' was computed by using the following formula. CGR (r) = [Antilog (log b) -1] * 100

Where,

r = Compound growth rate

3.3.2 (a) Instability Analysis

Instability in export is expected to hamper the process of economic development. To study the degree of instability in production and export of pomegranate was measured by using coefficient of variation

Coefficient of variation (CV) = $\frac{\sigma}{\bar{X}}$ * 100

$$S = \frac{\sqrt{\Sigma(X-\bar{X})^2}}{n}$$

Where,

σ = Standard deviation

$\bar{X}$ = Arithmetic means.

X = Variable

n = Number of observations

3.3.3 (b) Coppock's Instability Index (CII)

Coefficient of instability is another measure of instability besides coefficient of variation. The coefficient of variation measures the variation around the trend. Coppock's Instability Index (CII) is close approximation of the average year to year percentage adjusted for the trend are rose pronounced than the absolute variation.

Coefficient of instability was worked out using coppock's instability index.

$$V \log = \frac{\sum \left(\log \frac{X_{t+1}}{X_t} - m \right)}{N}$$

The Instability Index = $\left[\text{Antilog}\left(\sqrt{V \log}\right) - 1\right] * 100$

Where,

X_t = Production/ Export Quantity/Export value of Pomegranate in year t

N = Number of years minus one

m = Arithmetic mean of the differences between the log of X_t and X_{t-1}, X_{t-2} etc.

V log = Logarithmic variance of the series.

3.3.4 Trend Analysis

The trend in domestic and international prices of pomegranate was computed for the series data of 2003-04 to 2017-18 with the help of following Quadratic function.

$$Y_t = a + bt + ct^2$$

Where,

Y_t = Domestic / International Price

a = intercept

t = Time

b, c = Partial Regression Coefficient

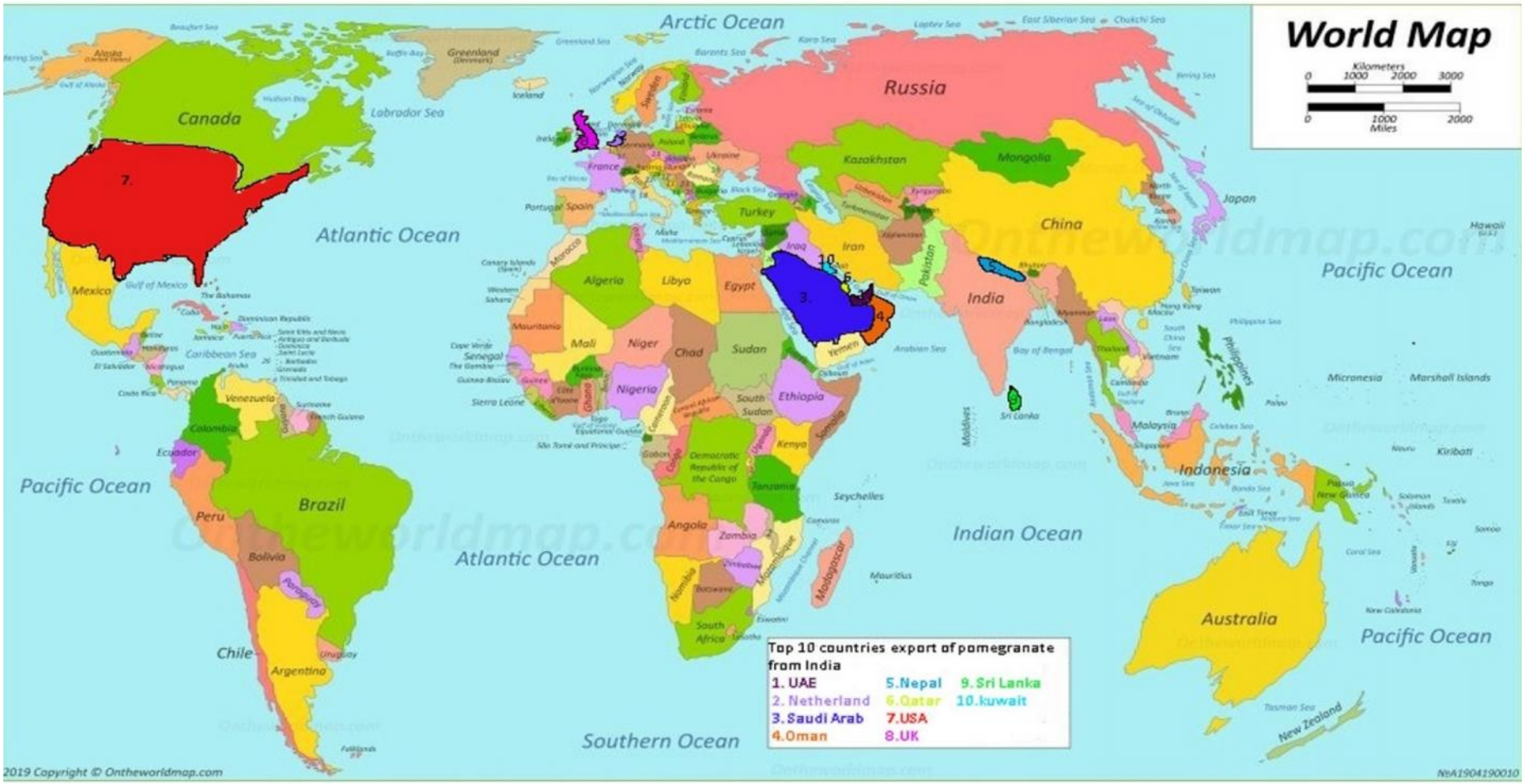


Plate 3.3. Major Pomegranate importer countries from India

Nominal Protection Coefficient (NPC)

NPC was computed to determine the extent of competitive advantage enjoyed by the commodity in the context of free trade. The coefficient shed light on whether a country has comparative advantage in the export of that commodity in the free trade scenario or not. The NPC is defined as the ratio of the domestic price to the world reference price of the commodity under consideration. Symbolically,

$$NPC = P_d/P_r$$

Where,

P_d = Domestic price of commodity

P_r = World reference price of the commodity

If NPC > 1, the commodity is protected, compared to the situation that would prevail under free trade and if NPC < 1, the commodity is disprotected.

RESULTS AND DISCUSSION

CHAPTER-IV

RESULTS AND DISCUSSION

The present investigation had been undertaken with a view to study "Production and Export of Pomegranate, Trends and Competitiveness". This chapter deals with general information regarding export, growth, instability and export performance of pomegranate, Trend in domestic and international prices of Pomegranate and Export Competitiveness of Pomegranate. Data were analyzed for a period 2003-04 to 2017-18 and the major findings of this study are presented in this chapter.

4.1 Growth in production and export of Pomegranate

4.2 Instability in production and export of Pomegranate

4.3 Trends in domestic and international price of Pomegranate

4.4 Export competitiveness of Pomegranate in India

4.1. Growth in production and export of Pomegranate

4.1.1. India's share Fresh fruit in World Export

India's share in world export at different points of times was worked out and presented in Table 4.1.

Table 4.1 India's share in World Export

Sr. No.	Year	World Export		India's Export		India's share in World Export (%)
		Quantity	Value	Quantity	Value	
1	2003-04	1193673	1130093	20651	21507	1.21
2	2008-09	1402645	1442610	26296	33631	2.33
3	2012-13	2211524	2420896	24545	37858	1.56
4	2017-18	2295444	2887989	50230	53429	1.85

(Value in (Rs. crores) and Quantity in MT)

In overall, India's share in world export was more than one percent. It could be seen from the Table 4.1 that India's export quantity during 2003-04 was 20651 MT which increases to 50230 MT during 2017-18. In terms share in world export India's export was 1.21 per cent in 2003-04 to raise 1.85 per cent in 2017-18.

4.1.2. India's share of Agricultural Exports in Total Export

The total exports of agriculture and allied products and share of agricultural export in total export of the country were presented in Table 4.2. It was observed that, India's total export in 2003-04 was Rs. 293366.75 crores which have increased up to Rs. 1849428.76 crores in 2017-18. The agricultural export in 2003-04 was Rs. 37266.52 crores which have increased up to Rs. 226651.94 crores in 2017-18. However, per cent share of agricultural export in the total export have decreased from 12.70 per cent in 2003-04 to 12.26 per cent in 2017-18. This decline in the share was due to the share growth of other sectors like service and Manufacturing etc.

Therefore, it is depicted that, the agricultural sector has been playing a key role in the composition of Indian exports. Thus, the Table 4.2 highlights the surprising fact that the share of Indian agricultural export has been slowly declining in the recent years.

Table 4.2 India's share of Agricultural Exports to Total Export

Sr. No.	Year	Total Export	Agricultural Export	Per cent share of Agriculture Export to total export (%)
1	2003-04	293366.75	37266.52	12.70
2	2008-09	655863.52	79039.72	12.05
3	2013-14	1905011.00	262778.54	13.79
4	2017-18	1849428.76	226651.94	12.26

In the era of globalization, the agricultural exports from India have been facing many internal and external challenges. Its share has declined

from 12.70 per cent in 2003-04 to 12.26 per cent reduce in 2017-18. It's points out that India's share of exports in tea and mate, tobacco and molasses has been slowly declining in the global market.

4.1.3. India's share of pomegranate production in export quantity

India's share of pomegranate production in export quantity was presented in Table 4.3. It revealed that the production of pomegranate in India during 2003-04 was about 664.9 tons and quantity exported was about 10.31 tons accounting for 1.5 per cent of production. During the year 2007-08 the production was about 884.1 tons and the quantity exported was 35.17 tons accounting for 3.9 per cent of production

Table 4.3 India's share in pomegranate production to export quantity

year	Production (MT)	Export (MT)	Export as% of pomegranate
2003-04	664.9	10.31	1.5
2004-05	800.7	14.03	1.7
2005-06	849.1	19.65	2.3
2006-07	853.2	21.67	2.5
2007-08	884.1	35.17	3.9
2008-09	807.2	34.81	4.3
2009-10	820.4	33.41	4
2010-11	743.1	18.21	2.4
2011-12	772.4	30.16	3.9
2012-13	744.95	36.02	4.8
2013-14	1352.92	31.32	2.3
2014-15	1789.31	20.99	1.1
2015-16	2306.44	44.72	1.9
2016-17	2442.39	49.85	2
2017-18	2670.67	47.33	1.7

Source: http://www.apeda.com

which was decrease during the year 2012-13 in production of 744.95 tons and the export was increase 36.02 tons (4.8 per cent). Also observed up to the 2012-13 years increase in production there was an increase in the quantity exported, but in the year 2013-14 up to 2017-18 production was increased 1352.92 tons up to 2670.67 ton but per cent export was declined 2.3 up to 1.7 percent. A similar finding has been observed in the year 2017-18 also.

4.1.4. Analysis of Growth Rates

This study attempts to analysis the growth rate of Pomegranate exports with respect to production, quantity and value realized through the exports of these products.

Table 4.4 Compound Growth Rate of Production, Export Quantity and Export Value of Pomegranate

Particulars	CGR	R^2	SE	t-Value
Production				
Period I	6.53**	0.77	0.02	3.23
Period II	-2.04	0.55	0.01	-1.94
Period III	18.19*	0.91	0.04	5.63
Overall Period	9.51*	0.68	0.12	5.28
Export Quantity				
Period I	33.47*	0.97	0.03	9.97
Period II	-0.33	0.00	0.14	-0.03
Period III	18.41	0.53	0.12	1.85
Overall Period	8.12*	0.57	0.13	4.20
Export Value				
Period I	134.46**	0.75	0.38	3.01
Period II	17.83	0.35	0.17	1.29
Period III	17.29*	0.92	0.03	6.07
Overall Period	31.59*	0.76	0.30	6.44

(*, ** - denotes significant at 1% and 5% level, respectively)

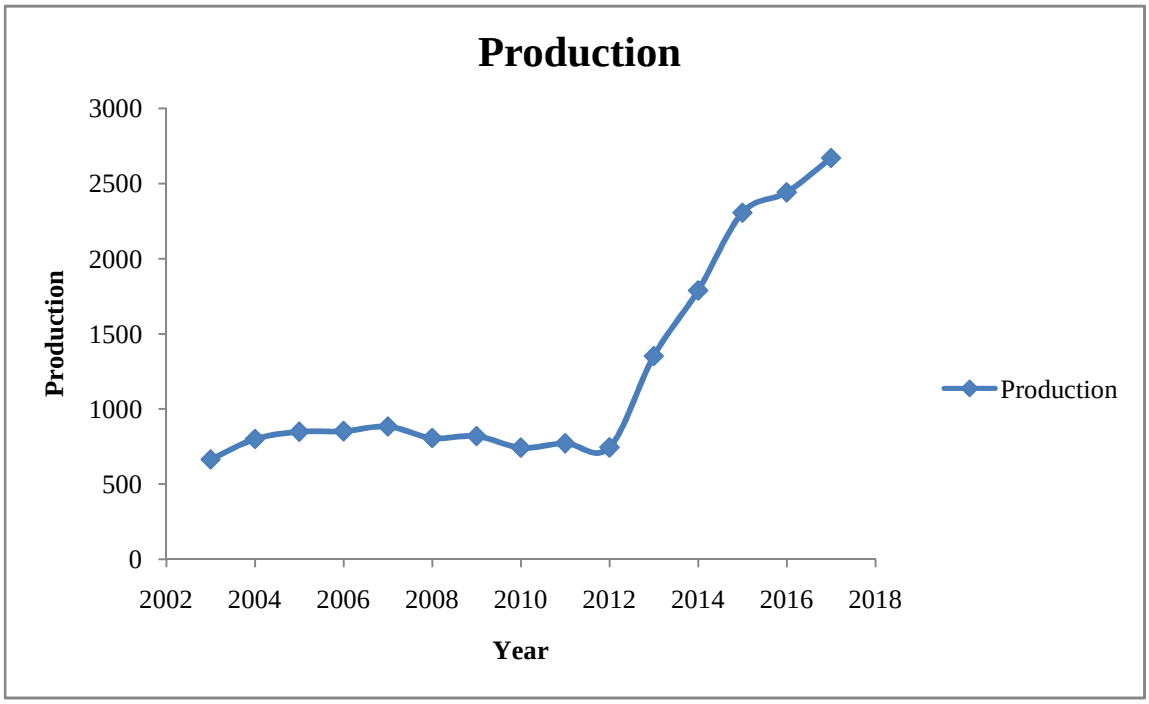


Fig.1. Pomegranate production

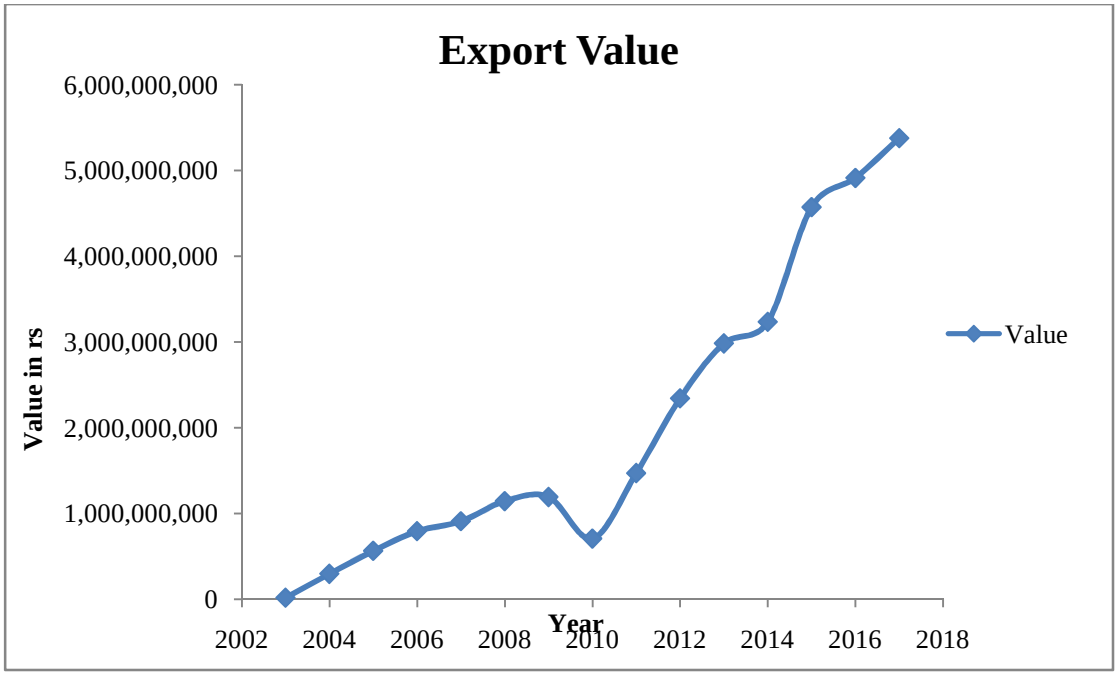


Fig.2. Export value of pomegranate

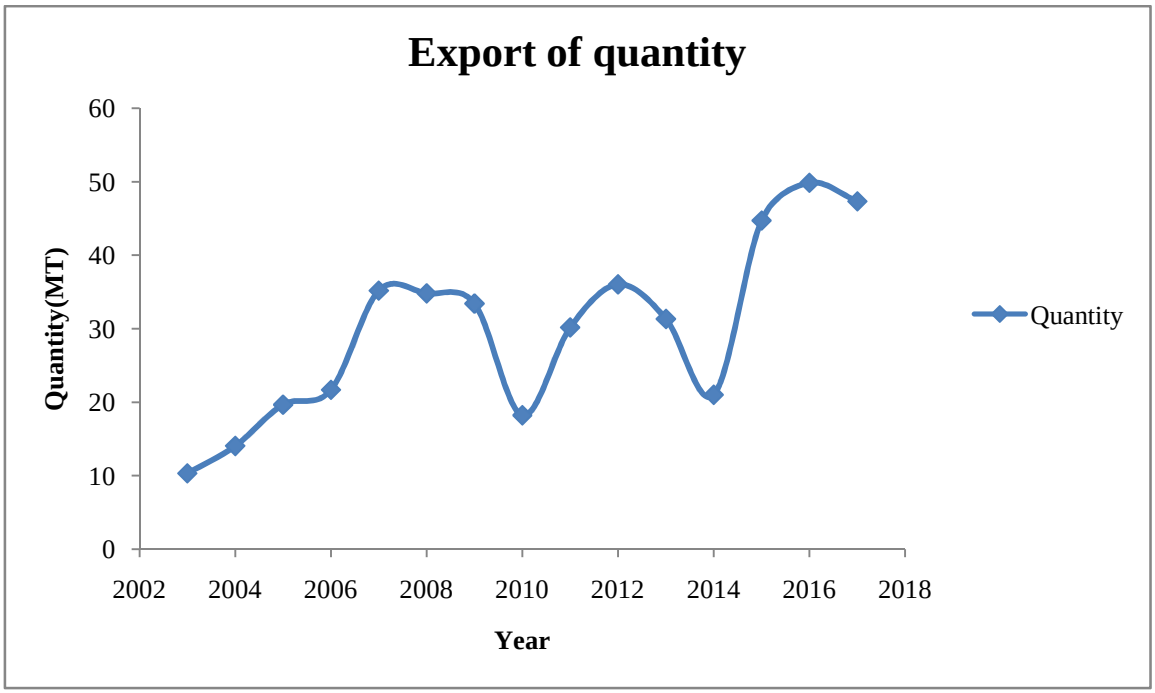


Fig.3. Export quantity of pomegranate

The exponential functional form was employed to compute the growth rates and the results are presented in Table 4.4. The total study period (2003-04 to 2017-18) was divided into four periods namely, period I (2003-04 to 2007-08), period II (2008-09 to 2012-13), period III (2013-2017) and overall period (2003-04 to 2017-18). The data presented in Table 4.4 revealed that in period I production, export quantity and export value realized through Production, export quantity and exports value have growth rate 6.53, 33.47 and 134.46 per cent per annum in period I, respectively and were found to be statistically significant at five per cent level of production and export value, export quantity were found to be significant at one per cent level.

However, in period II production and export quantity observed growth rates negatively significant at the rate of -2.04 and -0.33 per annum, respectively. However, in period III production and export value shows the growth rate positively significant at the rate of 18.19 and 17.29 per cent per annum, respectively.

The overall 15 years (2003-04 to 2017-18) growth rate of export value of Pomegranate in India was highly significant at 31.59 per cent per annum and much higher than the production and export quantity of Pomegranate for overall period was 9.51 and 8.12 per cent per annum, respectively and significant at one per cent level. Hence, there is significant growth in production and export of Pomegranate in India, the hypothesis is accepted. The results obtained are in close agreement with the findings of Patil (2018) concluded that, there was a significant growth in export of Pomegranate in terms of export and export value. Deshmukh (2016) they concluded that, production of pomegranate was positively significant during period I.

4.2 Instability in production and export of Pomegranate

4.2.1 Instability of Production, Export Quantity and Export Value of Pomegranate in India

In order to study the variability in production, export quantity and export value of Pomegranate exports during the study period, co-efficient of variation was worked out, the total period (2003-04 to2017-18) was split into four periods viz., period I (2003-04 to 2007-08) , period II (2008-09 to 2012-13), period III (2013-14 to 2017-18) and over all period IV (2003-04 to 2017-18). The results are presented in Table 4.5. It could be seen from Table 4.7 that, the production of Pomegranate exported exhibited less variability with co-efficient of variation at 10.69, 4.39, 25.26 and 57.17 per cent in period I, II, III and overall period, while it was highest in overall period with co-efficient of variation at 57.17 per cent.

Table 4.5 Instability of Production, Export Quantity and Export Value of Pomegranate in India (2003-04 to 2017-18)

Period	Particulars	Production	Export Quantity	Export Value
Period I	Mean	810.4	20.17	55.68
	SD	86.63	9.51	30.39
	CV (%)	10.69	47.18	54.57
Period II	Mean	778.64	30.52	137.35
	SD	34.18	7.22	60.79
	CV (%)	4.39	23.66	44.25
Period III	Mean	2112.34	38.84	421.73
	SD	533.71	12.27	105.35
	CV (%)	25.26	31.60	24.98
Overall Period	Mean	1233.79	29.84	204.92
	SD	705.36	12.09	175.68
	CV (%)	57.17	40.53	85.72

As regard the Export quantity of Pomegranate the highest variation was observed 47.18 per cent in period I with co-efficient of variation at 40.53 per cent in overall period 31.60 per cent in period III and 23.66 per cent in period II. Export earnings in terms of Export value showed higher instability in overall period with 85.72 per cent of co-efficient of variation when compared to the period I, II and III. From the above it was clear that instability in production in Pomegranate was less during period II. Findings can be correlated with Kumar (2015).

4.2.2 Coppock's Instability Index of Production, Export Quantity and Export Value

Coefficient of instability is another measure of instability besides coefficient of variation. The coefficient of variation measures the variation around the trend. Coppock's Instability Index (CII) is close approximation of the average year to year percentage adjusts for the trend. Thus variation around the trends is more pronounce than the absolute variation. The Coppock's Instability Index was work out for the total period (2003-04 to2017-18) was split into four periods viz., period I (2003-04 to 2007-08), period II (2008-09 to 2012-13), period III (2013-2017) and overall period (2003-04 to 2017-18). The results are presented in Table 4.6. that, the highest variation observed in export value of Pomegranate was 203.44 per cent in period I and 101.04 per cent, 61.81 per cent and 14.62 per cent in overall period, period II and period III, respectively.

Coppock's Instability Index for production, export quantity and export value was in period I 8.06, 22.90, and 203.44 per cent, respectively**.** In period II it was observed in production, export quantity and export value was 5.54, 49.92 and 61.81 per cent, respectively. In period III it was observed in production, export quantity and export value was 13.83, 51.66 and 14.62 per cent, respectively and for overall period it was 19.44, 41.98 and 101.04 per cent, respectively. The discussion thus revealed that instability in Pomegranate export value was higher in period I.

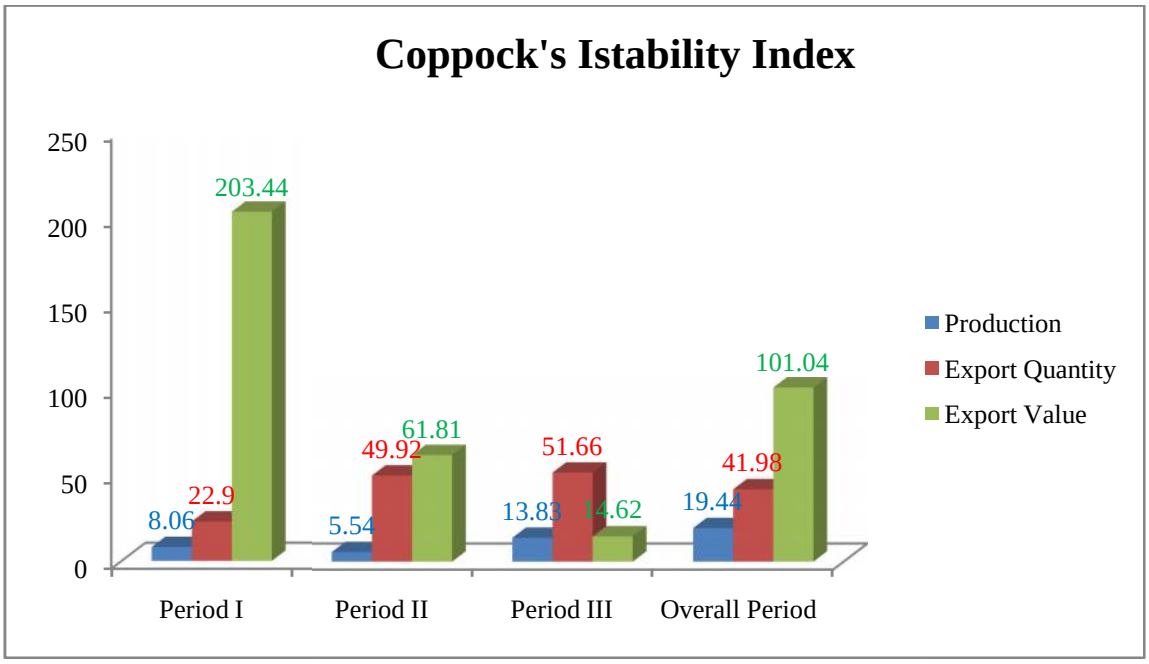


Fig.4. Coppock's Instability Index of Production, Export Quantity and Export Value of Pomegranate

Table 4.6 Coppock's Instability Index of Production, Export Quantity and Export Value of Pomegranate

Sr. No.	Particulars	Coppock's Instability Index (%)		
		Production	Export Quantity	Export Value
1	Period I	8.06	22.90	203.44
2	Period II	5.54	49.92	61.81
3	Period III	13.83	51.66	14.62
4	Overall Period	19.44	41.98	101.04

4.2.3 Country wise Coppock's Instability Index (%) of Export quantity

The instability in export quantity of pomegranate in various countries was calculated by Coppock's instability index and presented in Table 4.7.

It was revealed from the table that during Period-I the highest instability in exported quantity was observed in USA (408.03) followed by Kuwait (346.27 per cent), Oman (148.65 percent) and Saudi Arab (97.41 percent) while lowest instability was observed in U.A.E. (26.92 per cent) followed by UK (37.69 percent) and Nepal (46.91), As regards to India was failed to achieve the stability of export quantity in Period-I. During Period II the instability of Export quantity to was USA 356.92 per cent which was highest instability throughout the study period.

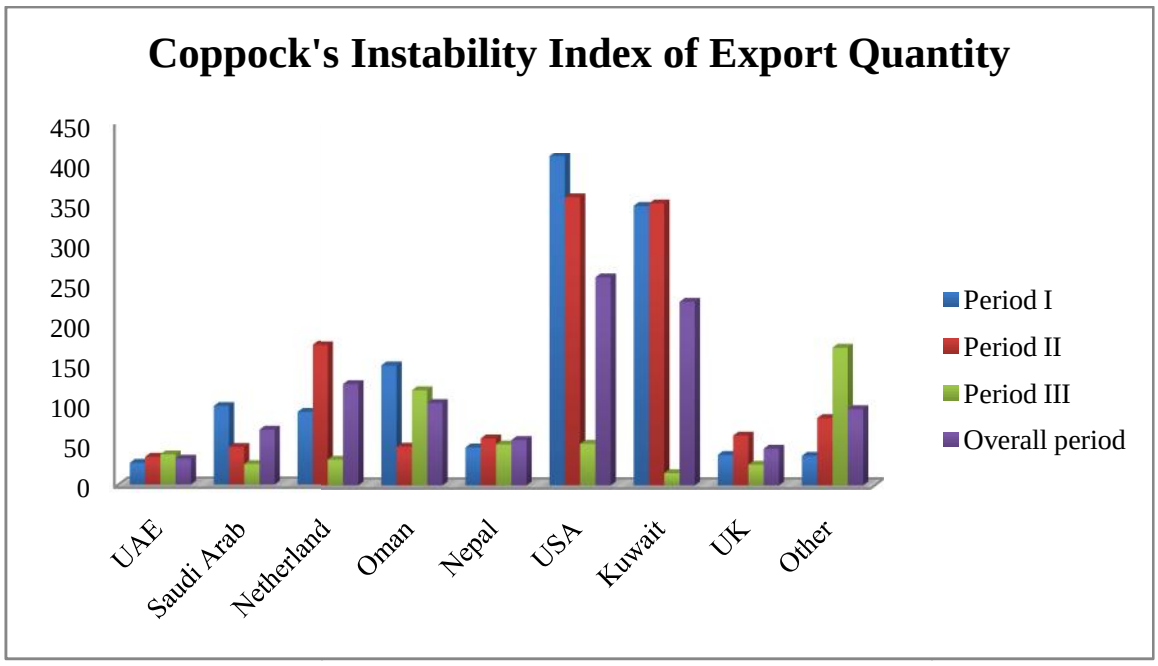


Fig.5. Country wise Coppock's Instability Index in percentage of Export quantity

Table 4.7 Country wise Coppock's Instability Index (%) of Export quantity

Country	Coppock's Instability Index (%)Export Quantity			
	Period I	**Period II**	**Period III**	**Overall period**
UAE	26.92	34.41	37.38	32.08
Saudi Arab	97.41	46.50	25.35	68.00
Netherland	90.12	173.50	31.87	125.49
Oman	148.65	47.90	117.77	101.98
Nepal	46.91	58.10	50.59	56.07
USA	408.03	356.92	51.44	257.74
Kuwait	346.27	349.23	15.12	227.33
UK	37.69	61.60	25.54	45.37
Other	36.59	83.34	170.56	94.34

The degree of instability steeply declined in Oman i.e. 47.90 per cent, the lowest instability index has recorded in U.A.E. 34.41 per cent followed by Saudi Arab (64.50 per cent), the increased instability in UK i.e. 61.60 per cent followed by Netherland i.e.173.50. During Period-III the highest instability was recorded in Oman country which was highest among all the study periods i.e. 117.77 per cent followed by USA and Nepal was 51.44 per cent and 50.59 per cent respectively. While lowest instability was recorded in Kuwait (15.12 per cent). . During overall period of study the highest instability was observed in USA (257.74 per cent) followed by Kuwait (227.33 per cent), Netherland (125.49 per cent) while lowest instability was recorded in UAE (32.08 per cent) followed by UK (45.37 per cent).

The instability recorded for India was 41.98 per cent. Thus, the above discussion was concluded that there was no stability in export of pomegranate from India throughout the studied period.

4.2.4 State wise Coppock's Instability Index (%) of Production

The instability in production of pomegranate in India was calculated by Coppock's instability index and is presented in Table 4.8. It was revealed from the table that during Period-I the highest instability in production was observed in Chhattisgarh (108.24 per cent) followed by Himachal Pradesh (90.32 per cent) and Andhra Pradesh (50.93 per cent) while lowest instability was observed in Maharashtra (3.17 per cent) followed by Rajasthan (4.83 per cent), Karnataka (7.28 per cent), As regards to India the instability was 8.06 per cent which mean that all the state of India failed to achieve the stability in Period-I. During Period-II the instability of production in Chhattisgarh was 100.33 per cent which was highest instability throughout the study period. The degree of instability steeply declined in Himachal Pradesh i.e. 67.07 per cent the lowest instability index has recorded in Karnataka 2.97 per cent followed by Maharashtra (8.05 per cent), the instability decreased in Gujarat (11.67 per cent), increased instability in Andhra Pradesh i.e. 68.86 per cent. As regards to India production of instability was decreased to 5.54 per cent. During Period-III the highest instability was recorded in Chhattisgarh which was highest among all the study periods i.e. 163.17 followed by Andhra Pradesh and Karnataka state was of 36.53 per cent and 32.77 per cent respectively.

While lowest instability was recorded in Maharashtra (11.49 per cent) followed by Tamil Nadu (16.49 per cent) and Gujarat (25.83 per cent). The instability of India was increased to 13.83 per cent. During overall period of study the highest instability was observed in Chhattisgarh (117.71 per cent) followed by Himachal Pradesh (66.83 per cent) while lowest instability was recorded in Karnataka (19.71 per cent) followed by Gujarat (22.41) Tamil Nadu (23.83 per cent). The instability recorded for India was

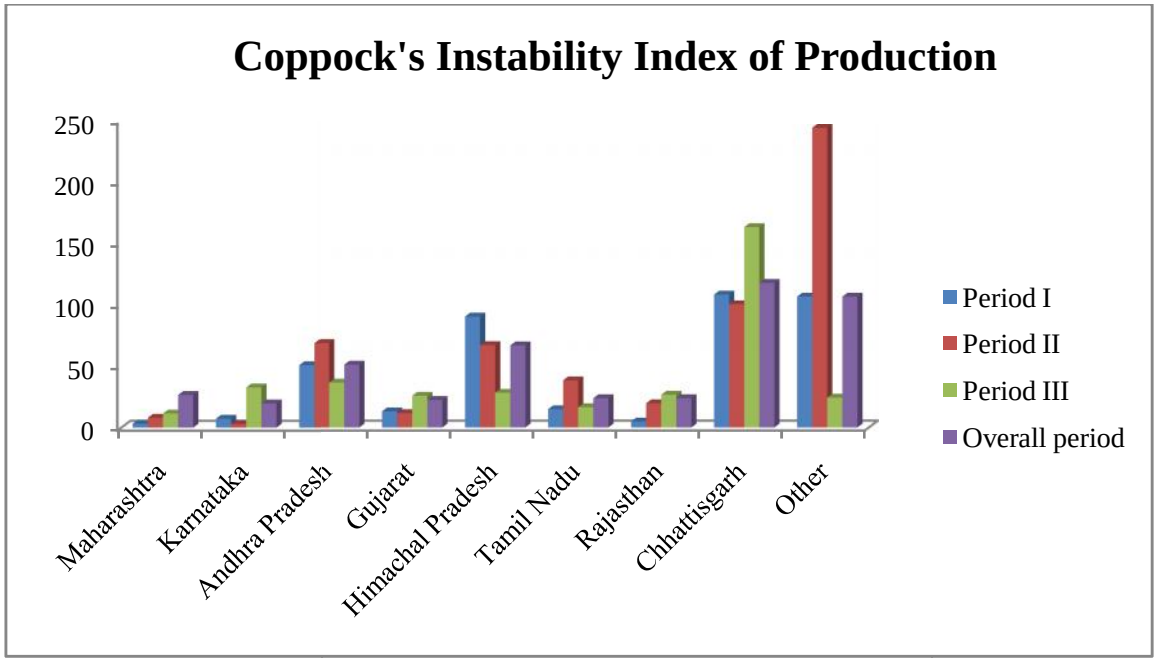


Fig.6. State wise Coppock's Instability Index in percentage of Production

19.43 per cent. Thus, the above discussion was concluded that there was no stability in production of pomegranate in India throughout the studied period.

Table 4.8 State wise Coppock's Instability Index (%) of Production

State	Coppock's Instability Index (%) Production			
	Period I	Period II	Period III	Overall period
Maharashtra	3.17	8.05	11.49	26.65
Karnataka	7.28	2.97	32.77	19.71
Andhra Pradesh	50.93	68.86	36.53	51.19
Gujarat	13.15	11.67	25.83	22.41
Himachal Pradesh	90.32	67.07	28.26	66.83
Tamil Nadu	14.83	38.40	16.49	23.83
Rajasthan	4.83	19.70	26.65	23.88
Chhattisgarh	108.24	100.33	163.17	117.71
Other	106.54	243.99	24.28	106.54

4.3 Trend in domestic and International prices of Pomegranate

The trend equations were fitted to assess the domestic and international prices. Depending upon its better fit, the trends and the results are assessed and presented under different categories namely trends in domestic price and trends in international price. The trend in international prices was studied for Pomegranate by regressing domestic price and international price with time as the variable. The quadratic function is fitted to the data and sign and significant of the quadratic coefficient 'c' indicate the magnitude and direction of the change in trade in international price.

Table 4.9 Trend in Domestic and International prices of Pomegranate

Sr. No.	Trend	Intercept (a)	X (b)	X^2 (c)	R^2	F value
1.	Domestic Price	5.21	0.04	0.002	0.83*	68.06
2.	International Price	4.94	0.08	0.0072	0.71*	32.01

(* - denotes significant at 1% level)

The results of the quadratic function are presented in Table 4.9. The analysis of trends in international prices of Pomegranate shows that, the quadratic function fitted for Pomegranate for domestic price and international price. The R^2 value (0.83) was statistically significant for Domestic price. However, sign of 'b' was positive (0.04) and sign of quadratic term 'c' was positive (0.002) this indicates that, trend in domestic price of Pomegranate was increasing at increasing rate. Also for international price value of R^2 (0.71) was statistically significant and the sign of 'b' was positive (0.08) and sign of quadratic term 'c' was positive (0.0072) this showed that, trends in international price of Pomegranate was increasing at increasing rate. The results obtained are in close agreement with the finding of Murthy (2014) they concluded that export of Grapes increase over a decade. Guledgudda (2005) they concluded that, there was increasing trend in domestic prices of raw cashew nut.

4.4. Export competitiveness of Pomegranate in India

The export competitiveness of Pomegranate was analyzed by using Nominal Protection Co-efficient. The competitiveness of market depends upon NPC ratio. NPC shows that the divergence of domestic price from international price and thus determines the degree of export competitiveness of commodity,

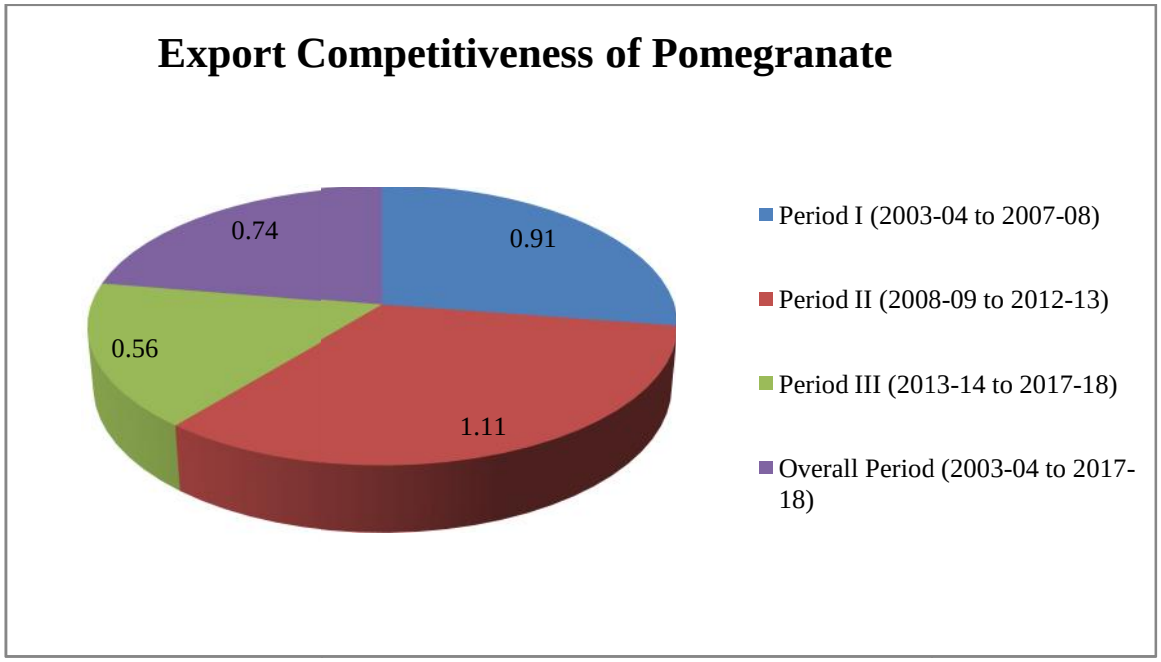


Fig.7. Export competitiveness of Pomegranate

Table 4.10 Export Competitiveness of Pomegranate

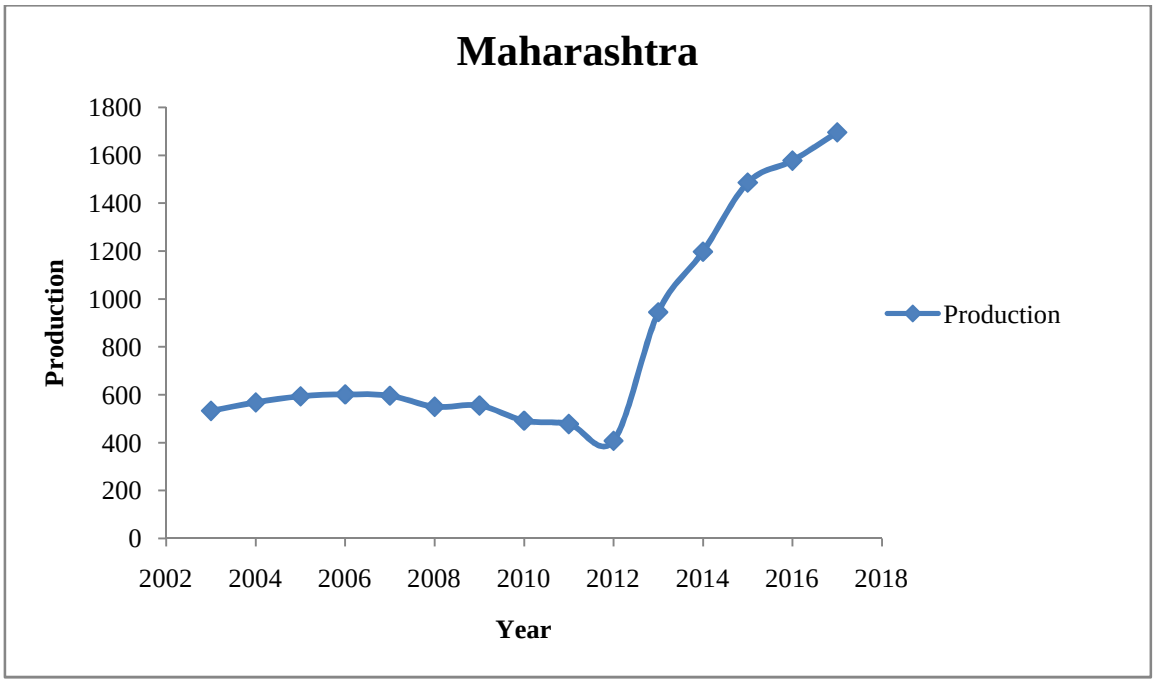
Sr. No.	Particulars	NPC (Pd/ Pr)
1	Period I (2003-04 to 2007-08)	0.91
2	Period II (2008-09 to 2012-13)	1.11
3	Period III (2013-14 to 2017-18)	0.56
4	Overall Period (2003-04 to 2017-18)	0.74

When NPC ratio is less than 0.5, market is highly competitive, when NPC ratio is in between 0.5 to1, the market is moderately competitive and when NPC ratio is greater than one, then market is non- competitive and it is presented in Table 4.10 shows that, at an overall level, the NPC values of Pomegranate export was worked out to 0.74, it is indicating moderately export competitiveness of Pomegranate in international level and proves commodity is protected in international market but when it was analyzed for the four different periods in period I, period II period III and overall period . It was observed that, the crop was during the period I, period II period III and overall period average NPC values was 0.91, 1.11, 0.56 and 0.74, respectively which indicates highly export competitiveness for period III. Hence, the hypothesis i.e. Indian Pomegranate has better competitiveness in International market is accepted. The results obtained are in close agreement with the findings of Tammana (1999), Vaishali (2010b), Parmar and Leua (2011) and Deshmukh (2016) they concluded that, Indian pomegranate, grape are competitive for international market.

4.5.1 State wise production performance of Pomegranate

State wise performance of Pomegranate is presented in the Table 4.11. It was revealed that in production of pomegranate observed at overall period Gujarat state was highest growth rate i.e. 16.60 per cent, whereas lowest growth was observed in Andhra Pradesh state i.e. 5.60 per cent, which is significant at 1 per cent level. It was observed in pomegranate production Maharashtra and Karnataka is Second and third position, respectively. Maharashtra state was observed in production of pomegranate highest growth rate i.e. 15.55 per cent in period III which is significant at 1 per cent level, and lowest growth was i.e. 2.85 per cent in period I which is significant at 5 per cent level. At overall period growth rate was observed i.e. 8.25 per cent, which is significant at 1 per cent level. Karnataka state was observed in production of pomegranate highest growth rate i.e. 23.63 per cent in period III which is significant at 1 per cent level, and lowest growth was i.e. 2.63 per cent in period II which is significant at 5 per cent level. At overall period growth rate was observed i.e. 7.35 per cent, which is significant at 1 per cent level. From table it is seen that, the highest variation in production of pomegranate in overall period was observed in Gujarat state i.e. 86.37 whereas lowest variation was observed in Karnataka state i.e. 40.60 per cent.

Growth rate of pomegranate production was observed in India i.e. 9.15 per cent, which is statistically significant at 1 per cent level and variation is observed i.e. 57.20 per cent.


Maharashtra
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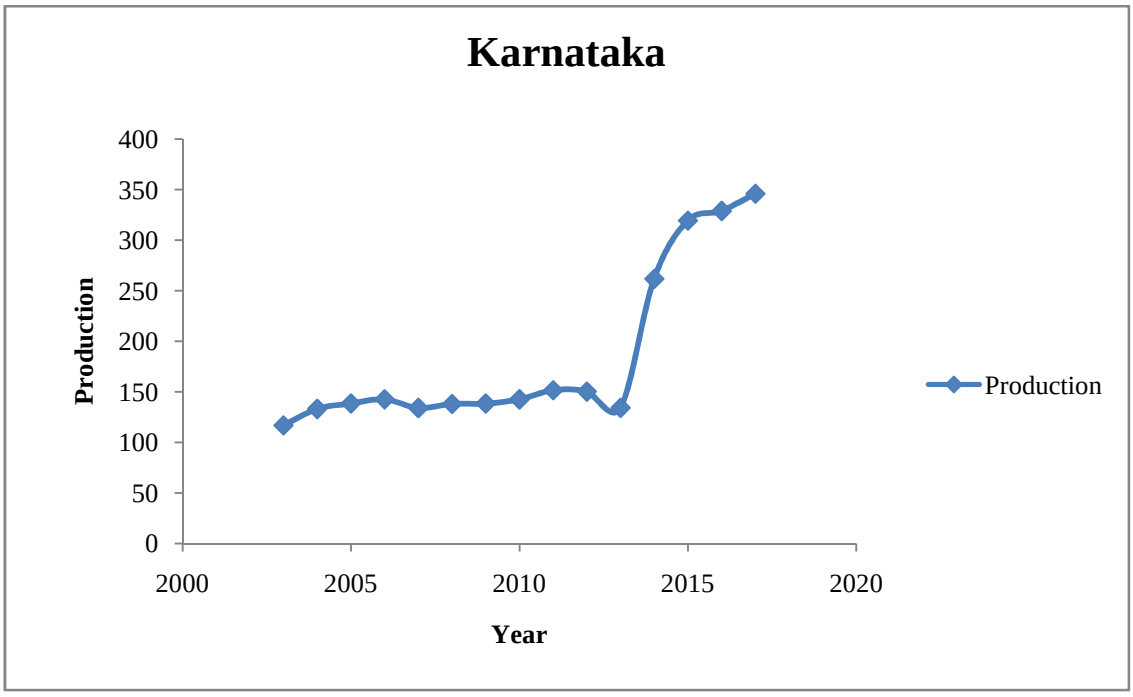
Karnataka
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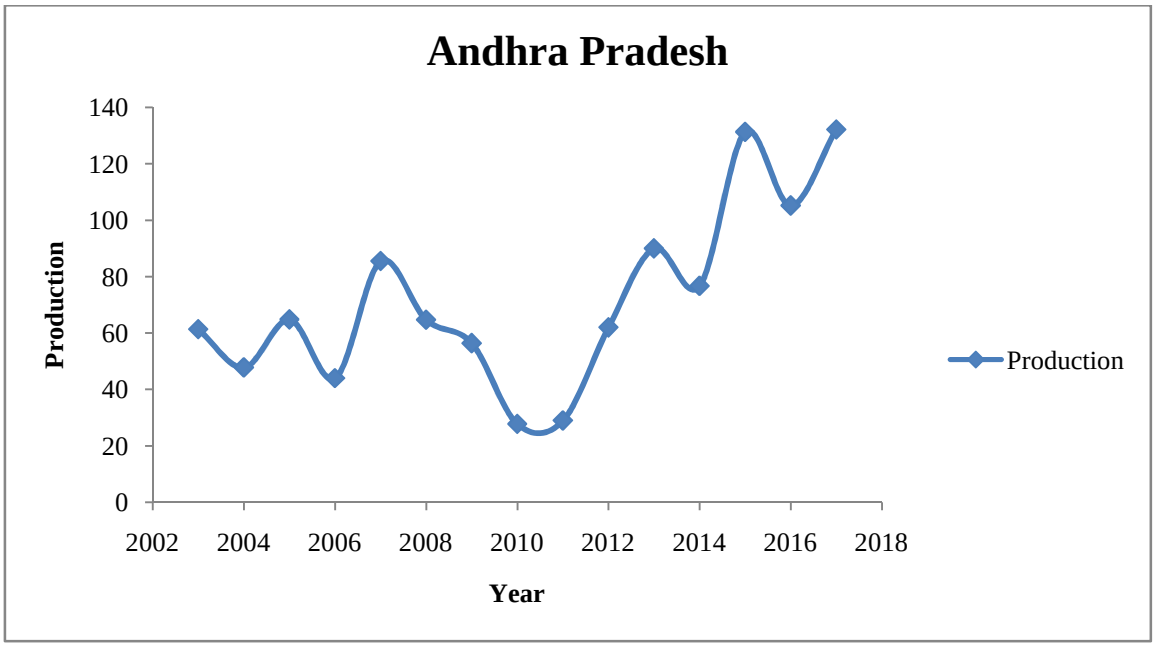


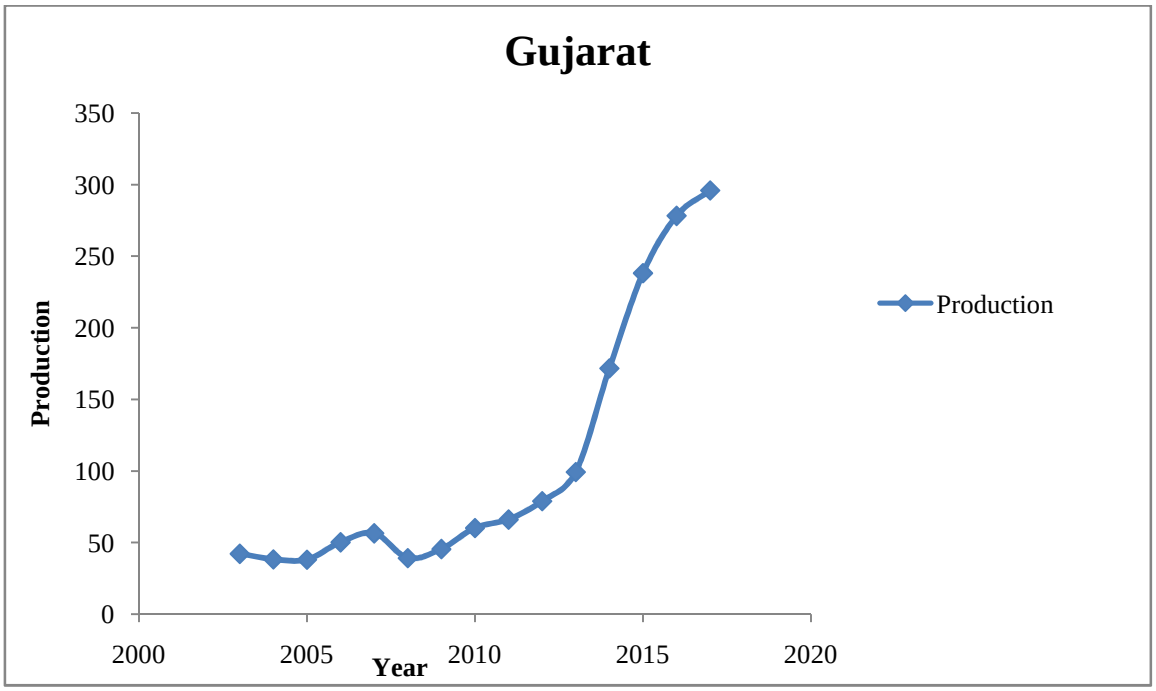


Fig.8. Production of Pomegranate in Maharashtra, Karnataka, Andhra Pradesh and Gujarat (2003-04 to 2017-18)

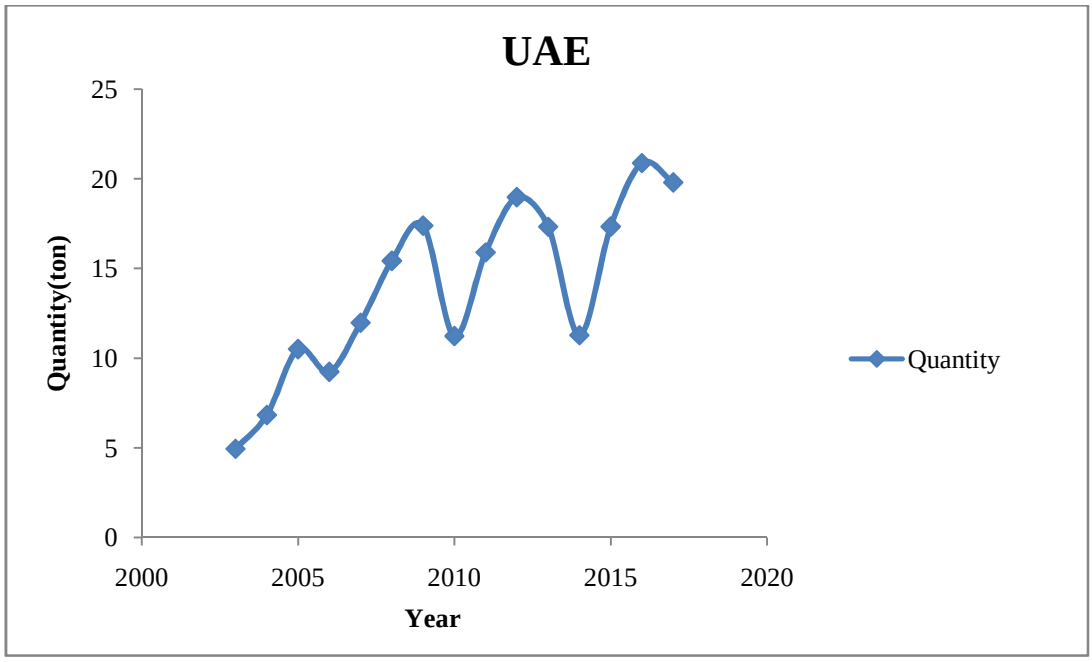
Table 4.11 State wise production performance of Pomegranate during (2003-04 to 2017-18)

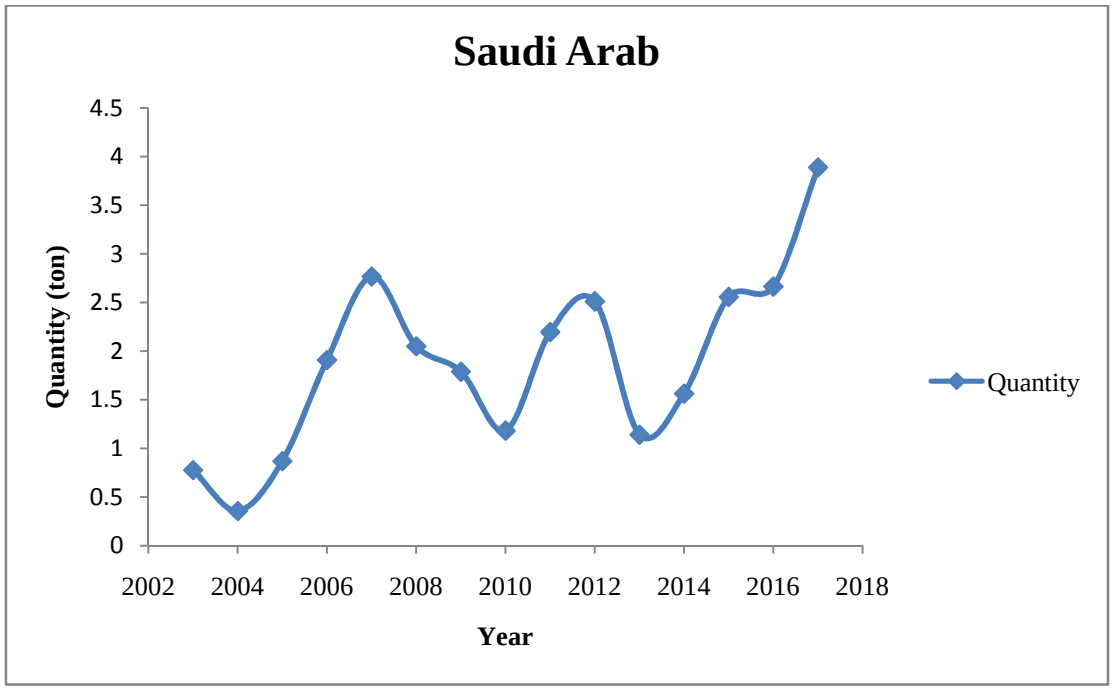
State	Production		
	CGR	CV	t Value
Maharashtra			
Period I	2.85**	4.92	3.26
Period II	-7.20	12.13	-4.86
Period III	15.55*	22.11	5.85
Overall period	8.25*	54.39	3.94
Karnataka			
Period I	3.49	7.37	1.74
Period II	2.63**	4.46	4.24
Period III	23.63**	31.07	2.85
Overall period	7.35*	44.60	5.35
Andhra Pradesh			
Period I	5.97	27.04	0.64
Period II	-7.22	37.78	-0.50
Period III	11.44	23.02	1.80
Overall period	5.60**	44.74	2.19
Gujarat			
Period I	8.89***	17.83	2.13
Period II	19.35*	27.45	12.16
Period III	30.54*	37.43	4.73
Overall period	16.60*	86.37	8.32
Total			
Period I	6.53**	10.69	3.23
Period II	-2.04	4.54	-1.9
Period III	18.19*	25.26	5.63
Overall period	9.51*	57.20	5.28

(*, **, *** - denotes significant at 1%, 5%, 10% level, respectively.)

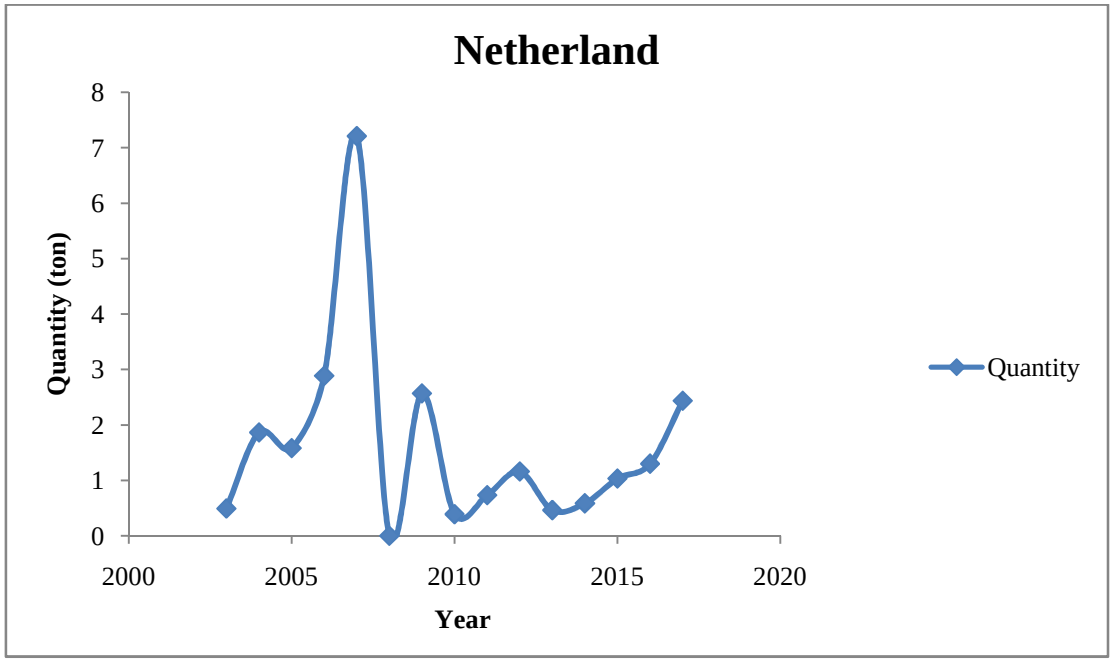
4.5.2. Country wise export performance of Pomegranate during (2003-04 to 2017-18)

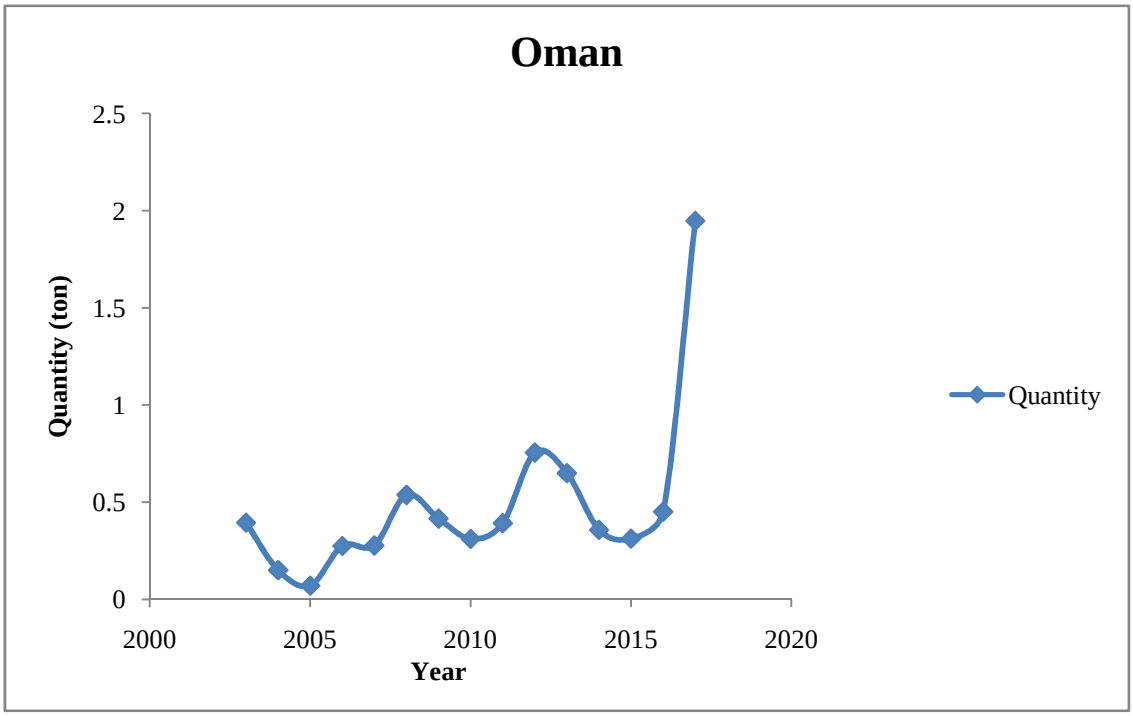
Country wise export performance of Pomegranate during (2003-04 to 2017-18) was presented in the Table 4.12, it was revealed that, highest growth rate of pomegranate exported quantity to Kuwait from India was 42.22 per cent which is significant at 1 per cent level, whereas lowest growth rate for export of pomegranate was found in Netherland i.e. 3.54 per cent. Second highest growth rate of quantity of pomegranate exported to USA from India was 22.96 per cent which is significant at 1 per cent level. The highest growth rate in case of total value of pomegranate exported was found in USA i.e. 63.24 per cent, whereas lowest was found in UK i.e. 8.01 per cent which is significant 1 per cent level. Second highest and lowest growth rate of total value of pomegranate exported was Kuwait i.e. 61.25 per cent and Netherland i.e. 13.43 per cent, respectively which is significant 1 per cent level. Followed by growth rate of total value of pomegranate exported was found in Nepal, Oman, U.A.E. and Saudi Arab i.e. 31.24, 30.57, 28.04 and 27.03, respectively. The highest and lowest variation in case of quantity of pomegranate export was found in Netherland and U.A.E. i.e. 107.35 and 34.99 per cent, respectively. The second highest and lowest variation in quantity of pomegranate export was found in Nepal i.e. 98.35 per cent and Saudi Arab i.e. 49.44 per cent, respectively. The second highest and lowest variation in quantity of pomegranate export was found in Nepal i.e. 98.35 per cent and Saudi Arab i.e. 49.44 per cent, respectively. Followed by in case of highest variation of quantity of pomegranate export was in Kuwait, Oman and UK i.e. 92.87, 90.45 and 60.81 per cent, respectively.


UAE
25
20
15
10
5
0
Quantity(ton)
2000
2005
2010
2015
2020
Year
Quantity

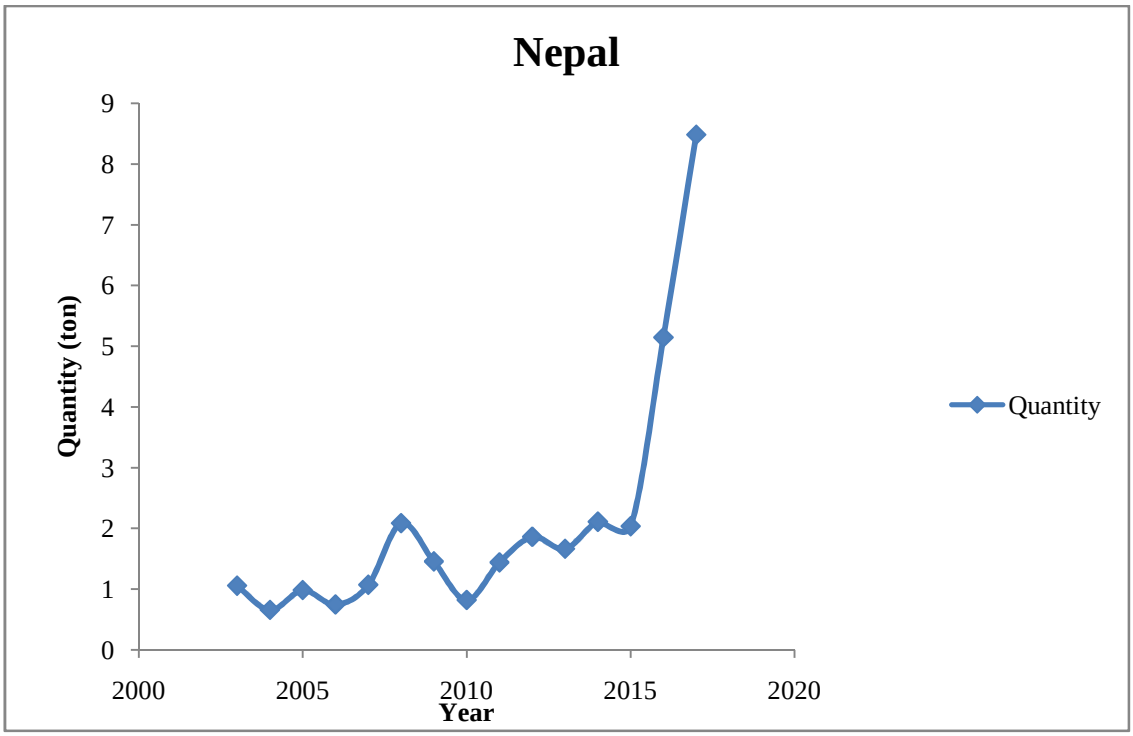

Saudi Arab
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Quantity (ton)
2002
2004
2006
2008
2010
2012
2014
2016
2018
Year
Quantity

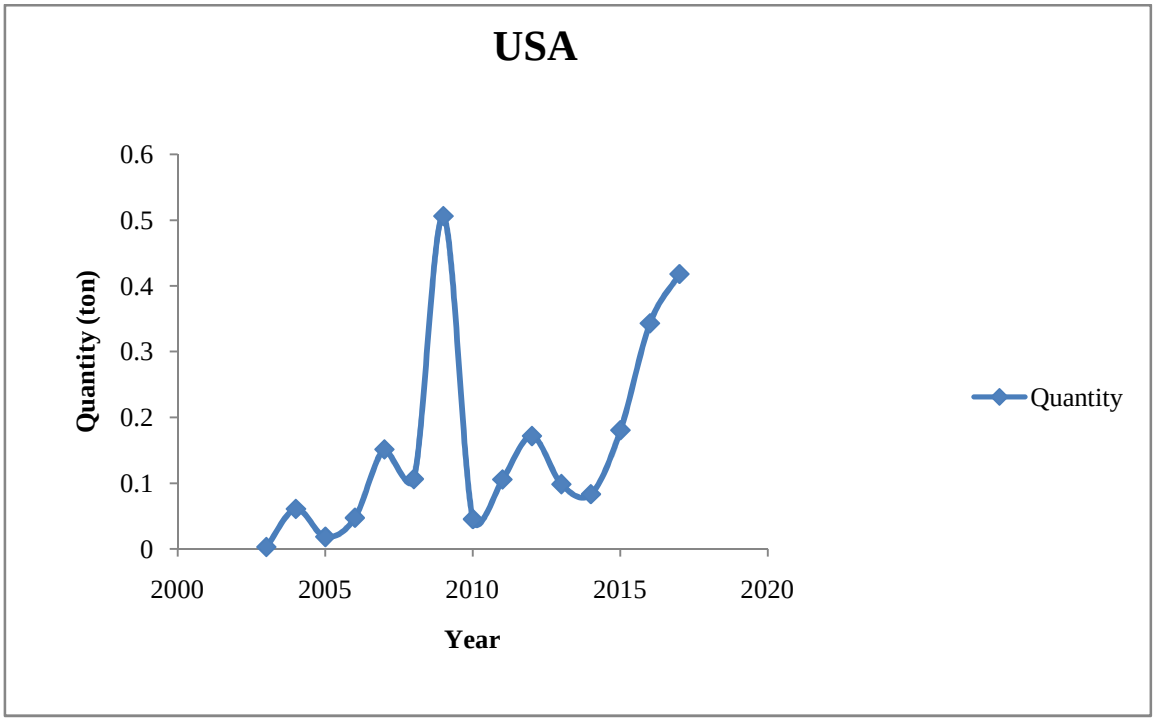
Continue…


Netherland
Quantity (ton)
8
7
6
5
4
3
2
1
0
2000
2005
2010
2015
2020
Year
Quantity

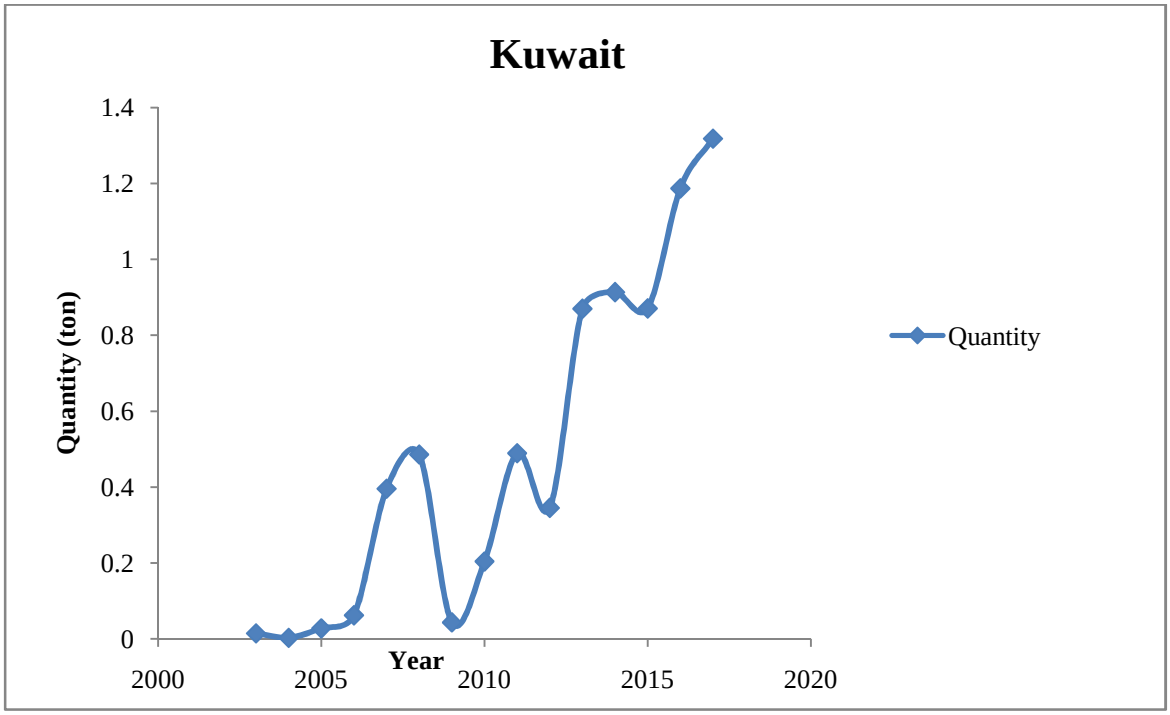

Oman
Quantity (ton)
2.5
2
1.5
1
0.5
0
2000
2005
2010
2015
2020
Year
Quantity

Continue…


Nepal
Quantity (ton)
9
8
7
6
5
4
3
2
1
0
2000
2005
2010
2015
2020
Year
Quantity


USA
Quantity (ton)
0.6
0.5
0.4
0.3
0.2
0.1
0
2000
2005
2010
2015
2020
Year
Quantity

Continue…



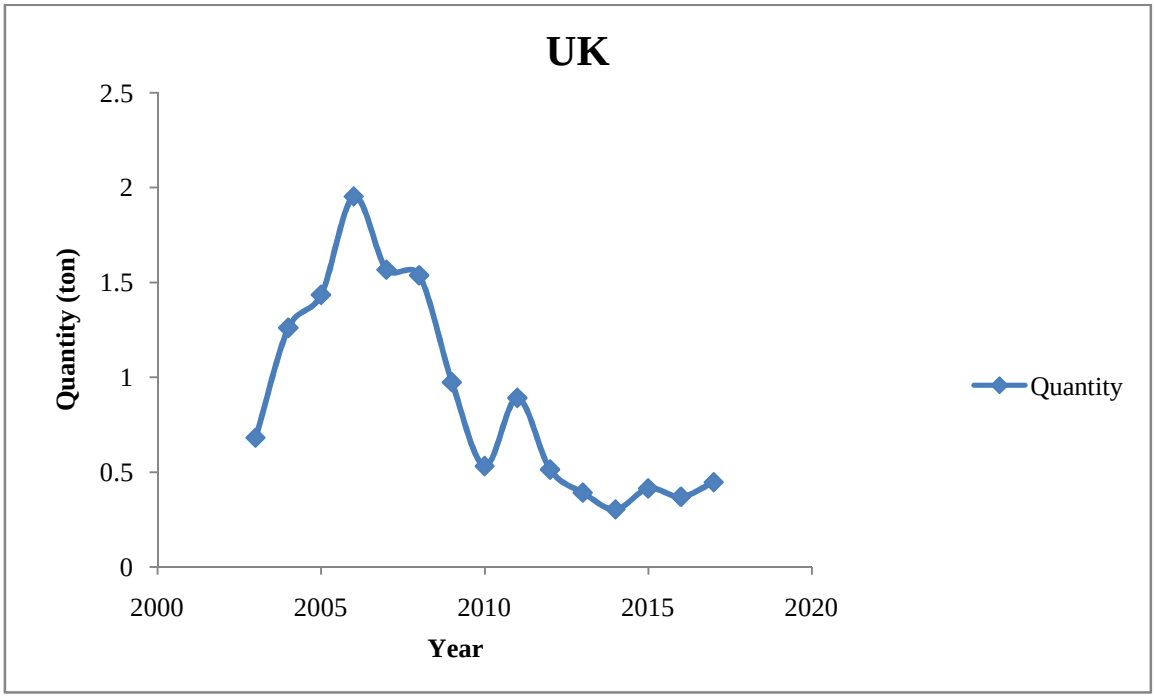


Fig.9. Quantity export to UAE, Saudi Arab, Netherland, Oman, Nepal, USA, Kuwait and UK from India (2003-04 to 2017-18)

4.12. Country wise export performance of Pomegranate during (2003-04 to 2017-18)

Sr. No	Country	Quantity		Value	
	country	CGR	CV	CGR	CV
1	U.A.E	7.85*	34.99	28.04*	92.75
2	Saudi Arab	9.68*	49.44	27.03*	96.11
3	Netherland	3.54	107.35	13.43*	82.73
4	Oman	11.07*	90.45	30.57*	152.56
5	Nepal	13.65*	98.35	31.24*	126.83
6	USA	22.96*	96.61	63.24*	144.21
7	Kuwait	42.22*	92.87	61.25*	125.04
8	UK	-10.29	60.81	8.01*	36.80
9	Other	10.29*	6.36	25.30*	81.79
10	India (Total)	8.12*	40.53	24.21*	85.72

Note- (*, **, *** - denotes significant at 1%, 5%, 10% level, respectively)

It was also showed that, the highest variation in case of total value of pomegranate export was found in Oman i.e. 152.56 per cent, where was lowest in UK i.e. 36.80 per cent. Followed by variation of total value of pomegranate export was in U.S.A, Nepal, Kuwait, Saudi Arab, U.A.E. and Netherland i.e. 144.21, 126.83, 125.04, 96.11, 92.75 and 82.73 per cent, respectively. Growth rate of India for pomegranate export was found i.e. 8.12 per cent which is statistically Significant at 1 per cent level and variation was i.e. 40.53 per cent.

SUMMARY AND CONCLUSION

CHAPTER-V

SUMMARY AND CONCLUSIONS

Pomegranate is one of the most important sub-tropical fruit crop.Pomegranate cultivation was started since ancient time. It is one of the first five domesticated edible fruit crops along with fig, date palm, grape and olive. Traditional use of pomegranate as a medical remedy as all parts of this plant have several bioactive metabolites. Consequently, its demand has increased tremendously not only in the western world but also in other parts of the globe. The production of pomegranate in India during 2017-18 was 220 (‘000) hectares, 2795(‘000) MT, production increase of 6.9 percent over previous year respectively.

India is the largest producer of pomegranates but export from India fresh fruit during 2017-18 was 1.85 per cent of the total share in world compared to Thailand and Vietnam soc rep which exports 28.37 and 23.73 per cent share in world, respectively of their production. The total production of pomegranate is concentrated mainly in the Western Maharashtra, Karnataka, Andhra Pradesh, Gujarat, Himachal Pradesh, Tamil Nadu and Rajasthan in India. Maharashtra is the leading State with 151.5 thousands hector area under pomegranate cultivation, followed by Karnataka and Gujarat with 29.1 thousand ha and 22.2 thousand ha respectively, Andhra Pradesh and Rajasthan stood at fourth and fifth position with7.71 and 2.5 thousand ha of pomegranate cultivation in India.India ranks first in area (107,000 ha) with a production of 2795million metric, but exports quantity 50230million tonnes, including 1.85 per cent export from India to rest of country.

Maharashtra is a major producer of pomegranates and contributes 81 per cent of the country's total export. At present, the total area under pomegranate cultivation across the country is 169,000 hectares, including 151,000 hectares in Maharashtra. The area under pomegranate

cultivation in Nashik district is close to 45,000 hectares. Besides Nashik, the major pomegranate-producing pockets in the state include Solapur, Ahmednagar, Jalgaon and Pune. In view of importance of export trade of Pomegranates, such a type of study was entitle “Production and Export of Pomegranates: Trend and Competitiveness” made to know the status and prospects of Pomegranates with the following specific objectives.

1. To estimate the growth in production and export of Pomegranates.
2. To workout the instability in production and export of Pomegranates.
3. To study the trend in domestic and international prices of Pomegranates.
4. To study the export competitiveness of Pomegranates.

The required data for the present study have been collected from APEDA, FAO, National Horticultural Board (NHB) Database and Agriculture Producing Market Committee (APMC).

The data regarding production, export, international price and domestic price in India was collected from 2003-04 to 2017-18, which includes 15 years data. The data divided into three periods i.e. Period I (2003-04 to 2007-08), Period II (2008-09 to 2012-13), period III (2013-14 to 2017-18) and Overall period (2003-04 to 2017-18).

The data collected from secondary sources, the different analytical techniques used in the study such as Tabular Presentation, Growth Rates, Instability analysis, Trend Analysis and Nominal Protection Coefficient.

India’s share fresh fruit in world export was more than one percent. India’s export quantity during 2003-04 was 20651 MT which increases to 50230 MT during 2017-18. In terms share in world export India’s export was 1.21 per cent in 2003-04 to raise 1.85 per cent in 2017-18. The total exports of agriculture and allied products and share of agricultural export in total export of the country is observed that, India’s total export in 2003-04 was Rs. 293366.75 crores which have increased up

to Rs. 1849428.76 crores in 2017-18. The agricultural export in 2003-04 was Rs. 37266.52 crores which have increased up to Rs. 226651.94 crores in 2017-18. However, per cent share of agricultural export in the total export have decreased from 12.70 per cent in 2003-04 to 12.26 per cent in 2017-18.

India's share of pomegranate production in export quantity was revealed that during 2003-04 was about 664.9 tons and quantity exported was about 10.31 tons accounting for 1.5 per cent of production.During the year 2007-08 the production was about 884.1 tons and the quantity exported was 35.17 tons accounting for 3.9 per cent of production which was decrease during the year 2012-13 in production of 744.95 tons and the export was increase 36.02 tons (4.8 per cent).Also observed up to the 2012-13 years increase in production there was an increase in the quantity exported, but in the year 2013-14 up to 2017-18 production was increased 1352.92 tons up to 2670.67 ton but per cent export was declined 2.3 up to 1.7 percent. A similar finding has been observed in the year 2017-18 also.

Compound Growth Rate of Production, Export Quantity and Export Value of Pomegranate was analyzed the result revealed thatgrowth rate 6.53, 33.47 and 134.46 per cent per annum in period I, respectively and were found to be statistically significant at five per cent level of production and export value, export quantity were found to be significant at one per cent level. In period II production and export quantity observed growth rates negatively significant at the rate of -2.04 and -0.33 per annum, respectively. However, in period III production and export value shows the growth rate positively significant at the rate of 18.19 and 17.29 per cent per annum, respectively.

The overall 15 years (2003-04 to 2017-18) growth rate of export value of Pomegranate in India was highly significant at 31.59 per cent per annum and much higher than the production and export quantity of Pomegranate for overall period was 9.51 and 8.12 per cent per annum, respectively and significant at one per cent level. Hence, there is significant

growth in production and export of Pomegranate in India, the hypothesis is accepted

The production of Pomegranate exported exhibited less variability with co-efficient of variation at 10.69 per cent, 4.39, 25.26 and 57.17 per cent in period I, period II, period III and overall period, while it was highest in overall period with co-efficient of variation at 57.17 per cent. As regard the Export quantity of Pomegranate the highest variation was observed 47.18 per cent in period I with co-efficient of variation at 40.53 per cent in overall period 31.60 per cent in period III and 23.66 per cent in period II.Export earnings in terms of Export value showed higher instability in overall period with 85.72 per cent of co-efficient of variation when compared to the period I, period II and period III. From the above it is clear that instability in production in Pomegranate was less during period II.

The Coppock's Instability Index was analyzed result revealed thatthe highest variation observed in export value of Pomegranate was 203.44 per cent in period I and 101.04 per cent, 61.81 per cent and 14.62 per cent in overall period, period II and period III, respectively.Coppock's Instability Index for production, export quantity and export value is in period I 8.06, 22.90, and 203.44 per cent, respectively**.** In period II it was observed in production, export quantity and export value was 5.54, 49.92 and 61.81 per cent, respectively. In period III it was observed in production, export quantity and export value was 13.83, 51.66 and 14.62 per cent, respectively and for overall period it was 19.44, 41.98 and 101.04 per cent, respectively. The discussion thus revealed that instability in Pomegranate export value was higher in period I.

Coppock's instability index was employed to calculated the instability in export quantity of pomegranate in country wise it was seen that during Period-I the highest instability in exported quantity was observed in USA (408.03) followed by Kuwait (346.27 per cent), Oman (148.65 percent) and Saudi Arab (97.41 percent) while lowest instability was observed in U.A.E. (26.92 per cent) followed by UK (37.69 percent) and Nepal (46.91).

During Period II the instability of Export quantity to was USA 356.92 per cent which was highest instability throughout the study period. The degree of instability steeply declined in Oman i.e. 47.90 per cent, the lowest instability index has recorded in U.A.E. 34.41 percent followed by Saudi Arab (64.50 percent), the increased instability in UK i.e. 61.60 per cent followed by Netherland i.e.173.50.

During Period-III the highest instability was recorded in Oman country which was highest among all the study periods i.e. 117.77 per cent followed by USA and Nepal was 51.44 per cent and 50.59 per cent respectively. While lowest instability was recorded in Kuwait (15.12 per cent). During overall period of study the highest instability was observed in USA (257.74 per cent) followed by Kuwait (227.33 per cent), Netherland (125.49 per cent) while lowest instability was recorded in UAE (32.08 per cent) followed by UK (45.37 per cent).

Coppock's instability index was employed to calculated the instability in export quantity of pomegranate in state wise it was seen that during Period-I the highest instability in production was observed in Chhattisgarh (108.24 per cent) followed by Himachal Pradesh (90.32 per cent) and Andhra Pradesh (50.93 per cent) while lowest instability was observed in Maharashtra (3.17 per cent) followed by Rajasthan (4.83 per cent), Karnataka (7.28 percent), During Period-II the instability of production in Chhattisgarh was 100.33 per cent which was highest instability throughout the study period. The degree of instability steeply declined in Himachal Pradesh i.e. 67.07 per cent the lowest instability index has recorded in Karnataka 2.97 per cent followed by Maharashtra (8.05 per cent), the instability decreased in Gujarat (11.67 per cent), increased instability in Andhra Pradesh i.e. 68.86 per cent. During Period-III the highest instability was recorded in Chhattisgarh which was highest among all the study periods i.e. 163.17 followed by Andhra Pradesh and Karnataka state was of 36.53 per cent and 32.77 per cent respectively. While lowest instability was recorded in Maharashtra (11.49 per cent) followed by Tamil

Nadu (16.49 per cent) and Gujarat (25.83 per cent). The instability of India was increased to 13.83 per cent.

During overall period of study the highest instability was observed in Chhattisgarh (117.71 per cent) followed by Himachal Pradesh (66.83 per cent) while lowest instability was recorded in Karnataka (19.71 per cent) followed by Gujarat (22.41) Tamil Nadu (23.83 per cent).

Trend in domestic and International prices of Pomegranate was observed that the R^2 value (0.83) was statistically significant for Domestic price. However, sign of 'b' was positive (0.04) and sign of quadratic term 'c' was positive (0.002) this indicates that, trend in domestic price of Pomegranate was increasing at increasing rate. Also for international price value of R^2 (0.71) was statistically significant and the sign of 'b' was positive (0.08) and sign of quadratic term 'c' was positive (0.0072) this showed that, trends in international price of Pomegranate wasincreasing at increasing rate.

the NPC values of Pomegranate export was worked out to 0.74, it is indicating moderately export competitiveness of Pomegranate in international level and proves commodity is protected in international market but when it was analyzed for the four different periods in period I, period II period III and overall period . It was observed that, the crop was during the period I, period II period III and overall period average NPC values was 0.91, 1.11, 0.56 and 0.74, respectively which indicates highly export competitiveness for period III.

Overall period Gujarat state was highest growth rate i.e. 16.60 per cent, whereas lowest growth was observed in Andhra Pradesh state i.e. 5.60 per cent, which is significant at 1 per cent level. It was observed in pomegranate production Maharashtra and Karnataka is Second and third position, respectively.

Maharashtra state was observed in production of pomegranate highest growth rate i.e. 15.55 per cent in period III which is significant at 1

per cent level, and lowest growth was i.e. 2.85 per cent in period I which is significant at 5 per cent level. At overall period growth rate was observed i.e. 8.25 per cent, which is significant at 1 per cent level. Karnataka state was observed in production of pomegranate growth rate i.e. 23.63 per cent in period III which is significant at 1 per cent level, and lowest growth was i.e. 2.63 per cent in period II which is significant at 5 per cent level. At overall period growth rate was observed i.e. 7.35 per cent, which is significant at 1 per cent level. The highest variation in production of pomegranate in overall period was observed in Gujarat state i.e. 86.37 whereas lowest variation was observed in Karnataka state i.e. 40.60 per cent. Growth rate of pomegranate production was observed in India i.e. 9.15 per cent, which is statistically significant at 1 per cent level and variation is observed i.e. 57.20 per cent.

Country wise export performance of Pomegranate was revealed that highest growth rate of pomegranate exported quantity to Kuwait from India was 42.22 per centwhich is significant at 1 per cent level, whereas lowest growth rate for export of pomegranate was found in Netherland i.e. 3.54 per cent.Second highest growth rate of quantity of pomegranate exported to USA from India was 22.96 per cent which is significant at 1 per cent level. The highest growth rate in case of total value of pomegranate exported was found in USA i.e. 63.24 per cent, whereas lowest was found in UK i.e. 8.01 per cent which is significant 1 per cent level. Second highest and lowest growth rate of total value of pomegranate exported was Kuwait i.e. 61.25 per cent and Netherland i.e. 13.43 per cent, respectively which is significant 1 per cent level. Followed by growth rate of total value of pomegranate exported was found in Nepal, Oman, U.A.E. and Saudi Arab i.e. 31.24, 30.57, 28.04 and 27.03, respectively.

The highest and lowest variation in case of quantity of pomegranate export was found in Netherland and U.A.E. i.e. 107.35 and 34.99 per cent, respectively.The second highest and lowest variation in

quantity of pomegranate export was found in Nepal i.e. 98.35 per cent and Saudi Arab i.e. 49.44 per cent, respectively. Followed by in case of highest variation of quantity of pomegranate export was in Kuwait, Oman and UK i.e. 92.87, 90.45 and 60.81 per cent, respectively. It was also showed that, the highest variation in case of total value of pomegranate export was found in Oman i.e. 152.56 per cent, where was lowest in UK i.e. 36.80 per cent. Followed by variation of total value of pomegranate export was in U.S.A, Nepal, Kuwait, Saudi Arab, U.A.E. and Netherland i.e. 144.21, 126.83, 125.04, 96.11, 92.75 and 82.73 per cent, respectively. Growth rate of India for pomegranate export was found i.e. 8.12 per cent which is statistically Significant at 1 per cent level and variation was i.e. 40.53 per cent.

Conclusions

The following conclusions were emerged from the present study.

1. There is increase in agriculture export but percent share of agriculture export to total exports was decreasing due to increase in share of manufacturing sectors and service sectors.
2. There is increase in quantity of India's pomegranate export during whole period of study.
3. The growth rate of pomegranate production in Maharashtra state was found to be positive and significant during the I,III and overall period.
4. The production of pomegranate exhibited less variability with co-efficient of variation at 10.69per cent, 4.54 per cent and 25.26 per cent in period I, II and III, respectively.
5. Export earnings in terms of Export value showed higher instability in overall period with 86.98 per cent of co-efficient of variation.
6. Coppock's Instability Index shows the highest variation in export value of pomegranate i.e. 203.44 per cent in period I.
7. Country wise export quantity of pomegranate Coppock's Instability Index shows the highest variation in USA and lowest variation in U.A.E. i.e. 257.74 and 32.08 per cent, respectively.

8. There was no stability in production and export quantity of pomegranate from India throughout the study period.
9. Trend in domestic price and international price of pomegranate was increasing at increasing rate.

Policy Implications

1. There is large number of small importers for Indian fresh pomegranate like Nepal, Saudi Arabia, Oman etc. therefore attempts should be made to exploit these potential markets and develop protocol to increase the pomegranate exports.
2. Indian pomegranate is highly price competitive in international market. Therefore, India should make use of this opportunity profitably through concerned efforts aiming at increasing its export share in the world trade of pomegranate.
3. There was no stability in export of pomegranate from India throughout the study period. Therefore Encouragement should be given to pomegranate producers for export their produce to get export stability and remunerative prices.

LITERATURE CITED

LITERATURE CITED

Ananthi, S. (2000) An econometric analysis of Indian rice exports. Unpublished M.Sc. (Agril.) Thesis, Uni. Agril. Sci., Dharwad, Karnataka (India).

And Mokashi, Prakash (2015) Export performance of Indian cashew.*Internat. Res. J. Agril. Eco. & Stat.,* **6**(2): 349-355.

Angles, A.(2001) Production and Export of turmeric in south India : An economic analysis. Unpublished M.Sc. (Agril.) Thesis, Uni. Agril. Sci., Dharwad, Karnataka (India).

Asha, Bisht., R. Singh., Arpita Gangawar and O. P. Singh (2015) Export of fruits from India: Growth pattern and SPS issues. *Economic Affairs*, **2**: 339-346.

Bairwa, K. C., R. Sharma., and T. Kumar (2012) Economics of growth and instability: fruit crops of India. *Rajasthan Journal of Extn. Edu*. **20**(1):128-132.

Balyan K., S.Kumar,V.P. Chahal and S.Kumar (2015) Dynamics of Indian fresh mango export**.** *Indian Journal of Agricultural Sciences,* **85**(11): 1466–71.

Chandra R.S., B. S. Satish and L. Achoth (2015) Degree and direction of mango exports from India. *Asian Journal of Res. in Mktg*., **4**(2): 45-63.

Dastagiri, M. B. (2015) International Market Signals for Indian Horticultural Export. *International Journal of Tropical Agril*. **33**(2):1203-1213.

Desai, M.N.R.(2001) Export Potential of Mango in Northern Karnataka - An Economic Analysis. Ph. D Thesis, Uni. Agric. Sci. Dharwad (India).

Deshmukh B.J., D.S.Navadkar, H.R. Shinde, D.R.Yadav (2015) Economics analysis of marketing and export of Pomegranate from Maharashtra. *Life Sciences International Research Journal*, **2**(2):101-117.

Deshmukh, B. J. and S. V. Satpute (2016) Economic analysis of marketing of Grapes from Maharashtra. *Contemporary Res. in India*, **6**(1): 8-13.

Gade, A. D., S. B. Gaikwad, and N. S. Gaikwad(2014) Trends in Production and Exports Grapes in India.*Indian Streams Res. Journal*, **4**(2):1-5.

Gireesh, P. S.(2009) Export competitiveness and direction of trade for Indian cashew: An econometric approach. Unpublished ABM Thesis, UAS, Dharwad. Karnataka (India).

Girma, A.A. (2002) Growth and Instability of CottonProduction in Karnataka. M. Sc. Unpublished (Agri.) Thesis, Uni. Agric. Sci., Dharwad. Karnataka (India).

Gowri, M. U. and T. R.Shanmugam(2015)An economic analysis of production and marketing of Banana in India. *American International Journal of Res. in Humanities, Arts and Social Sci.*, **9**(3):234-240.

Guledgudda, S. S, B. L. Patil and B. C. Rajur (2014) Export performance of Indian Cashewnut – An analysis. *Economic affairs*, **59**(4): 669-674.

Guledgudda, S. S. (2005) Production and export performance of cashew-an economic analysis. Unpublished Ph. D. Thesis, UAS, Dharwad. Karnataka (India).

HymaJyothi, S. and V. T. Raju (2005) Trends, competitiveness and comparative advantage of tea and coffee exports from India.*Agril. Situation in India*, **62** (1) : 165-172.

Jose, C. T. and S. Jayasekhar (2008) The growth trends in area, production and productivity of Arecanut in India.*Agril. Situ. India*, **65**(1): 135-140.

Kadli, V., S. lokapur, R. Gurikarand R. Hosali (2014) *Computer Science and Engineering & Technology Journal of Environmental Science*, **3**(4): 1808-1813.

Kareemulla, k., Tewari, R.K., Singh, B. and Kuldeep Kumar (2007) Production and marketing of Indian Gooseberry-Aonla (Emblicaofficinalis Gaertn.) in Pratapgarh district of U.P. *Indian J. Agril. Mktg*, **21**(3): 41-45.

Keerthi, H.R.(2008) Production and marketing of pineapple in Shimoga district-An economic analysis. Unpublished MSc. (Agril.) Thesis, Univ. Agril. Sci., Dharwad. Karnataka (India).

Koujalagi, C.B., B.L. Patil and C. Murthy (2014) Growth trends in area, production, productivity and export of pomegranate in Karnataka :An economic analysis. *Internat. J. Com. & Bus. Manage*, **7**(1) : 11-15.

Kumar K., H. L. Singh and Mayuri Shukla (2010) Export performance and potential of mango in mango export zone Lucknow (UP). *Society for recent dev. in Agril.*, **10**(1):188-191.

Kumar, M.K. Aravinda, Gaddi, G.M., Manjunath, L., Ashwini, B.C., Bavya, A.P.

Kumaresh K. and C. Sekar (2013) Export performance and competitiveness of fresh mangoes and mango pulp in India. *International Journal of commerce and business management*, **6**(2):154-159.

Kusuma, D. K. and H. Basavaraja(2014b) Stability analysis of mango export markets of India. *Karnatka Journal of Agril. Sci*,**27**(1):36-39.

Kusuma, D.K. and H. Basavaraja (2014a) Export of fresh Indian grapes. *International Journal of Com. & Bus. Manage*, **7**(1) : 6-10.

Kusuma, D.K. and H. Basavaraja (2014c) Export of fresh Indian grapes. *Internat. J. Com. & Bus. Manage*, **7**(1) : 6-10.

Kuthe, S. B. and S. S. More (2015) Export performance of other processed fruits and vegetables from India. *International Journal of Dev. Res*., **5** (10): 5682-5685.

Mahesh, N., Keshava Reddy, T.R. and LalithAchoth (2000) An empirical analysis of growth and Instability of Indian Tea Industry. *Agric. Banker*, **24**(24): 25– 27.

MekonnenMekuriaTessema (2003) Growth and instability in production and Export of fresh fruits in India.Unpublished M.Sc. (Agril.) Thesis. Univ. Agril. Sci., Bangalore (India).

Mokashi, P. K. (2012) An economic analysis of export potential of grapes from northern Karnataka. Unpublished M.Sc. Thesis, UAS, Dharwad. Karnataka (India).

Mokashi, Prakash and S.B. Hosamani (2014) Growth and instability analysis of Indian grapes export. *Agric. Update*, **9**(1): 132-135.

More, S. S. (1999) Economics of production and marketing of banana in Maharashtra state.Unpublished M. Sc. (Agrl.) Thesis, Univ. Agril. Sci., Dharwad, Karnataka (India).

Murthy, M. R. K., G. P. Reddy and K.H. Rao (2014) Retail Marketing of fruits and vegetable in India: Case study on Export of Grapes from Andhra Pradesh, *India*. *European Journal of Logistics and Supply Chain Management*, **2**(1):62-70.

Parmar Gautam, Leua Alpesh (2011) An Export Competitiveness And Marketing Channel For Fresh Grapes Of Maharashtra. *Adhyayan- A Journal of Management Sci*., **1**(2):1-4.

Patil, B. N. and A. J. Nirban (2010) Trend in export of mango from India.*International Journal in Multidisciplinary and Academic Res*., **2**(3): 1-11.

Patil, P. H. (2011a) Competitiveness of export of fruits and vegetables to Middle East countries. Unpublished MBA Thesis, UAS, Dharwad. Karnataka (India).

Patil, P. H. (2011b) Competitiveness of export of fruits and vegetables to Middle East countries. Unpublished MBA Thesis, UAS, Dharwad. Karnataka (India).

Patil, R.S., R.G.Deshmukh, Bhaskar K.R. and S.W. Jahagirdar (2018) Growth and Export Performance of Mango in India. *Int. J. Curr. Microbiol. App.Sci.,* **8**(6): 2667-2673.

Phuke, K. D., Pawar, N.D. andWaghmare, P.R.(2004) Export Potential of Banana in India. *Agric. Mktg., October-December*, 16 - 22.

Pooja,Trivedi (2012a)Export performance of Indian mangoes – an economic analysis.Unpublished MBA Thesis, UAS, Dharwad. Karnataka (India).

Pooja,Trivedi (2012b) Export performance of Indian mangoes – an economic analysis.Unpublished MBA Thesis, UAS, Dharwad. Karnataka (India).

Prasad L. V., V. Ramkrishnappa, V. A. Ramchandra (2014) Production and marketing of mangoes in India: An analysis of growth and performance. *Asian Journal of Res. in Social Sci. and humanities*, **4**(12): 112-125.

Priyanka, Sahni (2014) Trends in India's exports: A comparative study of pre and post reform period. *IOSR Journal of Econ.and Finance*. **3**(2): 8-18.

Ramachandra, V.A. (2006) Production and marketing of sapota in Northern Karnataka – An economic analysis.Unpublished M. Sc. (Agri.) Thesis, Univ. Agril. Sci., Dharwad. Karnataka (India).

Rauf, A., S.A. Saraf, M.A. Malik, and S.A. Sidique (2010) Growth performance of Apple in Jammu and Kashmir and Himachal Pradesh - A comparative study.*Agricultural situation In India, June, pp*. **7**(1) 121-126.

Reddy, A. (2005) Mango export trends and strategies.*IUP Journal of managerial econ*., **3**(1): 17-19.

Rekhapriyadarshini (2015)A study on the export performance of fresh mangoes from India.*International Journal of interdisciplinary and multidisciplinary studies*, **2**(6): 134-140.

Sachinkumar, T. N., V. Reddy and J. S. Binkadakatti (2011) Export performance of grapes from India. *International Journal of Commerce and Business Management*, **4**(2): 323-326.

Saraswat, S.P. and T. Rane (2006) Production and marketing of peach fruit-A case study of Rajgarh village of Uttar Pradesh.*Indian Journal Agril. Mktg*., **8**(5): 318-325.

Sarkar, Kingshuk (2014) Changing institutional architecture and india's export competitiveness in Tea. National Res. Programme on Plantation Development. Discussion paper 35:1–47.

Sharma, Amod and D.C. Kalita (2008) Trends of area, production and productivity of major fruit crops in Jammu and Kashmir. *Agric. Situ. India*, **66**(1):15-17.

Shinde V.A, Bhosale A.B, BhosaleS..S, Amrutsagar V.M. (2016) Economics of production, marketing and export of pomegranate**.** *Life Sciences International Research Journal,* **3 (**2): 354-388.

ShindgikarSmita and Patil, M.T. (2006) Trends in exports of grapes from India.*Agric. Situ. India*, **63** (8): 473-478.

Siddaya and Atteri, B. R, (2010) Export competitiveness of Fresh Fruits and Vegetables under compliance.*Agric. Econ. Res. Rev*., **23** (3): 555 - 561.

Singh, S.P., L.K. Adarsha, A.K. Nandi and O. Jopir (2018) Production Performance of Fresh Mango in India: A Growth and Variability Analysis, *Int. J. Pure App. Biosci.* **6**(2): 935-941.

Sujatha R. V, Y.Eswara Prasad and Vasudev (2003) Export scenario of mangoes from India.*Indian J. of Agril. Mktg*., **17**(3):142-149.

Tammana, C., and S. P. R. Chaurasia (1999) Identification of niche markets for some export competitive Indian fruits. *IndianJournal Agril. Mktg. (Conf. Spl.)*, **13**(2): 15-18.

Thanuja, W. J. (2006) Export Performance and Competitiveness of Ginger from India.Unpublished M. Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad. Karnataka (India).

Tirlapur, L. N., N. P. Navalur and B. O. Patil (2014) Status of Indian mangoes- a trend analysis. *International Journal of Commerce and Bussiness Management*,**7**(2): 396-399.

Vaishali, B. M. (2010a) Performance of Indian agriculture exports among SAARC countries. Unpublished MBA Thesis, UAS, Dharwad. Karnataka (India).

Vaishali, B. M. (2010b) Performance of Indian agriculture exports among SAARC countries. Unpublished MBA Thesis, UAS, Dharwad. Karnataka (India).

Veeranagouda.,Havaldar, Y. N., Megeri, S. N., Hosamani, S. B. and BasavarajBanakar (2011) Growth rate scenario of chilli in North-Karnataka. *Karnataka Journal Agric. Sci*., **24** (3): 412.

Yeledhalli, R. A., P. H. Patil, ChidanandPatil and V. R. Naik (2012) Changing direction and magnitude of India's major fruit export to Middle East countries. *International Journal of Agril. and Statistical Sci*., **8**(2): 651-658.

THESIS ABSTRACT

ABSTRACT

Name of the Student	:	**Mr. AWARE MAYUR RAMDAS**
Registration No.	**:**	2017A/42M
Degree	**:**	M.Sc.(Agri.)
Year of admission	**:**	2017-2018
Major advisor		**Dr. D.S. PERKE** Professor & Head, Dept. of Agricultural Economics, VNMKV, Parbhani.
Discipline	**:**	Agricultural Economics
Major Field	**:**	Agricultural Economics
a) Minor Field	**:**	Extension Education, Computer Application
b) Supporting field	**:**	Statistics
Title of the thesis	**:**	**"Export Performance of Pomegranate From India"**

Pomegranate (*Punicagranatum*L.) belongs to family *Punicaceae* and is a favourite table fruit of the tropical and sub-tropical regions of the world. In India, pomegranate is cultivated in the states of Maharashtra, Gujarat, Karnataka, Tamil Nadu, Uttar Pradesh, Haryana, Telangana State and Andhra Pradesh. The most promising cultivars grown in India are Bhagwa, Alandi, Dholka, Kabul, Kandhari, Muskat red, Vellode, Ganesh, G-137, Jyoti,Mridulaand Phule Araktha. Maharashtra is a major producer of pomegranates and contributes 90 per cent of the country's total export. At present, the total area under pomegranate cultivation across the country is 220,000 hectares, including 151.5 thousands hector area under pomegranate cultivation in Maharashtra, followed by Karnataka and Gujarat with 29.1

thousand ha and 22.2 thousand ha of pomegranate cultivation in India. India is the largest producer of pomegranates but export from India fresh fruit during 2017-18 was 1.7 per cent of the total share in world compared to Thailand and Vietnam soc rep which exports 28.37 and 23.73 per cent share in world, respectively of their production. The fruit is exported to UAE, Saudi Arabia, Netherlands, Oman, Nepal, USA, Kuwait, UK, and Others country.

The data regarding production and export of Pomegranate in India was collected from 2003-04 to 2017-18, which includes 15 years data. The time series data has been divided into three sub periods i.e. period I (2003-04 to 2007-08), period II (2008-09 to 2012-13) and period III (2013-14 to 2017-18). The growth in production, quantity exported and export value realized from export was analysed by using exponential growth function. The degree of instability in production and export of pomegranate was measured by using coefficient of variation. Coefficient of instability is another measure of instability besides coefficient of variation. Coppock's Instability Index (CII) is close approximation of the average year to year percentage adjusted for the trend are rose pronounced than the absolute variation. NPC was computed to determine the extent of competitive advantage enjoyed by the commodity in the context of free trade.

India's export quantity of Fresh fruit during 2003-04 was 20651 MT which increases to 50230 MT during 2017-18. In terms of share in world export India's export was 1.21 per cent in 2003-04 but in 2017-18 increase up to 1.85 per cent. India's per cent share of agricultural export in the total export was decreased from 12.70 per cent in 2003-04 to 12.26 per cent in 2017-18. India's share in pomegranate production to export quantity in the year 2013-14 up to 2017-18 production was increased 1352.92 tons up to 2660.67 ton but per cent export was declined 2.3 up to 1.7 percent. The overall 15 years (2003-04 to 2017-18) growth rate of export value of

Pomegranate in India was highly significant at 31.59 per cent per annum and much higher than the production and export quantity of Pomegranate for overall period was 9.51 and 8.12 per cent per annum, respectively.

The variability in production with co-efficient of variation was 10.69 per cent, 4.39, 25.26 and 57.17 per cent in period I, II, III and overall period, respectively while it was highest in overall period with co-efficient of variation (57.17 per cent). Export quantity of Pomegranate the highest variation was observed 47.18 per cent in period I with co-efficient of variation was 40.53 per cent in overall period. The variability in production and export quantity with Coppock's Instability Index was 8.06 and 22.90 per cent, respectively in period I**.** The production and export quantity of instability observed in period II was 5.54 and 49.92 per cent, respectively and for overall period it was 19.44 and 41.98 per cent, respectively. The highest instability in Export and production quantity was observed 51.66 and 13.83 per cent in period III, respectively.

Country wise Coppock's Instability Index for export quantity during overall period of study the highest instability was observed in USA (257.74 per cent) while lowest instability was recorded in UAE (32.08 per cent) followed by UK (45.37 per cent). State wise Coppock's Instability Index for production during overall period of study the highest instability was observed in Chhattisgarh (117.71 per cent) while lowest instability was recorded in Karnataka (19.71 per cent) followed by Gujarat (22.41) Tamil Nadu (23.83 per cent). The instability recorded for India was 19.43 per cent. Trend in domestic and international price of Pomegranate was increasing at increasing rate. The average NPC values of pomegranate during I, II, III and overall period was 0.91, 1.11, 0.56 and 0.74, respectively.

APPENDIX

A. State wise of pomegranate production (‘000MT) in India

State	Maharashtra	Karnataka	Andhra Pradesh	Gujarat	India
2003	533	116.9	0	0	664.9
2004	568.2	133.2	47.8	38.4	800.7
2005	593.6	138.6	64.8	38.2	849.1
2006	601.5	142.7	44	50.3	853.2
2007	596.2	134.1	85.5	56.6	884.1
2008	550	138.1	64.7	39.3	807.2
2009	555.5	138.5	56.4	45.6	820.4
2010	492	142.6	27.8	60.3	743.1
2011	478	151.7	29	66.2	772.4
2012	408	150.3	62	79	744.95
2013	945	134.2	90	99.3	1352.92
2014	1197.71	261.82	76.69	171.66	1789.31
2015	1486.11	319.34	131.28	238.1	2306.44
2016	1578.04	328.92	105.2	278.1	2442.39
2017	1695.9	345.88	132.11	295.78	2670.67

Source :www.*India Stat.com*

A. Country wise export quantity (’00 MT) of pomegranate from India

Country/Year	UAE	Saudi Arab	Netherland	Oman	Nepal	USA	Kuwait	UK	Other	India
2003	4.938672	0.776878	0.491436	0.394942	1.053981	0.0026	0.015	0.681121	1.961338	10.31597
2004	6.821153	0.357041	1.863646	0.150218	0.656215	0.0604	0.00329	1.260369	2.867657	14.03999
2005	10.50075	0.86969	1.581575	0.07071	0.981118	0.01793	0.02823	1.434069	4.168075	19.65215
2006	9.233922	1.90874	2.88544	0.274538	0.745492	0.046934	0.062617	1.952804	4.55994	21.67043
2007	11.97299	2.766553	7.210238	0.277178	1.069574	0.151029	0.395966	1.566553	9.765096	35.17517
2008	15.42566	2.050099	3.661102	0.537414	2.084466	0.106004	0.486066	1.537166	8.923238	34.81121
2009	17.3896	1.789346	2.567714	0.415574	1.454181	0.505772	0.043796	0.973202	8.275888	33.41508
2010	11.22957	1.182827	0.389072	0.310923	0.819178	0.044847	0.204401	0.531266	3.499591	18.21167
2011	15.89974	2.196625	0.732688	0.391873	1.438255	0.105255	0.489651	0.890853	8.01733	30.16227
2012	18.97885	2.511797	1.158721	0.755274	1.859792	0.171285	0.345742	0.512875	9.733091	36.02742
2013	17.32897	1.141762	0.462721	0.648957	1.661434	0.098089	0.870163	0.3911	8.725101	31.3283
2014	11.27747	1.563092	0.585795	0.357428	2.107764	0.082943	0.91398	0.303278	3.805276	20.99702
2015	17.33553	2.557768	1.031994	0.312602	2.034111	0.180105	0.871043	0.413672	19.98575	44.72258
2016	20.8796	2.664236	1.300463	0.450491	5.143667	0.342819	1.187325	0.36914	17.51429	49.85204
2017	19.79975	3.888139	2.43482	1.946631	8.481543	0.417737	1.318226	0.446654	8.602205	47.33571

Source :*www.APEDA.com (HS Code 08109010)*

B. Country wise export value (Rs) of pomegranate data 2003 to 2017

Country	UAE	Saudi Arab	Netherland	Oman	Nepal	USA	Kuwait	UK	India
2003	85855177	12548509	25823579	8123531	7504082	48,718	225955	37902598	21000334
2004	127652178	7846816	58618548	3335693	4849472	701265	206710	50440258	298870948
2005	233194094	23739027	103316884	3641392	7889938	436412	559512	88296882	567015820
2006	243466515	66326384	160105704	6993639	5251394	1988953	2648553	147325764	795730513
2007	255882223	59147327	218983656	7072050	9060559	12739617	9081556	80439693	911949200
2008	402335640	54267730	224481440	14546636	25482411	6851778	15371688	118336418	1146161792
2009	517001075	62777434	19853143	15155303	15710924	22243189	7454024	105147365	1194284159
2010	388441625	36843779	33016537	8584932	11106889	9261164	10247886	82544814	709519919
2011	641643670	87038614	102817494	19894642	24685349	14015058	23629642	97530533	1472782298
2012	1260129339	125197055	189885562	69390800	49637985	24098556	13938610	112481656	2344961506
2013	1563899839	115226506	169860419	86827902	71384808	59630558	88924548	168775601	2985162305
2014	1975971479	205878198	150311824	54550410	87697621	46568239	102416040	140799463	3236145922
2015	2538047755	317580839	213043333	49468170	76571952	87243058	107432175	148512168	4573873959
2016	2522913507	304048591	289399174	64314022	172407067	180907270	150783467	139271844	4914430046
2017	2320157156	363213520	581280211	279388593	234625863	196505472	150688575	182870442	5377283425

Source :*www.APEDA.com (HS Code 08109010)*

C. Domestic prices of pomegranate (Rs/qt)

Year/ Month	January	February	March	April	May	June	July	August	September	October	November	December
2003	1246	1873	1816	2008	2325	1693	207	1994	1805	2182	1761	1655
2004	1707	1659	1463	1280	1333	2252	1824	1867	1794	1707	1365	1644
2005	1929	2003	2218	2183	2148	2012	1036	1295	2088	2245	2443	2533
2006	2499	2442	2295	2073	2182	2287	2197	2140	2566	2713	2889	2782
2007	2845	2942	2863	3101	2692	2227	2162	2250	2618	2797	3180	3122
2008	3384	3043	3135	3104	3055	2586	2740	2699	3158	3284	3754	3981
2009	3933	3733	3865	3842	3864	3694	4225	3594	3935	4738	4513	4344
2010	4376	5060	5601	5710	5489	4422	3939	4104	4623	4763	4821	5662
2011	6886	7395	8221	7819	6401	4822	4868	4637	4964	5929	5578	6116
2012	7039	6875	6746	6599	6289	6260	6677	5974	5612	6075	6524	6320
2013	6713	7005	7182	7382	7134	7069	6854	5943	5716	6537	6893	7270
2014	8443	8067	7629	7858	7759	7512	6854	6175	5382	6219	6973	7144
2015	7080	6941	7239	7900	7825	6761	5945	5505	5788	6879	6250	5698
2016	5440	5902	5580	5810	5845	6179	5982	5541	6068	6520	6400	6084
2017	5871	6368	6560	5505	4809	5391	5436	5075	5027	5358	5369	4687

Source :*www.agmarknet.gov.in*