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EXPORT PERFORMANCE OF DRYLAND HORTICULTURAL FRUITS

BY

PATAIT SANTOSH RAJENDRA
B.Sc.(Agri.)

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DISSERTATION

Submitted to the
Marathwada Krishi Vidyapeeth, Parbhani
in partial fulfilment of the requirement
for the Degree of

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(Agriculture)

IN

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COLLEGE OF AGRICULTURE, PARBHANI
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PARBHANI 431 402 (M.S.) INDIA

2011

CANDIDATE'S DECLARATION

I hereby declare that this dissertation

or part thereof, has not been

previously submitted by me

for a degree of any

University

Place : PARBHANI
Date : 30/5/2011

(PATAIT S.R)
REG. NO. 49M/09A

Dr. K.V. DESHMUKH
M.Sc. (Agri.), Ph.D.
Associate Professor
Dept. of Agril. Economics and Statistics,
Marathwada Krishi Vidyapeeth,
Parbhani - 431 402 (M.S.), India.

CERTIFICATE-I

Mr. PATAIT SANTOSH RAJENDRA has satisfactorily prosecuted his course of research for a period of not less than four semesters and that the dissertation entitled "**EXPORT PERFORMANCE OF DRYLAND HORTICULTURAL FRUITS**" submitted by him is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that he has not previously submitted the dissertation or part thereof for a degree of any other university.

Place : PARBHANI
Date : / /2011

(Dr. K.V. Deshmukh)
Research Guide

CERTIFICATE-II

This is to certify that the dissertation entitled "**EXPORT PERFORMANCE OF DRYLAND HORTICULTURAL FRUITS**" submitted by **Mr. PATAIT SANTOSH RAJENDRA** to the Marathwada Krishi Vidyapeeth, Parbhani in partial fulfilment of the requirement for the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **AGRICULTURAL ECONOMICS** has been approved by the student's advisory committee after viva-voce examination in collaboration with the external examiner.

(B. R. Pachpande)
External Examiner

(Dr. K.V. Deshmukh)
Research Guide

Member of Advisory committee:

(Dr. T.G. Satpute)

(Dr. J. N. Ghulghule)

(Dr. Md. Asmatoddin)

Associate Dean (P.G.)
College of Agriculture
MKV, Parbhani.

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(PATAIT S.R.)

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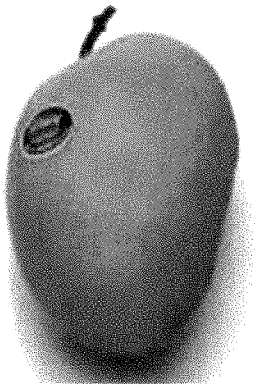
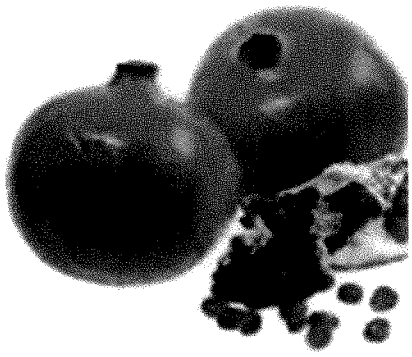
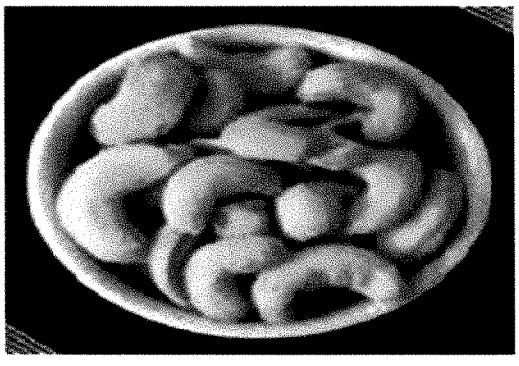




Introduction



CHAPTER I
INTRODUCTION

High initial investment, long gestation period and high water demand discourage the cultivation from growing fruits. However, some of fruit crops such as mango, pomegranate, cashewnut, custard apple, tamarind, etc. come up reasonable well even under dryland cultivation. These crops not only grown in arid and semiarid regions but also earn a good profit to farmer if properly cared and maintained in arid regions these crop bring use of the wasteland of farm such as bunds, river banks, gullies, such as places where the cultivation of agronomical crops difficult.

Dry lands is the common term for three agro-climatic zones; arid, semiarid and subhumid, where water resources are limited. Aridity and climate variability are dominant characteristics of dry lands. The climates are however sufficient to sustain vegetation and human settlement.

Approximately 40 per cent of the world's land area is dry land, encompassing savannah, grassland, woodland and shrub land. Dry lands are found in all continents except Antarctica. More commonly recognized dry lands include the African Sahel and the Australian outback. Australia, the United States, the Russian Federation, China and Kazakhstan are the countries with the most extensive dry lands.

Dry lands are a vital part of the earth's human and physical environments. Their ecosystems plays a major role in global biophysical processes by reflecting and absorbing solar radiation and maintaining the balance of atmospheric constituents. They provide much of the world's grains and livestock and from the habitat that supports many vegetable species and micro-orgnaisms.

An estimated 40 per cent of people in Africa, South Africa and Asia live in dry lands. The human population of the dry lands lives in increasing insecurity as per capita productive land diminishes. Soil degradation in drylands, referred to as desertification, affects or puts at risk the livelihoods of people who are directly dependent on the land for their livelihood. The sutainable development of dry lands is essential for achieving food security and the conservation of biomass and biodiversity.

The term fruit can have different meanings. In biology a fruit is the ripened ovary of a flowering plant, which contains the seeds. Plant use fruits to disseminate their seeds. But when we talk about fruits as food, we limit ourselves to those fruits that we consume.

Strictly speaking the world tropical refers to the tropics, which is the area of earth centered on the equator and limited in the North by the tropic of cancer and in the south by the tropic of Capricorn. This tropical zones stretches from 23.4^0 north latitude to 23.4^0 south latitude. Tropical fruits are those that have their origin in the tropics and require a rather tropical or subtropical climate, they don't tolerate frost. Other fruits usually are grown in more temperate climates. The distinction is not very accurate. Some tropical fruits are also grown in warmer areas outside the tropics, while many of the temperate fruits can also be found in the tropics, especially in cooler mountain or hill areas.

There are hundreds of edible tropical fruits. Some of these are well known and are exported all around the world. Other are only known and appreciated locally. Remember to eat more fruits because they are an important source of vitamins and minerals and part of healthy diet.

Agriculture is the bedrock of Indian economy where, farms rather than factories have been mainstay of masses. Representing

17.2 per cent of the Indians Gross Domestic Product (GDP). Agriculture provides livelihood to nearly three fourth of its population making agriculture the life blood of our existence. India share in world agriculture export was 1.75 per cent in 2005 as compared to 1.52 per cent in 1991.

The country's export lending a helping hand in earning valuable foreign exchange. The impressive achievement of this sector have been the fruits of joint efforts of the hard working farming community, dedicated, agriculture sector scientists, marketing professional and the public and co-operative sectors. Agricultural development in its comprehensive definition is central to all strategies for the planned socio-economic development of any nation. Thus, there can be no sustained growth of Indian economy without broad based progress of our agriculture, this is also experience of the most of the fast growing countries of the East Asia. Their high rates of growth reflect double digit growth in the industrial sectors but they have also been supported by growth rates of agricultural sectors estimated at 2.3 per cent by the end of current fiscal year. The survey argues for a further push in reforms along with improved credit flow. In particular, it plays stress on faster agriculture and rural development in horticultural, organic farming, genetic engineering, food processing, branding packaging and future trading.

Today, Indian economy is facing all kinds of challenges as a result of new economic scenario that has emerged due to globalization liberalization and privatization. The most critical factor to meet this challenge will be the exporting capability of the country, in a highly competitive environment. When every country is desperately struggling hard to export something or the other, the Tenth five year plan has mentioned increase export as critical concern to contain balance of payment position of the country. It is imperative for the country to

reduce it as much as possible, abolition or reduction of import duties on many items including consumer goods has made balance of payments problem highly volatile for India. To capture a large share of world market for manufacture goods is not as an easy task, in a world where every country is desperately trying to do so. But India has a unique opportunity to substantially increase its exports of agricultural products particularly in the free trade regime under World Trade Organization (WTO). India is bestowed with varied agro-climate, which is highly favourable for growing a large number of horticultural crops such as fruits and vegetables including root, tuber and ornamental crops, medicinal and aromatic plants, species and plantation crops like cocnut, aracanut, cashew and cocoa.

Presently horticultural crops occupy 10.00 per cent of gross cropped area of the country producing 160.75 million tonnes. India is the second large producer of the fruits in the world. The total production of fruits has been estimated at 45.20 million tonnes, from 3.78 million ha. Share in the world fruits production is 10 per cent.

India is the largest producer of mango, pomegranate, cashewnut. About that 52.20 per cent of the world mango and the largest area under pomegranate about 500 ha. In Maharashtra but there are small planting almost all parts. Total area under guava in the country is about 30,000 ha and yield of 22,000 kg/ha reported. Custard apple growing in India about 79,300 ha. Under this crop producing fruit 143.900 tonnes per annum.

Agri-export zones

During 2001-02 exim policy the union government had allowed the state government to identify product specific agri export zones (AEZS) for end to end development to promote their cultivation for export in geographically contiguous area. The state governments also

have to involve a comprehensive package of service that may be provided by state agencies like the State Agriculture Universities and instituion agencies of union government for intensive delivery in these zones. The service provided may be related to pre/post harvest handling, plant protection, processing, packaging, storage related to research and developmental work, etc.

Till the end of December 2001 government had approved the setting up of 10 agricultural export processing zones involving an investment of Rs. 200 crore of which Rs. 80 crore was expected to come various government bodies like APEDA, National Horticulture Board, Department of Food Processing and Industries etc.

The total agriculture export zones in India is 60 in that Maharashtra AEZ will cover the district of Sangli, Nashik, Pune, Solapur, Satara, Ahmednagar, Beed, Latur and Osmanabad. The Maharashtra government also planned to set up AEZs for mango in Konkan region, Chndrapur and Gadchiroli district (Vidharbha) and custard apple Beed and Osmanabad (Marathwada region) pomegranate and ber Solapur (East Maharashtra).

India and world trade

Before examining the future prospects and implification of the international trade of agriculture in India, it would be important to examine the existing status of its export vis-à-vis world trade. India's share in world agricultural export remained very low in many items during all these years despite inherent strength of the Indian agriculture with the exception of a few commodities, India's share is increasing particularly in world trade for fish, vegetable and fruits. Agriculture suffered from a variety of paraphernalia of aliments, which in for all a include cow growth rates in agricultural production. Since, India is already in the export market for some of the commodities there is need

to have proper assessment of availability of these commodities for export as well as identification of export markets.

Dry land fruits export

India can be safely referred to as the fruits bowl of the world being the second largest producer of fruits. Next only to Brazil in spite of this its share in the global market is less than one percent indicating vast potential for India to emerge as major exporter of fruits.

India is the world's largest producer of most exotic variety of dry land fruits. But the major share in fruits export is claimed by mangoes only. The UAE, Kuwat, Saudi Arabia and the UK are the importers from India. The UAE is second largest importer of other fruits and Kuwat the third. India exports only one or two varieties including Alphanso of Maharashtra on a large scale, many delicious varieties such as Banganapalli of Andhra Pradesh, Deshehari and Langra of Uttarpradesh and Malda of West Bengal. Formation of mahamango, mahagrape *etc.*, in Maharashtra has provided for export.

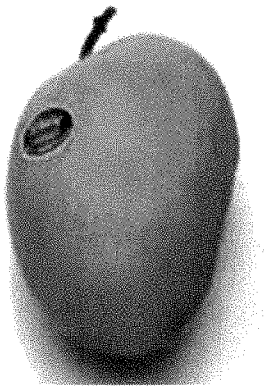
Fruits can earn 20-30 times higher foreign exchange per unit area than cereals which occupy the larger proportion of our land. Horticulture crop cover about 6.80 per cent area and contribute about 18 per cent of India's gross agricultural output. Fruits constitute a crucial nutrient source in human diet. The economic importance of fruits has increased on account of increase in domestic as well as international demand for them. The domestic demand was increasing due to increase in income, population growth, changing consumption patterns and higher nutrition consciousness among the masses. Inspite of impressive performance in certain fruits and their per capita consumption remained at 46 grams even though Indian Council of Medical Research recommended 92 grams. Institutions like NHB, NDDB, APEDA and FAO gave major thrust to improved production.

Outlook

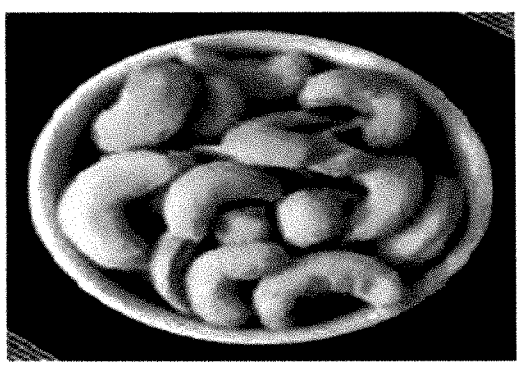
Indian economy endowed with cheap labour, diverse agro-climatic conditions and soil resources, abundant sunshine, coupled with favourable government policies is well poised for accelerated growth in agricultural exports the domestic production process. Quality of the exportable goods their grading and other non-price factors matterd in export promotion. There is a strong need for strengthening the information system so that the country will not be a laggard in exploiting the new market opportunities.

Objectives

1. To study the statewise performance of dry land horticultural fruits in India.
2. To estimate country wise export performance of dry land horticultural produce in terms of quantity
3. To estimate country wise export performance of dry land horticultural produce in terms of value



Review of Literature



CHAPTER II

REIVEW OF LITERTURE

Review of literature related to the research topic is a necessary step in conduct of any scientific research. It helps in formulating the framework of the study, deciding objectives and methodology appropriate to the situation under which research is to be carried out. It also helps to compare results of such relevant studies and reason thereof. The literature published having direct or indirect bearing on the objectives of the present investigation is reviewed in the following sections.

2.1 Statewise performance of area, production and productivity of fruits in India

Pandey (1990) pointed out that, India because of its agroclimatic diversities, has been among few countries capable of growing large variety of fruits and vegetables through out the year. Fruits and vegetables could earn 20 to 30 times higher foreign exchange per unit area than the cereals which occupied the larger portion of our land.

Thakare *et al.* (1992) reported that in 1988, out of 2,387.78 thousand hectares of land under total fruit crops in India, maximum percentage (42.80 %) was under mango cultivation, contributing 8,975 thousand tonnes of production (39.98 %). The fruit and the fruit products export increased from 43.88 thousand tonnes in 1978-79 to 72.37 in 1987-88. They observed that nearly 0.32 per cent of total fruit production and 0.63 per cent of total vegetable production was exported in 1987-88. The study revealed that there exist vast scope for increasing export of fruits and vegetable from India and its proportion to total production would increase to at least 8 to 10 times in near future.

Ghosh (1995) opined that India tops the world in sapota production and high productivity has been achieved in Karnataka (17.2 t/ha), followed by Maharashtra (16 t/ha). Mango, grapes and walnut are being exported in large quantities and pomegranate, sapota, banana, litchi, apple and strawberry in limited quantities. During 1993-94 total export earnings from fresh fruits were Rs. 179.50 crores against 145.9 crores in the previous year.

Autkar *et al.* (1997) in their study examined the production of major fruit and vegetable crops in India and the prospects for exports, the study revealed that India has been the second largest producer of fruits accounting for a share of 8 per cent in the world production. India occupies the first position in mango production with a share of about 51 per cent in the world market. India accounted for about 13 per cent of the vegetable production in the world. Mango, grapes, onion and potato are the major producing commodities.

Azhakiamanavalan and Vadivel (1997) pointed that the tamarind culture T.1.13 a selection from Endapuli Village performed better with superior yield and pod characters compared to local and registered a mean annual yield (4 years from 1988-91) of 263.3 kg/tree as against 165.0 kg/tree in local cultivar. The cumulative yield for seven years from 1985-1991 was maximum i.e. 1122 kg/tree compared to 707.00 kg in local. Thus according for general mean increase of 58.7 per cent over local type.

Geporge and Rao (1997) pointed that for tamarind being a non forecast crop no official estimates are available on area and production, it is also difficult to make a realistic estimate of area under this crop with the scattered nature of cultivation. However, rough estimates are available on production of tamarind. As per one estimated production was over 3 lakh tonens in 1994-95. Tamarind cultivation is

concentrated in the states of Tamil Nadu, Andhra Pradesh, Karnataka, Orissa and Kerala.

Murthy (1997) pointed that in status paper on tamarind tree improvement works in Karnataka. India is the largest producer of tamarind and within the country Tamilnadu, Andhrapradesh, Karnataka and Maharashtra are the main producers. The total production is estimate to be 3.25 lakh tonnes of pulp per year. About 1500 tonnes of processed pulp and powdered seed products are exported. Retention of freshness is an improved consideration in tamarind trade. Today there are 1500 ha of tamarind plantation in the department. Under the eastern plains. Afforestation project just being launched in Karnataka. Tamarind estimate is an important component not only as performing asset but also as a strong subject of joint forest management even where not much of forest areas are available. The Karnataka forest development corporation has an exclusive tamarind project going on. The project is funded by NABARD and will cover 1270 ha of area with tamarind 285 ha area has already been planting up mainly with grafted plants. Three is an even increasing demand for grafted tamarind plants from the public as well the forest department. The production and estimated demand of grafts is presented as in year 1995, 1996, 1997 production was 0.35 lakh, 1.20 lakh, 2.00 lakh and estimated demand was 0.6 lakh, 2.0 lakh and 5.0 lakh, respectively.

Singh and Singh (1997) made attempts to assess the country's production potential of tropical fruits based on data available with the national Horticulture Board and Directorate of Economics and statistics, Ministry of Agriculture and cooperation, Government of India. The data on area, production and productivity of various tropical fruits in India during 1991-92 and 1992-93 showed an increasing trend in both area and production of all important tropical crops after the implementation of economic reforms in the country. India produces over

32 million tonnes of fruits as against the world production of 369 million tonnes and ranks third in the world next to Brazil and the United states of America. During the last three decades (1961-1991) the area and production of fruit crops in the country increased by 172 per cent and 320 per cent respectively. At the all India level, area, production and productivity of fruit crops increased by 11.52, 15.10 and 3.21 per cent, respectively between 1991-92 and 1992-93. The study suggests that a strong investment climate and economic background for high value tropical fruits exports, commitment to competitive marketing strategies, marketing and production are needed to complete with other Asian countries.

Suryawanshi and Pardeshi (1997) revealed that Maharashtra occupies 62 per cent of countries grape area of which 44 per cent alone is in Nasik district. In order to study the economic benefits of the high tech production technology of drip system, a study was conducted in Nasik district during 1996-97 covering a sample of 60 grape growers comprising 30 grape growers adopting conventional irrigation of the study revealed that the cropping intensity has increased from 180 per cent before drip system to 258 per cent after the adoption of drip technology.

Singh (1997) Examined the role of post harvest management in the export of mango of Saharanpur district which has the largest area under mangoes in Uttar Pradesh. The state ranks first in the area under mangoes and second in mango production. Improper transportation accounted for over 37 per cent of the post harvest losses, followed by packing, spoilage, assembling and grading accounting for 19 per cent, 17 per cent, 8 per cent and 6 per cent, respectively. The main reasons for the low volume of foreign trade in mango from Saharanpur are insufficient number of cold storages, inadequate knowledge of post harvest management and improper marketing system.

Behura and Naik (1999) Examined India's contribution to the global cashew (kernel) trade has declined from more than 90 per cent during sixties to about 50 per cent in 1996-97. It is due to the reason that major rawnut exporting countries like Brazil, Kenya, Mazambique, Vietnam, etc. have started their own processing units and restricted their rawnut exports to India posing serious threat to India's monopoly in kernel trade. Processing capacity in India is very high and internal production can meet hardly 65 per cent of the processing potentially. Share of internal rawnut production to the total kernel exports has declined from the more than 60 per cent in early eighties to less than 20 per cent in 1996-97. Compound growth rates of area, production and yield of cashew in India are 1.71 per cent and 1.49 per cent respectively during 1981-82 to 1996-97. However, some states have registered negative growth in area and yield because of old plantations. To meet the challenges of the 21st century and to bridge the gap between demand and supply of rawnuts, large scale plantation programme have to be taken up according to agro-ecological suitability of the crop with clones and grafts of high yielding cultivars and with improved cultural practices.

Giriappa (1999) in his study viewed that the sustainability in agricultural exports necessarily implied higher production and productivity. While the share of primary agriculture materials in both production and exports had substantially declined, its predominance was a proof of continuance of traditional agriculture. The recent emphasis of hi-tech agriculture and the entry of multinationals into that sector had resulted in some progress in the export of value added products.

Jayakumar and Chinnadurai (1999) observed that in the global market India's cashew share was more than 90 per cent till 1960's. But thereafter, the share continuously declined and at present it is only 60 per cent. This was due to the stiff competition from Brazil,

Vietnam and African countries. An analysis of export potential of cashew has been attempt by examined the changes in area, production, export of cashew kernels and its export performance. Which indicated in increasing trend in area and production, with a decreasing trend in export of kernels. The significant determinant of export of cashew kernels was analyzed with the help of linear regression analysis. It was found that import of raw cashewnuts was the only significant determinant contributed for export of kernels. The coppock's instability index and variation in the export of kernels. In order to maintain our supremacy and improve our position, replanting of old plantations with new HYV and increasing the area under cultivation with HYV will do better.

Bembalkar (2001) revealed that during 1993-94 total area under the pomegranate in country was 44818 ha with the production of 125841 MT. However, amongst the States, Maharashtra stood first for area as well as production with a share of 81.29 and 60.29 per cent respectively, followed by Karnataka, Gujarat and Andhra Pradesh, Rajasthan, Tamil Nadu and Uttar Pradesh contributes minor share. In remaining States, Pomegranate has either no area or vary negligible area.

Vishweshwar *et al.* (2000) analyzed growth rates to know growth trends in area, production and productivity of different crops. From this analysis, it was observed that growth rates of area for groundnut, sesamum, sunflower, chilli, onion, potato were positive and show increasing trends. In case of growth rates of production for all bengalgram, groundnut, sesamum and all horticultural crops showed positive growth rate (33.33 per cent).

Khunt and Vekariya (2008) in their study on mango performance in Gujarat State observed that India accounted for 8 per cent of total fruit production of the world. India enjoys the first position in fruit production and second position in vegetables production in the world. The major fruit producer states of India are Maharashtra (17 %), Karnataka (12 %), Tamil Nadu (12 %) India ranks first among the mango producing countries with a share of 51 per cent in the world mango production. Mangoes are produced in go countries worldwide on about 3.69 millions hacters. Production and area have increased by 15.43 and 22.22 per cent in the last decade, but the productivity remained almost stable around 7 tonnes/ha. This indicates that increase in world production 15 due to increase in area under mango crop only. In India, during the period 1995-96 to 2003-04, a continuous increase in area was observed but the production remained almost unchanged except in some years. However, that productivity has declined by 19.93 per cent during the same period. The productivity of mango was also observed lower than world productivity which is an important decisive factor of export competitiveness of Indian mango. In Gujarat, area under mango has increased continuously to more than double during the period 1991-92 to 2003-04 (32000 to 79311 ha) and same period production has also increased form 3.20 to 5.95 lakh tonnes.

Smita Shindgikar and Patil (2008) in their study in the export of cushewnut from India. Cushew nut is one of the major dry land Horticultural crop grown in India. The area and production of cushewnut in India shows a mixed trend. Maharashtra, Andhra Pradesh, Orissa, Tamil Nadu, Kerala and Karnataka are the major cashewnut producing states of India. Maharashtra has the maximum area under cashewnut in India. Maharashtra produces nearly 31 per cent total cashewnut during India. Kerala was the largest producer and also had the maximum area over which cashewnut were grown in 1994-95. It shows a decline in both area and production of cashewnut in 2004-05.

Maharashtra has emerged as a key player in cashew production in last decade. In India growth in area in cashewnut was to the tune of 42.07 per cent during the period 1994-95 to 2004-05. cashewnut were grown on an area of 5, 77,200 ha in 2004-05, which increased to 8,20,000 ha in 2004-05, with respect of production of cashewnut has increased from 321640 tonnes in 1994-95 to 5.4400 tonnes in 2004-05, Kerala has shown a decline in production from 119200 tonnes in 1994-95 to 64000 tonnes in 2004-05. Maharashtra has emerged as the leading state in cashewnut production in India during 2004-05. The overall growth in area and production of cashewnut in India was 1542.7 per cent and production 69.13 per cent in 2004-05.

2.2 Export of dryland fruits from India

The analysis of India's export trade in cashewnuts by Sridharan (1982) showed a steady increase in net foreign exchange earnings from the export of cashew kernels from Rs. 226.5 million to Rs. 1280 million during the period 1970-1978. India's share in the world export trade in cashew kernels declined from 95 per cent in 1960 to about 37 per cent in 1978 and around 48 per cent in 1980. One of the causes for the declining share of India in world exports of cashew was the dwindling imports from the East African countries. The emphasis was to diversify the national export trade in cashew and improve the production of cashew nut.

Rana (1985) revealed that the total exports of fruit and vegetables including cashewnut, was only Rs. 177 million in the year 1981-82 and their processed products contributed about about 12 per cent of the total export. In the year 1983-84, the total export of those commodities stood at Rs. 2030 million against Rs. 450 million only in the year 1974-75. The exports of fresh fruits and vegetables had shown significant increase during 1983-84 of the order of Rs. 690 million as compared to Rs. 540 million during 1982-83. The total export of

preserved fruits and vegetables during 1983-84 was Rs. 370 million as compared to Rs. 630 million in the year 1982-83. The total exports of fruits and vegetables in 1988-89 was in the range of Rs. 3200 million with an annual growth rate of 10.5 per cent per annum. Projections of exports from India based on 1979-80 prices were Rs. 1200 million for processed foods, Rs. 3310 million for commercial crops and Rs. 2180 million for fruits and vegetables for the year 1979-80. For the year 1989-90 the exports were Rs. 4250 million for processed foods, Rs. 8000 million for commercial crop and Rs. 3200 million for fruits and vegetables.

Tilekar (1989) examined the trend in the total value of agricultural exports, as well as, in the value of individual agriculture commodity export along with change in expect commodity complex since 1976. Consistency was observed in the trend of export of agriculture commodities during the period under study. The share of total value of agricultural export in total exports declined from 1976-77 to 1983-84.

Perur (1989) reported that, the annual production of fruits in 1984-85 was estimated at 23.76 million tonnes (MT). The export of fruits and vegetables in 1988-89 was valued at Rs. 320 crores. India exports annually 1000 tonnes of mango fruits, valued at Rs. 12 crores. In area and production banana came next to mango, followed by citrus, guava, pineapple and grape. Maharashtra has now emerged as the largest grape growing state with 75 per cent of the production. Dryland fruit tree planting has been becoming popular with considerable increase area in the arid tracts coming under ber, pomegranate, custard apple, anola and date palm. The government of India has liberalized the policy of importing high quality disease free planting materials of vegetables, flowers and fruits. This has encouraged farmers to take up export-oriented horticulture on a very large scale.

Rajashekharan and Radhkrishnan (1989) observed that India was the sole exporter of cashew kernels in the world at the time of independence and continued to have virtual monopoly till the beginning of 1960s. Net foreign exchange earnings from cashew exports amounted to Rs. 259.49 crores in 1987-88. The export of kernels touched the peak level of 66278 tonnes in 1972-73. From 1965-66 to 1972-73 the linear growth rate in terms of quantity was 1,764 tonnes and in terms of value Rs. 424 lakhs per annum. In 1965-66 USA and USSR together accounted for more than 75 per cent of import of kernels from India.

Rai *et al.* (1991) in their study on trends in India's export of major fruits and vegetables over the period from 1974-75 to 1986-87 revealed no improvement in India's share in the total export, except for onions. Export trends for selected vegetables and fruits indicated that export performance lagged a behind. A positive upward trend in India's export performance for fresh fruits and vegetables has been noted.

Rao and Madhava (1992) revealed that the UK is the largest importer of fresh mangoes. Increasing demand among the indigenous population is thought to be the main cause of the growth of this market. Asians prefer Alphanso from India, Chausa, Langra and Sindhri from Pakistan. The cause for the overseas market's ignorance of Indian varieties has been lack of exposure of several varieties to the consuming public. A second reasons for the poor export performance has been that most supplier air freighted in the overseas market.

Patil and Deshmukh (1992) revealed that, trend in volume of export of mango, orange and grape exhibited an increasing trend. The share of mango, orange, grape and banana in the total export of fresh fruits during the period from 1976 to 1989 worked to be 14.87, 2.05, 22.0 and 0.11 per cent, respectively. In monetary terms export of mango, orange, grape and banana were Rs. 12.01, 1.66, 1.76 and 0.11 crores,

respectively. Main markets for export of Indian banana were Nepal, Kuwait and Bahrain.

Mishra and Das (1994) opined that agricultural products had a share of 18.47 per cent in the total export of India during 1990-91. The processed food held a lot of promise in exports. The major problems the export sector has been facing in India have been in respect of quality and timely delivery. Improvement in these areas will help us to enhance our competitiveness in the international market.

George and Rao (1997) pointed out that, among spices, tamarind has the sixth position in terms of export earning. It is exported in the form of fresh, dry and paste. Export of tamarind seed is also taking place both in unground and ground forms. In 1992-93 tamarind fresh exported in terms of quantity 5289.02 MT and value terms Rs. 324.30 lakh to increase in 1995-96 quantity 5270.53 MT and value Rs. 483.96 lakh. In case of tamarind dried during 1992-93 export in terms of quantity 3364.27 MT and value terms Rs. 520.41 lakh to increase in 1995-96 quantity 4713.11 MT and value terms Rs. 946.40 lakh. Among various forms exported, tamarind dry constitute roughly 50 per cent. Tamarind product are exported to around 60 countries. Important importers are Egypt. France, Germany, Japan, Natherland, Pakistan, Switzerland, Sri Lanka Saudi Arabia, USA, UK, UAE and Yamen Arab Republic. Fresh tamarind is exported to 33 countries of which Pakistan, UAE, UK, Bangladesh, Japan and France are major importer. The largest quantity is exported to Pakistan. The quantity and value of fresh tamarind exported to this country were 4656.07 tonnes and Rs. 2.44 crore in 1995-96. Export has come down almost by half during 1996-97. Dried tamarind is exported to a large number of countries. The important importers of dried tamarind from India are UAE, Saudi Arabia, Syria, Egypt, UK and (YAR) Exports to Saudi Arabia and UAE were notably higher than other countries. While, exports to UAE was the

highest at 1378.85 tonnes valued at Rs. 2.78 crores in 1995-96, it has come down steeply in 1996-97. During the year 1995-96 the highest export was to Saudi Arabia at 997.08 tonnes valued at Rs. 1.99 crore.

Shinde *et al.* (1997) reported that, tamarind is economically important dryland fruits crop grown in India mainly for its sour pulp. Seed of tamarind has many industrial uses *viz.* starch, dye, oil, gum, etc. Tamarind tree can be utilized for afforestation and for proper utilization of waste lands. Tamarind fruits of about 1700 to 4000 MT are exported in the from of processed pods, paste, dried powdered and concentrate to Europe, America and Gulf countries, with value ranging between Rs. 153 to 260 lakh. In review of its economic importance and its suitability for varied soil and easy management, different stages of cultivation may be extended under rainfed condition for development of waste land and to generate peritual income for future generation once planted.

Kaul (1997) studied status of horticulture exports. Horticulture products exported from India were valued at Rs. 3,144.4 crores in 1995-96, accounting for over 25 per cent of the total Agril. Commodities in same year. Export of these commodities increased by over 302 per cent between 1983-84 and 1991-93 and over 80 per cent between 1991-92 and 1995-96. Among fresh fruits exported, mango, particularly Alphonso, Kesar, Dashehari and Banganpalli varieties and the gapes constituted the bulk of the exports, other being exported in smaller quantities. Most of Indian's exports, particularly in mango and vegetables were exported to West Asian countries, such as Saudi Arabia, Bahrain and Kuwait etc. Mango was not allowed into U.S.A., Europe, Australia, New Zealand and Japan because of fear of fruit fly infestation, for which vapour heat treatment of fruits was mandatory before exports.

Arora (1997) studied the share of India in international trade, based on the time series data on exports and imports of different

products during the period from 1960-61 to 1992-93. He found that the agricultural trade was increasing significantly. India enjoyed competitive position and potential in commodities like fruits, vegetables, flowers, marine products, dairy products, fine/superfine rice, spices and products of animal origin. By adopting International quality standards for post-harvest technology, transport, storage, packaging and aggressive marketing strategy, India was bound to improve its share in global trade of agricultural products. He further reported that the economic reforms pursued in the past few years had started giving clear and positive impact on agriculture.

Gray and Kleih (1997) revealed that India is a major producer of a number of horticultural crops, including mango, bananas, onions and had traditional markets in Asia and Gulf. Only a very small percentage of the total production was exported. This report reviews past trends and prospects for horticultural exports from India. The principal products reviewed are mango melon, papaya, specialty banana, onion and Asian vegetables.

Vinning and Moody (1997) pointed that tamarind is economically important species. There are two main varieties, sweet and sour, though the genetic diversity in Asia and Africa is high with varying fruit and flower colours and sugar/acid ratio in the fruits. The sweet tamarind is produced mainly in Thailand where it is grown on a commercial scale and is exported both in the fresh and processed form. Approximately 140,000 tons of tamarind is produced annually in Thailand. India is also a major producer of tamarind, where it is collected and marked mainly by the rural communities. Both sweet and sour types are grown in India, though the sour type is by far the more commercial variety and total tamarind production is thought to exceed 300,000 tons annually. India exports tamarind products to Pakistan,

Arab countries, Europe and North America, Other Asian countries also produce and export tamarind, but on a much smaller scale.

Tamanna Chaturvedi and Chaurasia (1999) studied identification of Niche Markets for some export competitive Indian fruits resulted that export of Indian mango was most profitable to Australia with NPC as low as 0.226, followed by Swedan, France, Japan, Switzerland, Belgium, Singapore etc. Countries including UAE, Thialand, UK, Kuwait, Italy, Nepal etc. were found to be moderately competitive. Mango exports were also recorded in good quantities where it was non competitive (NPC> 1) which included Saudi Arabia, Bahrain, Qatar etc.

Hirevenkanagudar (1999) revealed that India has been endowed with various agro climatic zones, right from the tropical to temperate. India can grow any horticultural crops which are in the export list. With the changed economic environment and relaxation in trade norms associated with incentives, India can leap forward with its export efforts. Strong perspective markets for Indian horticulture produce exits in Middle East, Europe and South East Asian countries.

Patil *et al.* (2000) stated that the present study revealed that, the export of fruits from India by 2006-2007 A. D. estimated at Rs. 3.54 lakh metric tonnes. Estimated value to be realized due to export is computed at Rs. 3701 crore. The distribution of forex earnings in export of fresh, canned/processed and dry fruits worked out to be Rs. 274.93 crore. Rs. 3138.69 crore and Rs.282.16 crore, respectively. This accounted for 7.44, 84.93 and 7.63 per cent to the total export of fruits from India.

Patil *et al.* (2000) pointed that Tamarind is cultivated throughout the tropical and sub-tropical regions in India. It has universal demand thereby offers good scope for export. The mean

quantities of tamarind exported from India during the period from 1977-78 to 1995-96 worked out to be 4641 tonnes/annum worth Rs. 4.37 crores. The highest growth in volume of export was recorded in export to Egypt (50.54 per cent / annum) and the lowest was in export to UAE (8.27 per cent /annum). The projected quantities of export of tamarind from India by 2005 AD are estimated at 9050 metric tonnes worth Rs. 9.17 crores of this export to Bahrain alone would be 84.24 per cent.

Wilson (2000) studied that, in the near future the mango exports from India were likely to grow annually at a rate of 6.1 to 7.8 per cent by the year 2000. Around 95 per cent of India's mangoes exports are routed to the Middle East countries. In the export of apples and its contribution to the world trade has been hardly about 0.15 per cent although India exports apple to the neighboring countries Bangladesh and Sri Lanka about 99 per cent of India's apple exports. India has been exporting over 68 thousand tonnes of grapes, currently to the middle East. UK and South Asian countries have been the main importers of Indian grapes and in 1997-1998 the export touched 20,000-22,000 tonnes, valued Rs. 52 crore against the target fixed at 28,000 tonnes valued at Rs. 70 crorers. There has been good export market for banana particularly the countries like UAE, Dubai, Oman, Kuwait, Saudi Arabia, Qatar Bahrain and other gulf countries, Singapore, Nepal, Sri Lanka, Malaysia and so on.

Atribudhi (2003) examined the performance, strategy and policy issues of fruits and vegetables exports in India. The analysis of export showed that India exported fruits and vegetables worth Rs. 80 crores in 1980-81 which increased to Rs. 844.09 crores during 2000-2001 in terms of percentage share of fruits and vegetables it increased from 2.5 per cent in 1970-71 to 3.9 per cent in 1980-81 and 9.16 per cent during 2000-2001. This deficits a promising picture of India's fruits and vegetable export.

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

Kalamkar and Shinde (2003) studied trade liberalization and India's fruit and vegetable exports and revealed that India's share in the world trade of fruit and vegetables is hardly 1.41 per cent. It clearly indicated that performance on the export front was quite poor. This decreased upto 1990, but in post-reform period, it recorded a significant increase. There was high jump in export earnings from the year 1997-98 which was mainly due to the effect of liberalization policy.

Pant (2003) studied export of fruits and vegetables in the stage of Modern Indian Agriculture and examined the export of horticultural produce. He has recorded a very significant increase in export during the last 25 years, however its share in world export is around one per cent which varied from 0.8 per cent to 1.7 per cent. Maximum foreign exchange was earned by exporting onion, shallots, garlic and other alliaceous vegetables (Rs. 125.22 crores) during 1992-93 while during 1992-93 while during 1998-99 maximum foreign exchange was earned from export of dried leguminous vegetables (Rs. 223.07 crores) followed by onions, shallots, garlic, leeks etc. (Rs. 180.20 crorres). Over this period the export of all the vegetable, fruits, nut and peels of citrus fruits in value terms have increased. Among the fruits, coconut, brazilnut, cashewnut, other nuts,

dates, figs, pineapples, mangoes, grapes, provisionally preserved by sulphur dioxide gas or other preservers contributed the maximum foreign exchange and which has increased almost doubled over a period of six years. There area a large number of vegetables and fruits whose contribution in export increased both in value as well as quantitative terms.

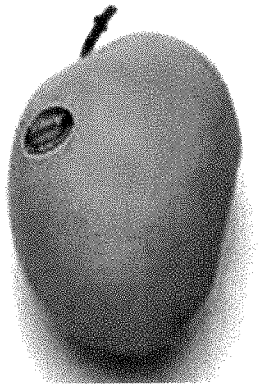
Khunt and Vekariya (2008) it was observed from the study that during last decade, area and production of mango in Gujarat, country as well as in the world have increased considerably while productivity of the crop remained almost stable. The mango productivity in Gujarat observed to be at par with World average productivity during last years indicating export competence of Gujarat mango. Bangaldesh and Nepal are the major Mango importing countries but the unit values received were found the lowest whereas, in the countries like U.K. Singapore, Japan and Gulf countries was marginal. This Needs in depth investigation about the constraints behind which may really help to increase our mango export policy. Export of fresh mango found most profitable and got highly competitive price in EU. USA, Canada and South Africa whereas, it was observed non competitive in South Asian countries as well as some countries of middle East.

Kalkundrikar and Shashidhar Chiniwar (2008) pointed that Maharashtra, Karnataka, Tamilnadu, Punjab and Andhra Pradesh are leading producers of grapes and Maharashtra, Karnataka, Gujarat and Andhra Pardhesh are the leading states in production of pomegranates in India. The quantity of grapes and pomegranates exported over the period 1996-97 to 2005-06. India is emerging as a major exports of pomegranate. The country exported 19652 MT of pomegranate valued at 56.70 crore in the year 2005-06, has achieved a moderate CGR of 11.61 per cent for grapes and 15.65 per cent in case of pomegranates export has grown at a CGR of 15.75 per cent and that of pomegranates at 22.09

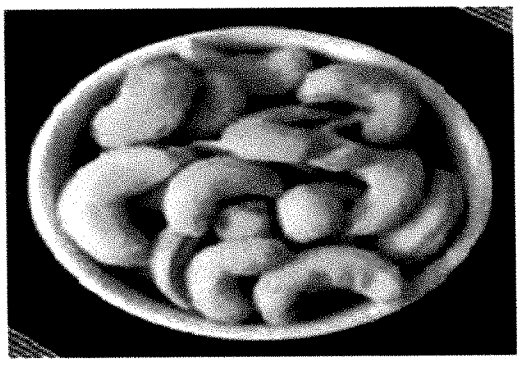
per cent indicating the realization of better prices for their produce in the international markets over a period of time. India exports grapes mainly to Netherlands and the United Kingdam with the two European countries accounting for 56.89 per cent of the total grape exports. Pomegranate exported are mainly to United Arab Emirates with 53.43 per cent of the quantity exported in 2005-06. The study also reveals that the CGR of quantity of pomegranate exported to different countries over the years varied greatly. In case of grapes there has a positive and significant growth in the export to European countries like Germany, Belgium and Netherlands with a CGR of 30.84, 24.06 and 22.79 per cent respectively in terms of quantity exported. In case of U.K., though the per cent share of grape export is 20.94 per cent of the total export in 2005-06, the CGR in quantity exported is just 0.86 per cent so also the quantity of graphs exported to Saudi Arbia in the middle East has shown a negative growth rate in exports indicating a fall in demand for Indian grapes in this country.

Harish Kumar and Chinappa (2010) In their study in Trade performance of Indian cashew. Viewed that trade performance of Indian cashew was analyzed by collecting secondary data on export of cashew kernels. Cashewnut shell liquid (CNSL) and import of raw cashewnut for the year 1974-75 to 2007-08. The growth rate of kernel export was 5.37 per cent with instability index of 8.70 per cent and export of CNSL was 6.15 per cent with instability index of 41.92 per cent during the post liberalization period.was observed. Among the different countries USA is a stable market for Indian cashew kernel and CNSL. Export potential is to be tapped by creating brand or image loyality in the potential market Abroad. India largely depend on East African countries for It's raw materials mainly due to inadequate area under cashew cultivation. Hence, schemes for increasing productivity of cashew should be initiated to increase availability of raw materials for processing units. At present export of cashew is restricted to countries like USA, Natherlands

and Korean Republic. There is a potential for cashew export to countries like UAE, Japan and UK. Hence, export potential is to be tapped by creating brand or image loyality in these countries about our cashew products. Since there is stiff competition from other countries with regard to quality of nuts, partial or complete mechanization may be introduced in cashew industries to improve the quality so as to induce other countries to import our cashew product.



Methodology



CHAPTER III

METHODOLOGY

This chapter deals with sampling technique, method of collection of data and analysis of data which forms a basis of any scientific study to arrives at final conclusions.

3.1 Basic approach

The basic objectives of this study were

1. To study the statewise performance of dry land horticultural fruits in India.
2. To estimate country wise export performance of dry land horticultural produce in terms of quantity
3. To estimate country wise export performance of dry land horticultural produce in terms of value

The details regarding plan of investigation i.e. sampling design, sources of data, analysis of data, etc. adopted for the study are presented in this chapter.

3.2 Selection of fruits

To assess export performance of dry land horticultural fruits of India and to judge export potential of these fruits, the fruits having significant contribution in the export basket of Indian fruits were selected for the present study purposively. Similarly, while selecting the fruits their regularity in export was also taken in to consideration. The following fruits were selected for the present study

1) Mango
2) Pomegranate
3) Tamarind
4) Cashewnut

3.3 Selection of countries

The countries which were regular importers of fruits during the study period were selected purposively. In addition to this their contribution towards import of concerned fruits was also consider in selection of the countries importing fruits from India.

3.4 Collection of data

The present study is based on secondary time series data collected from different published sources.

3.4.1 Area, production and productivity of dryland fruits

The according to statewise data pertaining to area, production and productivity of different dryland fruit crops were collected form Horticulture Statistics, National Horticultural Board, Gurgaon, Spices Board, Cochin. Central for Monitoring Indian Economy (CMIE), Mumbai.

From the above sources the data in respect of area, production and productivity for mango (1990-91-2009-10), cashewnut (1990-91-2009-10), Tamarind (1999-00-2009-10) and pomegranate (2003-04-2009-10) were collected.

3.4.2 Export of fruits

The countrywise time series data on export of major dry land horticultural fruits from India during the period of 1990-2009 were collected from Agricultural and Process Food Product Export Development Authority (APEDA), New Delhi and Directorate General of Commercial and Intelligence (DGCIS), Ministry of Commerce, Kolkatta.

Major export destination for Indian dry land horticultural fruits

3.5 Analysis of data

For an analysis of the data techniques of tabular analysis and functional analysis were employed to arrive at meaningful conclusions. To assess of the performance of export during study period data were divided into four halves *viz.* Period-I (1990-95), Period-II (1996-2000), Period-III (2001-2005) and Period IV (2006-10). However for cashewnut pertaining volume was only undertaken and for which the data were divided into three periods *viz.*, Period-I (2000-05), Period-II (2006-10), Period-III (2000-2010) Growth rates of export in terms of quantity and value were computed separately for each period and overall period which is termed as Period V (1990-2009).

3.5.1 Coefficient of variance

To judge instability in Area / Production / Productivity and export of fruits from India to different countries CV was computed by using the following formula.

$$C.V. = \frac{\sqrt{\text{Variance}}}{\text{Mean}} \times 100$$

3.5.2 Linear average growth rate (LGR)

The linear average growth rate was calculated by using following formula

$$Y = a + bx$$

$$\text{Linear average growth rate} = \frac{b}{y} \times 100$$

Where,

y = Estimated area/production/productivity/ export volume/export value for the base year

a = Intercept

b = Regression coefficient

x = Time period

3.5.3 Compound growth rate

The semi log trend equation was used for computing compound growth rate

$$Y = ax^b$$

Per cent compound growth rate = (antilog b-1) x 100

Where,

y = Estimated area/production/productivity/ export volume/export value

a = Intercept

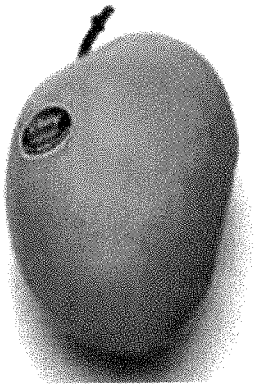
b = Regression coefficient

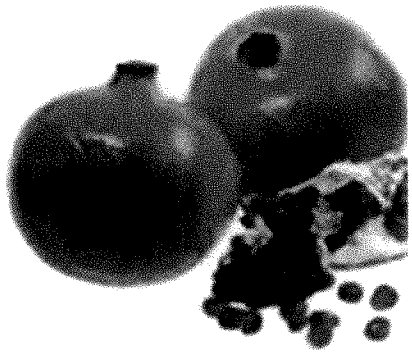
x = Time period

3.5.4 Test of significance

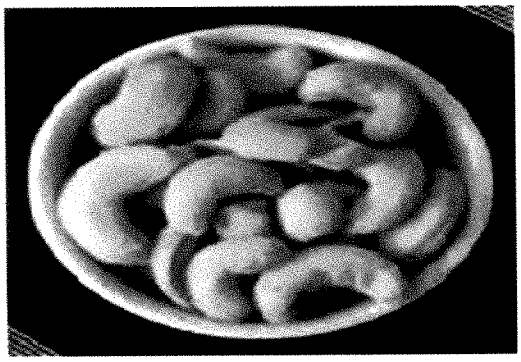
The significance of growth rates was tested with the help of correlation coefficient (r).

$$r = \frac{N \sum xy - (\sum x)(y)}{\sqrt{N \sum x^2 - (\sum x^2) N \sum y^2 - (y^2)}}$$





Results and Discussion



CHAPTER IV

RESULTS AND DISCUSSION

India has about 143 million hectares of arable land which constitutes nearly 75 per cent of the total 108 million hectares of rainfed area. In such areas crop production becomes relatively difficult as it mainly depends upon intensity and frequency of rainfall. The crop production, therefore in such area is called dry land farming as there is no facility to give any irrigation and even protective or life saving irrigation is not possible. These areas receives an annual rainfall between 400 mm to 1000 mm which is unevenly distributed, highly uncertain and erratic. In certain parts of the country total annual rainfall does not exceed 500 mm. The crop production, depending upon this rain is technically called dryland farming and areas are known as dryland.

In agriculture, export basket of fruits plays an important role the horticultural crops hold a great promise for accelerating the income of farmers. Realizing the importance of horticultural crops, many farmers are diverting theis resource towards this crop. The area under fruits has been increasing steadily.

This chapter is divided into three sections *viz.*

4.1 State wise performance of area, production and productivity of dryland horticulture fruits.

4.2 Country wise exports of dryland horticulture fruits from india (volume)

4.3 Country wise export of dryland horticulture fruits from India (value)

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4.1 State wise area, production and productivity of dryland fruits

4.1.1 State wise area, production and productivity of mango in India

4.1.1.1 Area

Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Tamilnadu, West Bengal are the major mango growing states in India during the period 1990-2009 are given in Table 1.

Mean

On an average the area under mango in India for period I, II, III and IV worked out 1147.520 thousand ha, 1380.266 thousand ha, 1717.360 thousand ha, 2311.960 thousand ha, respectively. During the overall period V it was 1639.275 thousand ha. This indicated that the area under mango in India during IV period increased by as compared to period I, II and III. The statewise area under mango in India for period I showed that the highest area under mango was observed in Andhra Pradesh followed by Kerala which was to the tune of 226.100 thousand ha and 76.120 thousand ha, respectively. For period II the highest area under mango grown states was in Andhra Pradesh (278.020 thousand ha) followed by TamilNadu (97.700 thousand ha). During period III Andhra Pradesh and Tamil Nadu were major mango growing states. During period IV the Andhra Pradesh (457.260 thousand ha) and Maharashtra (401.780 thousand ha) were the major mango growing states in India.

Coefficient of variation

The coefficient of variation for the total area under mangoes in India for period I, II, III and IV were 6.360, 5.441, 11.785 and 12.681 per cent, respectively and for overall period V 29.326 per cent.

Table 1 : State wise area of mango in India **(000 ha)**

Period	State							
	Andhra Pradesh	Gujarat	Karnataka	Kerala	Maharashtra	Tamil Nadu	West Bengal	All India
Mean								
I	226.100	34.640	47.080	76.120	63.180	66.200	55.200	1147.520
II	278.020	51.740	65.820	85.500	69.340	97.700	57.280	1380.260
III	315.800	55.400	96.800	88.700	110.200	112.800	66.240	1717.360
IV	457.260	101.240	131.700	78.960	401.780	137.720	80.666	2311..968
V	319.295	60.755	85.350	8.320	161.125	103.605	64.847	1639.275
Coefficient of variation								
I	10.283	8.636	58.698	0.912	31.213	17.202	0.179	6.360
II	4.511	2.389	16.265	3.629	10.943	4.637	3.803	5.441
III	2.871	5.041	9.729	3.325	29.407	3.399	3.799	11.785
IV	15.018	24.940	12.110	6.408	31.785	8.718	8.808	12.681
V	29.552	45.904	42.934	7.268	96.973	26.800	16.814	29.320
Linear growth rate								
I	6.462***	5.254***	-22.749	0.145	12.187	10.030**	0.109***	3.845**
II	2.777***	-0.676	9.845**	2.175**	-4.024	2.016	2.165**	3.365***
III	1.678**	3.069***	5.579**	-0.620	17.604**	2.128***	2.355***	7.085**
IV	7.648*	13.898***	7.229**	-2.862	15.185	4.858**	5.487*	7.024***
V	4.600***	6.732***	6.461***	0.252	13.123***	4.424***	2.642***	4.736***
Compound growth rate								
I	6.672***	5.327***	-40.065	0.145	12.651	10.565**	0.109	3.912**
II	2.800***	-0.669	10.529**	2.190**	-3.891	1.998	2.173**	3.420***
III	1.698**	3.134***	5.968**	-0.625	19.059**	2.184***	2.396***	7.276**
IV	8.764	17.409	7.800**	-2.711	22.465	4.943**	5.684***	6.974**
V	4.568***	6.574***	8.328***	0.251	12.498***	4.851***	2.586***	4.753***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

The state wise CV values of area under mango for period I revealed that, it was highest in Karnataka (58.698 per cent) followed by Maharashtra (31.213 per cent). During the overall period, it was highest in Maharashtra (96.973 per cent) and lowest in Kerala (7.268 per cent), respectively.

Growth rates

The linear growth rates of area under mango in India for period I, II, III and IV revealed that, increasing trend with positive and significant growth rates, respectively. The state wise performance of area of mango in India indicated that for period I, Andhra Pradesh, Gujarat, Tamil Nadu, West Bengal was significant growth rates. During overall period growth rate for positive and significant in Andhra Pradesh, Karnataka, Gujarat, West Bengal, Maharashtra and Tamil Nadu.

The compound growth rates of area under mango for the overall period was found to be positive and significant for Andhra Pradesh (4.568 %), Gujarat (6.574%), Karnataka (8.328%), Kerala (0.251%), Maharashtra (12.498%), TamilNadu (4.85%) and West Bengal (2.386%).

4.1.1.2 Production

Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, TamilNadu and West Bengal are the major mango producing states in India. The values of mean, CV and growth rates of mango production in India during the period 1990-2009 are furnished in Table 2.

Mean

On perusal of Table 2 it was seen that on an average the mango production in India for the period 1990-2009 was 11189.690 MT.

Table 2 : State wise production of mango in India *(000 tonnes)*

Period	State							
	Andhra Pradesh	Gujarat	Karnataka	Kerala	Maharashtra	Tamil Nadu	West Bengal	All India
Mean								
I	2368.280	346.480	374.060	264.880	325.880	434.630	446.320	9566.740
II	2876.820	342.660	209.860	265.280	294.100	483.080	417.200	10352.820
III	2841.880	524.240	781.020	318.260	587.900	581.260	412.180	11181.080
IV	3274.620	738.600	1360.260	458.540	661120	694.560	561.260	13658.190
V	2840.400	487.295	681.300	326.740	467.250	548.382	459.240	11189.690
Coefficient of variation								
I	40.991	8.676	68.790	12.889	13.796	19.422	1.405	10.162
II	17.673	13.865	21.858	47.632	47.632	25.032	33.682	3.050
III	13.078	27.190	56.936	9.759	9.759	20.695	31.379	10.291
IV	22.969	34.080	14.105	7.558	7.558	19.336	7.198	7.460
V	25.133	43.935	76.412	38.669	38.669	26.852	23.716	15.982
Linear growth rate								
I	21.964*	5.276***	-39.943	6.271**	7.951**	10.754*	0.863***	6.110**
II	-8.884	7.920**	5.961	-5.127	8.201	-6.674	7.251	-0.350
III	7.543**	16.927***	30.709*	11.802**	5.756**	2.458	-0.437	4.084
IV	-8.890	-4.946	6.014	-2.866	-0.253	11.892***	2.040	2.917
V	1.876*	5.531***	10.146***	3.773***	5.492***	3.315***	1.534***	2.390***
Compound growth rate								
I	37.447	5.348***	-39.901	6.112	8.367**	11.126**	0.865***	6.191**
II	-8.889	8.435	4.249	-4.249	5.679	7.838	8.452	-0.326
III	7.983**	18.481***	47.133	12.558**	6.110**	2.806	0.168	4.324
IV	-7.229	-7.832	5.743	-2.714	-0.367	12.927***	2.137	2.879
V	2.725*	5.101***	11.396***	3.386***	5.928***	3.322**	1.460	2.375***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

Period wise production of mango in India revealed that in Period I the average production of mango was 9566.74 MT. During Period II it increased to 10352.82 MT. For period III and IV production was 1181.08 MT and 13658.19 MT per year, respectively. This clearly indicated that the after the period I production of mango increased of increasing rate. With regard to the state wise production of mango in Period I it was found to be highest in Andhra Pradesh (2368.280 MT). During period II, III and IV the highest production was observed in Andhra Pradesh. During the overall period the mango production in Andhra Pradesh (2840.400 MT per year) was the highest followed by Karnataka (681.3 MT) and Tamil Nadu (548.38 MT).

Coefficient of variation

The coefficient of variation in production of mango during study period was 15.982 per cent. For period I, II, III and IV it was 10.162, 3.050, 10.291 and 7.460 per cent, respectively.

The state wise CV of mango production in during the period I was the highest in Karnataka (68.790 %) and the lowest in West Bengal (1.405 %). During the overall period V it was the highest in Karnataka (76.412 %) and lowest in West Bengal 23.716 per cent.

Growth rates

Positive and significant linear growth rates were observed in Andhra Pradesh, Gujarat, West Bengal, Maharashtra, Kerala and TamilNadu for Period I. Amongst them Andhra Pradesh (21.964 %) registered the highest growth rate. During period II significant growth rate observed only for Gujarat state. Period III indicate to significant growth rate in Andhra Pradesh, Gujarat, Karnataka, Kerala and Maharashtra. During period IV, showed that only TamilNadu registered significant growth rate. During the overall period indicated that all the

states registered positive and significant linear growth rates. Amongst them Karnatana observed highest growth rate (10.146%).

At national level during the period 1990-2009 compound growth rate was observed for mango production was 2.375 per cent whereas for period I, II, III and IV was observed total value 6.191, -0.326, 4.324 and 2.879 per cent per annum, respectively. Statewise performance of overall period showed that significant compound growth rate in Andhra Pradesh (2.725 %), Gujarat (5.101 %), Karnataka (11.386 %), Kerala (3.663 %), Maharashtra (5.928%) and TamilNadu (3.322 %).

4.1.1.3 Productivity

The statewise mean CV, LGR and CGR of mango productivity during various study period are given in Table 3.

Mean

After examining Table 3 it was revealed that, on an average the annual productivity of mango in India for the period 1990-91 to 2009-10 was 10798.100 kg/ha per annum. Sub period wise mean values of productivity of mango in I, II, III and IV were 22941.200, 7520.800, 6553.000 and 6177.400 kg/ha per annum, respectively.

The state wise productivity of mango in India during period I, was highest in Andhra Pradesh (10275.600 kg/ha per annum) followed by Gujarat and Karnataka. For period II and III also Andhrra Pradesh registered highest productivity of India and lowest was Kerala. Highest productivity of mango in Karnataka (8318.600 kg/ha per annum) and lowest was Maharashtra (1898.400 kg/ha per annum) in period IV. During overall period the highest productivity was observed in Andhra Pradesh (9255.400 kg/ha per annum) and lowest was seen in Maharashtra (3991.850 kg/ha per annum).

Table 3 : State wise productivity of mango in India *(kg/ha)*

Period	State							
	Andhra Pradesh	Gujarat	Karnataka	Kerala	Maharashtra	Tamil Nadu	West Bengal	All India
Mean								
I	10275.600	10000.000	8989.599	3491.600	4236.000	6006.400	8078.000	22941.200
II	10413.800	6639.400	3113.400	3117.400	4239.600	4932.600	7271.800	7520.800
III	8978.000	9462.401	7839.600	3599.200	5593.400	5156.000	6226.200	6553.000
IV	7354.400	7924.800	8318.600	5807.200	1898.400	5013.600	6984.000	6177.400
V	9255.400	8506.651	7065.300	4003.850	3991.850	5287.150	7140.000	10798.100
Coefficient of variation								
I	37.525	7.071	65.382	12.942	51.356	11.826	1.256	142.001
II	20.897	15.563	20.419	15.404	47.187	26.352	33.116	6.982
III	10.342	22.054	52.225	21.330	20.210	20.311	31.116	11.805
IV	29.558	48.301	49.964	1.218	52.272	12.990	31.513	6.499
V	28.384	29.189	63.580	29.461	51.203	18.669	22.416	153.750
Linear growth rate								
I	16.782	1.000	20.222	6.014	19.585	7.094**	0.733**	-31.056
II	-11.454	8.475*	-1.388	-7.548	12.978	-8.263	4.934	-3.785
III	5.916**	13.487***	26.832*	12.250**	-10.825	0.464	-2.877	-2.663
IV	-17.236	-22.840	-27.121	0.169	-24.800	7.095*	-3.342	0.099
V	-2.105	-0.729	1.067	9.647***	-2.550	-0.881	-1.138	-9.978
Compound growth rate								
I	28.856	1.059	11.734	5.822	52.496	7.433**	0.733**	-18.824
II	-11.374	9.163	-1.866	6.781	9.961	-9.643	6.144	-3.6222
III	6.178*	14.369***	38.845	13.263**	-10.873	0.644	-2.160	-2.754
IV	-16.544	-21.487	-38.113	0.170	-18.650	7.577*	-3.356	0.011
V	-1.762	-1.350	0.374***	3.380***	-2.594	-0.849	-1.087	-4.839

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

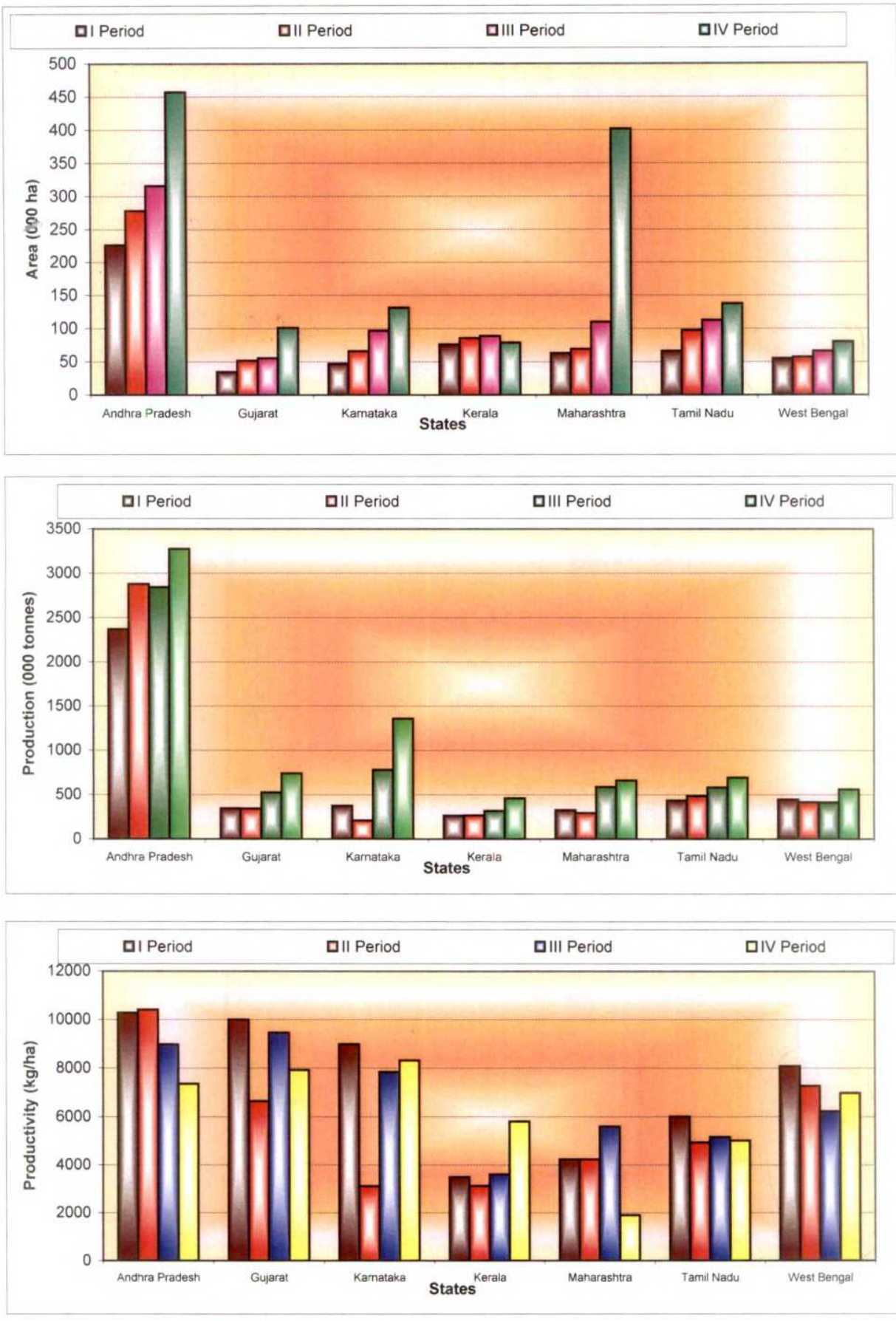


Fig. 1 : State wise area, production and productivity of mango in India

Coefficient of variation

The coefficient of variation in productivity of mango for the study period of 1990-2009 was 153.750 per cent. Whereas, during period I, II, III and IV it was 142.001, 6.982, 11.805 and 6.499 per cent, respectively.

The CV statewise productivity of mango in period I was highest in Karnataka (65.382 %) and lowest in West Bengal (1.256 per cent). During the overall period the highest productivity was observed in Karnataka (63.580%) and lowest was TamilNadu (18.669%).

Growth rates

The present study revealed that, for the overall period (1990-2009) the productivity of mango in India registered negative growth rate. Sub-period wise analysis also showed similar trend expect period IV.

For linear and semi-log trend the statewise productivity of mango showed that for Period-I all the states registered positive growth rate. Amongst them significant growth rates were observed for Tamil Nadu and West Bengal. During the overall period positive and significant growth rates were registered by Karnataka and Kerala.

4.1.2 State wise area, production and productivity of cashewnut in India

4.1.2.1 Area

Andhra Pradesh, Karnataka, Kerala, Maharashtra and Orissa were the major cashewnut growing states in India during the period of 1990-2009. The result of analysis is given in Table 4.

Table 4 : State wise area of cashewnut in India *(000 ha)*

Period	States					
	Andhra Pradesh	Karnataka	Kerala	Maharashtra	Orissa	All India
Mean						
I	74.220	68.860	155.620	39.200	60.120	556.020
II	130.720	64.360	101.760	51.380	84.980	588.000
III	144.600	56.600	87.800	83.800	87.600	624.400
IV	171.000	98.00	76.800	153.600	125.00	832.000
V	130.135	71.955	105.495	81.995	89.425	650.105
Coefficient of variation						
I	7.462	18.803	0.117	38.230	0.138	4.297
II	7.444	22.928	13.824	33.296	24.005	10.532
III	5.880	4.067	4.440	18.800	3.574	4.131
IV	8.239	22.622	7.503	22.574	16.971	13.344
V	28.760	29.283	30.212	60.894	30.615	19.389
Linear growth rate						
I	-1.347	8.510	0.071**	21.709**	0.083**	2.628***
II	4.575***	-11.902	-7.822	-0.550	-13.980	-5.816
III	-1.867	2.473***	-2.733	9.427	1.598	2.226*
IV	4.737**	12.347*	-2.865	11.198	9.600*	6.983*
V	4.514***	2.325**	-4.639	9.224**	4.173**	2.620***
Compound growth rate						
I	-1.252	10.415	0.071	27.418**	0.083	2.655***
II	4.688***	-11.134	-7.479	2.286	-14.078	-5.584
III	-1.963	2.527***	-2.718	11.076	1.652	2.291*
IV	4.989**	15.034*	-2.894	14.133	10.961*	7.827*
V	5.113***	1.979*	-4.363	10.143***	4.198***	2.482***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

Mean

On an average the annual area under cashewnut in India for period I, II, III and IV was 556.020, 588.00, 624.400 and 832.00 thousand ha, respectively. During the overall Period it was observed to be 650.105 thousand ha. This indicate that the area of cashewnut in India during Period IV was increased as compared to Period I, II, III. The statewise area of cashewnut in India for Period I showed that the highest area was observed Kerala (155.620 thousand ha) followed by Andra Pradesh (74.220 thousand ha) and respectively. During Period II highest was observed in Andhra Pradesh (130.720 thousand ha) and Kerala (101.760 thousand ha) in Period III is Andhra Pradesh (144.600 thousand ha) and lowest was seen in Karnataka (98.00 thousand ha). Major area under cashewnut in Andhra Pradesh (171.000 thousand ha) and Maharashtra (153.600 thousand ha) was observed during period IV. During overall period highest area under Cashewnut was seen in Andhra Pradesh (130.135 thousand ha) and lowest in Karnataka (71.955 thousand ha).

Coefficient of variation

The coefficient of variations for the area under cashewnut in India for Period I, II, III and IV were 4.297, 10.532, 4.131 and 13.344 per cent, respectively and for overall Period it was 19.389 per cent.

The statewise CV values of area under cashewnut for Period I revealed that, it was highest in Maharashtra (38.230 %) and lowest in Kerala (0.117 %). During the overall period, it was highest in Maharashtra (60.894 %) and lowest in Andhra Pradesh (28.760 %), respectively.

Growth rates

The linear growth rate of area under cashewnut in India for Period I, II, III and IV revealed that, growth rates were significant and positive except Period II. The statewise performance of area under cashewnut in India indicated that, Kerala, Maharashtra and Orissa was significant growth rates during Period I.

Positive and significant growth rates seen in Andhra Pradesh, Karnataka, Maharashtra and Orissa during the overall Period.

The compound growth rates of area under cashewnut for overall period for all the state except Kerala was positive and significant.

4.1.2.2 Production

Andhra Pradesh, Karnataka, Kerala, Maharashtra and Orissa were the major cashewnut growing states in India during the period of 1990-2009. The results of the analysis are given in Table 5.

Mean

On perusal of Table 5 it was seen that on an average the production of cashewnut in India for the period 1990-2009 was 475.625 MT per annum. Sub period wise production of cashewnut in India revealed that during period I the production of cashewnut was 333.740 MT per annum. Which increased to 437.560, 499.800, 631.400 MT per annum during the Period II, III and IV, respectively. This clearly indicated that after Period I production of cashewnut increase at increasing rate during Period I Kerala tops in production in cashewnut (145.220 MT per annum). The similar trend was observed in Period II. However, during Period III and IV Maharashtra recorded highest production of Cashewnut which 121.000 and 202.600 MT per annum respectively. During the overall period highest production of cashewnut was observed in Maharashtra 109.295 MT per annum and lowest production was observed Karnataka 40.735 MT per annum.

Table 5 : State wise production of cashewnut in India *(000 tonnes)*

Period	States					
	Andhra Pradesh	Karnataka	Kerala	Maharashtra	Orissa	All India
Mean						
I	43.940	25.860	145.220	29.320	37.980	333.740
II	73.680	44.000	112.160	84.260	43.600	437.560
III	73.200	39.880	70.880	121.000	66.600	499.800
IV	101.800	53.200	71.600	202.600	86.200	631.400
V	73.155	40.435	99.965	109.295	58.595	475.625
Coefficient of variation						
I	11.088	42.377	3.338	8.633	19.539	9.707
II	23.839	26.358	16.239	29.282	9.540	13.406
III	42.115	14.680	19.102	25.419	10.649	8.103
IV	7.653	10.415	7.162	7.778	7.536	7.704
V	36.766	31.950	33.647	61.758	35.105	24.884
Linear growth rate						
I	6.964***	22.158	0.744	-0.102	12.217***	5.876**
II	10.206	9.545	0.214	13.340	0.917	5.357
III	4.456	7.823*	3.485	13.967*	6.306	5.062***
IV	2.652	4.511	0.140	2.863	2.668	2.170
V	4.788***	4.165***	-4.871	10.039***	5.675***	4.035***
Compound growth rate						
I	7.274***	39.799	0.739	-0.108	13.297***	6.117**
II	9.786	9.782	0.348	12.563	0.788	5.181
III	3.995	8.690*	3.026	13.893**	6.590	5.221***
IV	2.737	4.816	0.108	2.947	2.750	2.220
V	5.000***	5.655***	-4.688	12.768***	6.002***	4.224***

* - Significant at 5 % ** Significant at 1% *** - Significant at 10 %

Coefficient of variation

The coefficient of variation in production of cashewnut in the study period of 1990-2009 was 24.884 per cent. For period I, II, III and IV it was 9.707, 13.406, 8.103 and 7.704 per cent respectively.

The statewise production of cashewnut in CV during the period I observed that CV was highest in Karnataka (42.377%) and lowest in Kerala (3.338%). During the overall period it showed highest value in Maharashtra (61.758%) and lowest in Karnataka (31.950%).

Growth rates

The present study revealed that during period (1990-2009). The National level the growth rates for linear growth rate and compound growth rate was seen in positive. The statewise growth rate of cashewnut for linear and compound growth rate during Period I for Andhra Pradesh (6.964 %) and Orissa (12.217 %). For Period III significant growth rate was observed in Karnataka (8.690%), Maharashtra (13.967 %) and Orissa (6.306%) per annum Period II and IV showed that all the states are having positive but non significant growth rate. During overall period linear and semi-log trend showed that all the states registered significant growth rates except Kerala. Amongst them highest growth rate was observed in Maharashtra (LGR 10.039 % and CGR 12.768 %).

4.1.2.3 Productivity

Andhra Pradesh, Karnataka, Kerala, Maharashtra and Orissa were the major states growing cashewnut in India during the period of 1990-2009 are given in Table 6.

Table 6 : State wise productivity of cashewnut in India *(kg/ha)*

Period	States					
	Andhra Pradesh	Karnataka	Kerala	Maharashtra	Orissa	All India
Mean						
I	595.400	357.620	933.200	878.200	631.800	599.200
II	551.800	728.000	1115.000	1745.200	540.600	752.800
III	493.800	702.400	809.600	1464.00	760.00	800.000
IV	596.600	562.800	935.200	1380.600	703.000	767.200
V	559.400	587.700	948.250	1367.00	658.850	729.800
Coefficient of variation						
I	14.710	34.148	3.288	49.108	19.407	5.677
II	22.058	35.188	18.846	35.390	26.899	19.402
III	42.074	11.376	20.171	22.745	8.916	4.940
IV	6.672	20.091	8.591	25.168	15.038	11.230
V	22.577	35.582	18.030	38.100	20.371	15.574
Linear growth rate						
I	8.263*	18.205***	0.654	-21.666	12.140**	3.271*
II	5.292	21.140*	7.758	10.083	16.038*	11.211*
III	3.463	5.538	6.139	2.522	4.724***	2.863*
IV	-2.112	-9.790	3.069	-9.801	-7.923	-5.422
V	0.040	2.406**	-0.322	2.389	1.563*	1.595
Compound growth rate						
I	8.681***	26.711	0.648	-21.666	13.202**	3.368*
II	4.877	23.538**	8.477	10.083	17.312	11.388*
III	3.088	6.004	5.942	2.522	4.859***	2.878*
IV	-2.164	-8.888	3.093	-9.801	-7.410	-5.191
V	-0.158	3.570*	-0.339	2.389	1.728*	1.701**

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

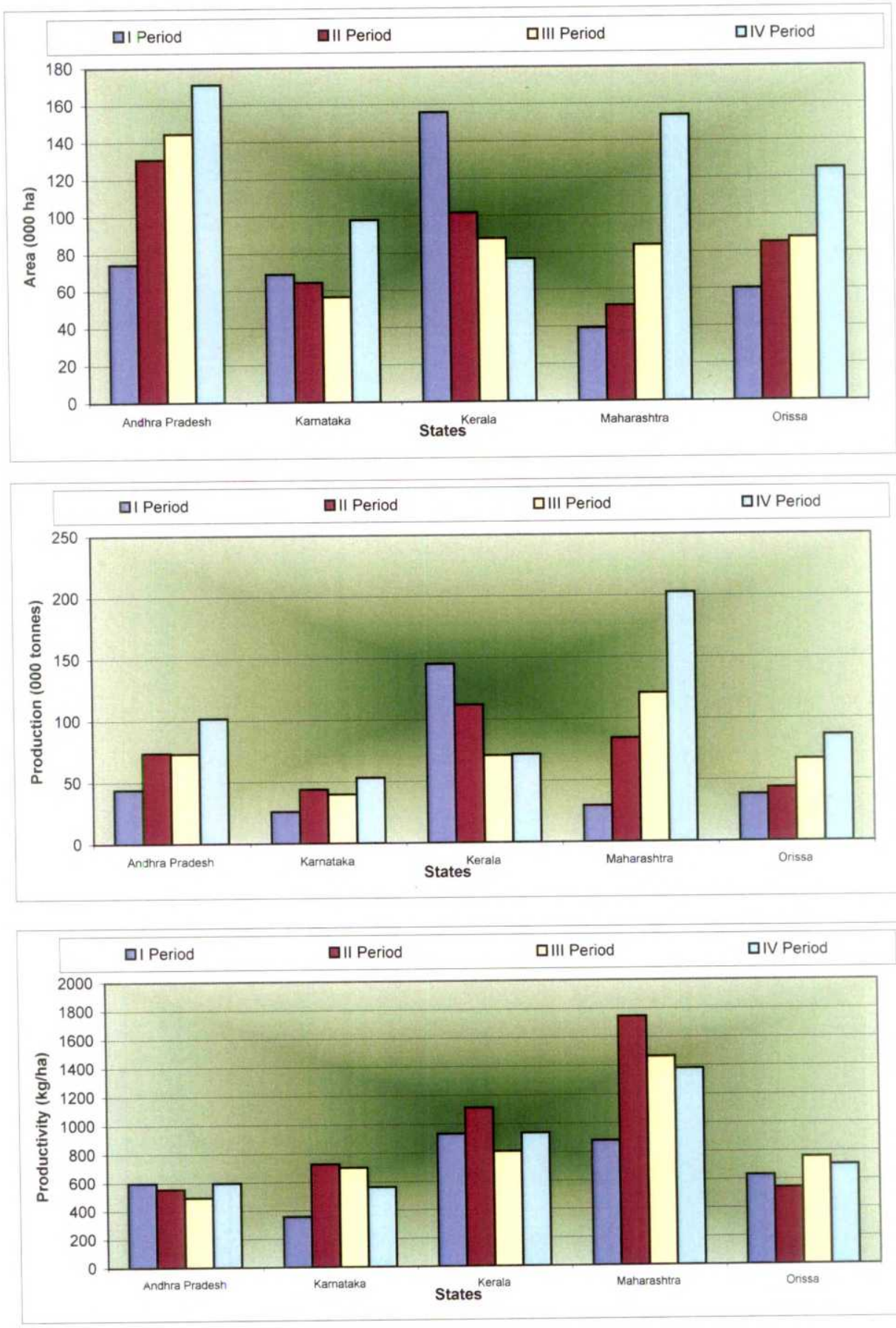


Fig. 2 : State wise area, production and productivity of cashewnut in India

Mean

After examining Table 6 it was observed that on an average the annual productivity of cashewnut in India for period 1990-2009 was 729.800 kg/ha per annum. period wise mean values of productivity of cashewnut during in I, II, III and IV period were 559.200, 752.800, 800.000 and 767.200 kg/ha per annum respectively.

It was observed from state wise productivity of cashewnut in India that productivity was highest in Kerala (933.200 kg/ha) and lowest was Karnataka (357.620 Kg /ha) Period I. In period II also highest productivity was seen in Kerala (540.600 kg/ha). During Period III and IV it was observed that attained highest productivity in Maharashtra (1464.00 kg/ha and 1380.600 kg/ha). During the overall period also the similar trend was observed.

Coefficient of variation

The coefficient of variation in productivity of cashewnut for the study period of 1990-2009 was 15.574 per cent. Whereas during Period I, II, III and IV it was 5.677, 19.402, 4.940 and 11.230 per cent, respectively.

During Period I highest CV was observed for Maharashtra (49.108 %) and lowest was Kerala (3.288 %). During the overall period highest productivity was observed in Maharashtra (38.100 %) and lowest in Kerala (18.030 %).

Growth rates

The present study revealed that, for the overall period (1990-2009) the productivity growth rate of cashewnut in India was significant growth (1.595 %) per annum. The period wise analysis revealed that linear growth rates during Period I, II, III and IV were 3.271, 11.211, 2.863 and 5.422 per cent per annum. The state wise

productivity growth rate of cashewnut showed that for Period I it was significant in Andhra Pradesh, Karnataka and Orissa.

It was observed that compound growth rate for cashewnut during the overall Period (1990-2009) was 1.791 per cent per annum. For Period I, II, III and IV observed that total value of CGR were 3.368, 11.388, 2.878 and 5.191 per cent per annum. The state wise compound growth rate of productivity for cashewnut in Karnataka (3.570 %) and Orissa (1.728 %) significant.

4.1.3 State wise area, production and productivity of tamarind in India

4.1.3.1 Area

Kerala, Tamil Nadu, Karnataka and Andhra Pradesh were the major tamarind producing states of in India. State wise and period wise mean, CV and growth rates of tamarind in India during the period 1999-2009 are given in Table 7.

Mean

After examining Table 7 it was observed that on an average annual area under tamarind in India. For period 1999-2009 was 59.688 thousand ha. Whereas, sub-period wise mean values of area for Period I and II were 61.558 thousand ha and 57.819 thousand ha, respectively. The state wise breakup of the total area of tamarind in India for the period 1999-2009 revealed that, Tamil Nadu (20.796 thousand ha) was highest registered.

Coefficient of variation

The coefficient of variation of area under tamarind for the study period was 5.905 per cent. Whereas for Period I and II they were 0.600 per cent and 5.905, respectively. A fairly high growth rate was accompanied by high value of CV for the sub period.

Table 7 : State wise area of tamarind in India *(000 ha)*

Period	State				
	Kerala	Tamil Nadu	Karnataka	Andhra Pradesh	Overall
Mean					
I	19.072	21.175	16.171	5.141	61.558
II	16.379	20.418	15.251	5.770	57.819
III	17.726	20.796	15.711	5.456	59.688
Coefficient of variation					
I	0.770	2.209	5.869	12.697	0.600
II	17.988	3.887	2.305	3.899	5.905
III	13.681	3.521	5.287	10.401	5.061
Linear growth rate					
I	0.336	0.736	-3.594	7.512**	0.040
II	-11.158	-2.409	1.031	0.527	-3.687
III	-3.507	-0.747	-1.214	2.674***	-1.377
Compound growth rate					
I	0.336	0.745	-3.533	7.711	0.041
II	-10.770	-2.392	1.020	0.505	-3.630
III	-3.776	-0.758	-1.175	2.838	-1.404

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

The highest CV values was observed for Kerala (13.681 %) and lowest for Tamil Nadu (3.521 %). During period of 1999-2009.

Growth rates

Positive linear growth rate was observed for Period I in Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. Among them Andhra Pradesh (7.512 %) registered significant growth rate. For Period II positive linear growth rate in Karnataka and Tamil Nadu were observed. The linear growth rates for all the studied states except Andhra Pradesh (2.674%) were negative.

The similar trend was observed compound growth rates in overall period.

4.1.3.2 Production

Kerala, Tamil Nadu, Karnataka and Andhra Pradesh were the major tamarind growing states in India. State wise and period wise mean, CV and growth rates of tamarind in India during the period 1999-2009 are given in Table 8.

Mean

The annual production of tamarind during Period I and II were to the tune of 196.715 MT ha and 186.467 MT ha, respectively.

The state wise production values in Period I revealed that, production was highest in Karnatka (83.316 MT per annum) and lowest in Andhra Pradesh (16.916 MT per annum) whereas, in Period II the highest production was observed for Karnataka (75.745 MT per annum) and lowest for Andhra Pradesh. During the overall period highest production was observed Karnataka.

Table 8 : State wise production of tamarind in India *(000 tonnes)*

Period	State				
	Kerala	Tamil Nadu	Karnataka	Andhra Pradesh	Overall
Mean					
I	29.475	67.007	83.316	16.916	196.715
II	25.284	64.813	75.747	20.627	186.467
III	27.380	65.910	79.532	18.770	191.591
Coefficient of variation					
I	0.421	2.254	31.631	23.145	14.558
II	17.293	3.774	4.478	11.310	2.719
III	13.362	3.396	22.831	19.246	10.505
Linear growth rate					
I	-0.136	0.406	-16.204	-14.418	-7.985
II	-10.676	-0.270	2.002	-1.556	-1.595
III	-3.532	-0.725	-3.268	1.211	-1992
Compound growth rate					
I	-0.136	0.410	-13.523	-13.585	-7.332
II	-10.324	-2.246	1.965	-1.586	-1.575
III	-3.776	-0.733	-2.449	1.303	-1.797

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

Coefficient of variation

The coefficient of variation in production of tamarind for the study period of 1999-2009 was 10.505 per cent whereas for Period I and II. It was 14.555 per cent and 2.719 per cent, respectively.

The state wise highest CV of tamarind was observed in Karnataka 22.831 per cent followed by Andhra Pradesh 19.246 per cent, respectively. For study period of 1999-2009.

Growth rates

Positive linear growth rate was observed for Tamil Nadu and Karnataka during Period I and II respectively. During overall Period positive linear growth rates was observed in Andhra Pradesh.

In case of compound growth rate during overall period in Andhra Pradesh (0.189 %) registered positive growth rate.

4.1.3.3 Productivity

Kerala, Tamil Nadu, Karnataka and Andhra Pradesh were the major growing states of tamarind in India. State wise and period wise mean, CV and growth rates of tamarind in India during the period 1999-2009 are given in Table 9.

Mean

After examining Table 9 it was observed that on an average annual productivity of tamarind in India was 3216.900 kg/ha for period 1999-2009. Whereas, the sub period wise mean values of productivity of period I and II were 3203.400 kg/ha and 3230.400 kg/ha, respectively. The state wise performance total productivity of tamarind in India for the period 1999-2009 revealed that Kernataka was having highest productivity (5058.600 kg/ha) as compared to other states. Productivity during in Period II was highest in Karnataka and lowest in Kerala.

Table 9 : State wise productivity of tamarind in India *(kg/ha)*

Period	State				
	Kerala	Tamil Nadu	Karnataka	Andhra Pradesh	Overall
Mean					
I	1545.400	3167.600	5112.400	3440.000	3203.400
II	1545.200	3174.600	4964.800	3568.600	3230.400
III	1545.300	3169.600	5038.600	3564.300	3216.900
Coefficient of variation					
I	0.768	0.617	26.281	32.292	14.568
II	0.860	0.943	2.108	8.438	3.666
III	0.769	0.769	17.898	21.981	9.988
Linear growth rate					
I	-0.466	-0.332	-11.992	-19.863	-7.645
II	0.485	0.158	0.943	-2.152	2.124**
III	0.000	0.027	-1.806	-2.073	-0.163
Compound growth rate					
I	-0.465	-0.332	-9.949	-18.418	-6.964
II	0.486***	0.156	0.934	-2.083	2.132**
III	0.000	0.026	-1.248	-1.541	-0.124

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

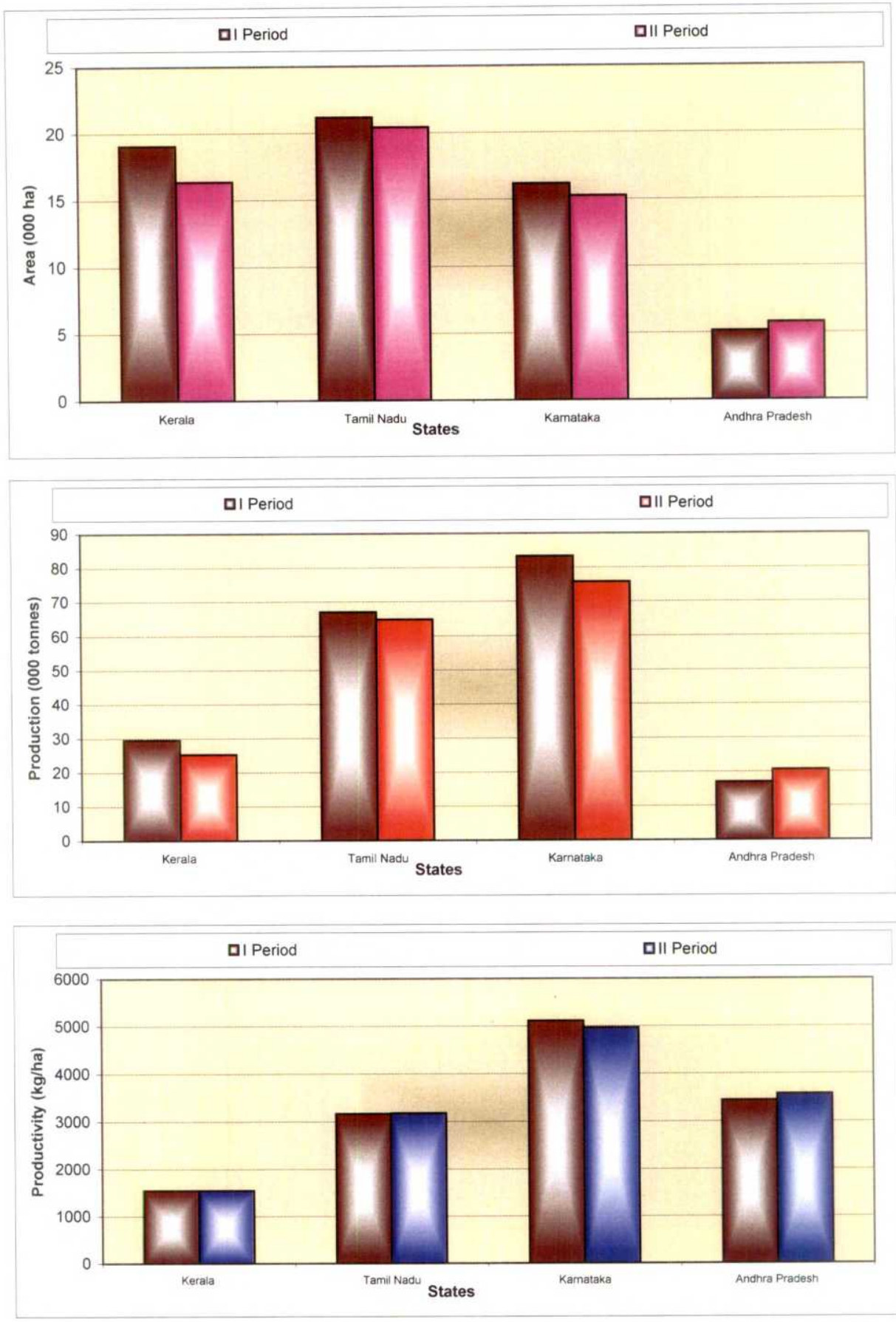


Fig. 3 : State wise area, production and productivity of tamarind in India

Coefficient of variation

The coefficient of variation in productivity of tamarind for the study period of 1999-2009 was 9.988 per cent. Whereas, for Period I and II it was 14.568 and 3.666 per cent, respectively.

The statewise analysis highest CV in Andhra Pradesh (21.981%) and lowest in Kerala (0.769 %) and TamilNadu (0.769 %) for the study period 1999-2009.

Growth rates

Productivity growth rates were negative during Period I for all the studies state. For Period II positive linear and compound growth rate was observed in Kerala, TamilNadu and Karnataka. Amongst them Kerala was registered significant growth. During the overall period positive growth in Kerala, TamilNadu and Karnataka states was observed.

4.1.4 State wise area, production and productivity of pomegranate in India

4.1.4.1 Area

Maharashtra, Karnataka, Andhra Pradesh, Gujarat, Tamil Nadu, Rajasthan were the major pomegranate growing states in India. Statewise mean, CV and growth rates of pomegranate in India during the period 2003-2009 are given in Table 10.

Mean

After examining Table 10 revealed that on an average area under pomegranate in India, during study period 2003-2009 was 114.543 thousand ha. Amongst all the studied states Maharashtra was highest 90.671 thousand ha and lowest for Tamilnadu 0.144 thousand ha. This indicates that Maharashtra is leading state in pomegranate

cultivation. It accounts 79.15 per cent of total area under pomegranate in India.

Coefficient of variation

The coefficient of variation for area of pomegranate for the study period of 2003-2004 was 8.683 per cent whereas amongst the studied states highest CV values observed in Gujarat (18.898%) and lowest in Maharashtra (6.833%).

Growth rates

Linear and compound growth rates for pomegranate area during period 2003-2009 was 2.878 per cent and 2.988 per cent per annum respectively.

The state wise area of linear and compound growth rates observed positive growth rate in Maharashtra, Karnataka, Gujarat, Rajastan states. Among them significant and positive growth rate were observed Karnataka (5.126%) and Rajastan (11.154%) per annum.

4.1.4.2 Production

Maharashtra, Karnataka, Andhra Pradesh, Gujarat, TamilNadu, Rajastan were the major pomegranate growing states in India. Statewise mean, CV and growth rates of pomegranate in India during the period 2003-2009 are given in Table 10.

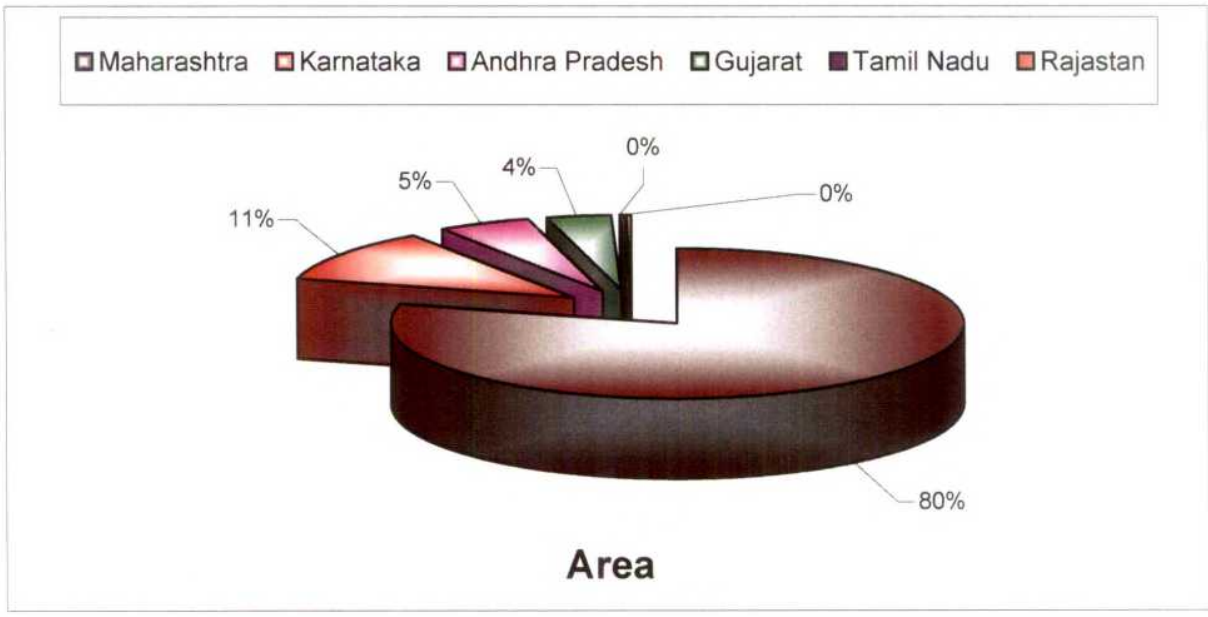
Mean

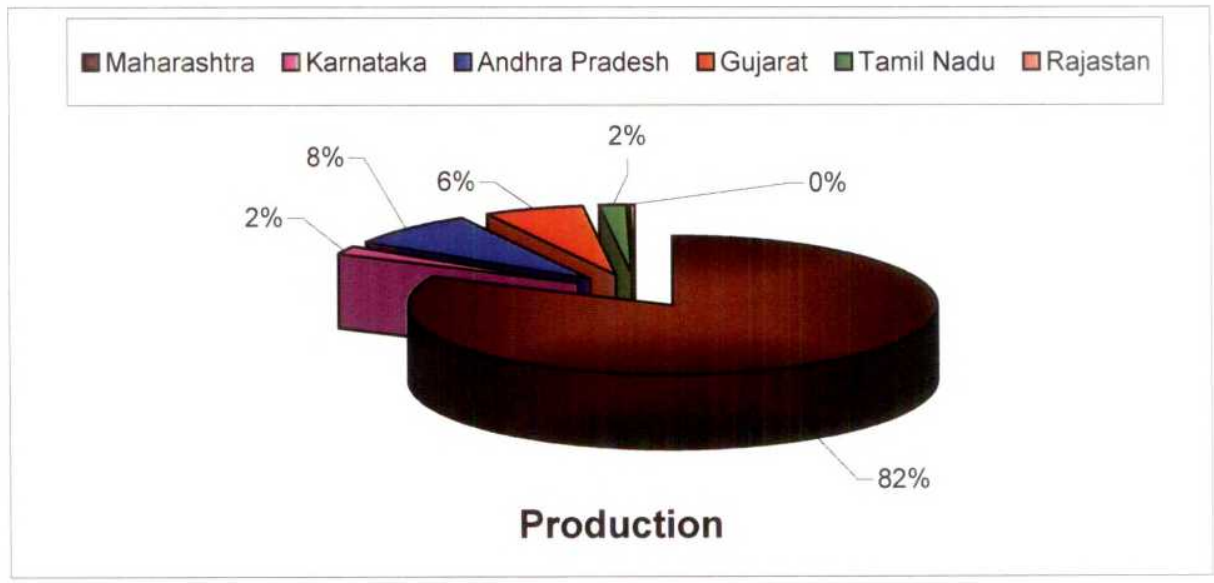
On perusal of Table no 10 it was seen that on an average the production of pomegranate in India during the Period 2003-2009 was 809.529 MT tonnes per annum.

Table 10 : Statewise area, production and productivity of pomegranate in India

Period	State						
	Maharashtra	Karnataka	Andhra Pradesh	Gujarat	Tamil Nadu	Rajasthan	All India
Area (000 ha)							
Mean	90.671	13.029	6.086	4.200	0.144	0.464	114.543
CV	6.833	11.663	14.618	18.898	16.657	29.633	8.683
LGR	1.430	5.126***	-1.761	4.677	-1.724	11.154**	2.878
CGR	1.386	5.203*	-1.677	5.196	-1.354	10.894***	2.988
Production (000 tonnes)							
Mean	585.429	13.614	58.514	43.500	11.143	2.429	809.529
CV	7.700	6.617	25.060	17.479	11.279	50.021	8.613
LGR	-1.015	2.387**	5.182	3.949	-2.564	18.382**	2.278
CGR	-0.928	2.471**	5.421	4.101	-2.532	16.945**	2.492
Productivity (kg/ha)							
Mean	60302.00	10329.000	9786.000	9959.00	25271.00	4964.00	7073.00
CV	5.406	7.108	24.993	6.332	6.687	19.397	4.802
LGR	-0.991	-2.524	6.022	1.804	-0.721	4.460	-0.225
CGR	-1.065	-2.527	6.198	1.874	-0.717	4.300	-0.561

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %





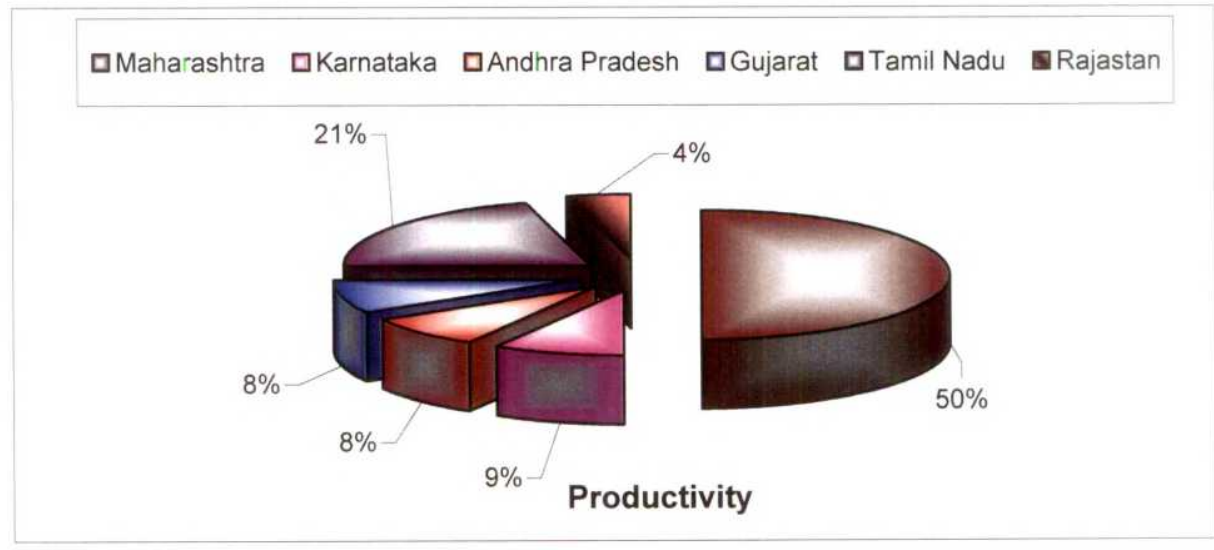


Fig. 4 : State wise area, production and productivity of pomogranate in India

The state wise production of pomegranate revealed that in the period 2003-2009 highest production was observed Maharashtra (585.429 MT tonnes per year) and lowest in Rajastan (2.429 MT per annum). This clearly indicate that Maharashtra is highest in pomegranate production.

Coefficient of variation

The coefficient of variation in production of pomegranate in the study period of 2003-2009 was 8.613 per cent.

The coefficient of variation was observed highest in Rajastan (50.02 %) and lowest in Karnataka (6.617 %) during the Period 2003-2009.

Growth rates

Linear and compound growth rate in pomegranate production during period 2003-2009 were 2.278 per cent and 2.492 per cent, per annum respectively. State wise production in linear and compound growth rates observed during the period 2003-2009 were positive in Karnataka, Andhra Pradesh, Gujarat and Rajastan. Among them Karnataka and Rajastan observed Significant growth rates.

4.1.4.3 Productivity

Maharashtra, Karnataka, Andhra Pradesh, Gujarat, TamilNadu, Rajasthan were the major area grown pomegranate states in India. Statewise mean, CV and growth rates of pomegranate in India during the period 2003-2009 are given in Table 10.

Mean

On an average the annual productivity of pomegranate in India for period 2003-2009 was 7073.00 kg/ha. In that period highest productivity of pomegranate was highest in Maharashtra (60302.00

kg/ha) and lowest in Rajastan (4764.00 kg/ha). However, Karnataka (10329.00 kg/ha), Andhra Pradesh (9786.00 kg/ha), Gujarat (9959.00 kg/ha) and TamilNadu (25271.00 kg/ha).

Coefficient of variation

The coefficient of variation in productivity of pomegranate for the study period 2003-2009 was 4.802 per cent.

Whereas the state wise productivity CV of pomegranate was highest in Andhra Pradesh (24.993 %) and lowest for Maharashtra (5.406 %).

Growth rates

Linear and compound growth rate for pomegranate productivity for period 2003-2009 was negative at national level.

The statewise productivity in linear and compound growth rate were to be observed positive in Andhra Pradesh, Gujarat and Rajasthan.

4.2 Country wise export of dry land horticultural fruits from India (volume)

4.2.1 Mango

UAE, Bangladesh, Saudi Arabia, Kuwait, UK, Bahrain, Qatar, Nether land, Singapore, USA were the major importing countries of mangoes from India.

The mango is king of fruits and India is a leader in global production of mango. India ranks first in the producing countries in the world with around 54 per cent share in the global production of mangoes. However, this distinction is not being enjoyed in the field of export due to certain constraints, hence an attempt has been made in this

section to review the performance of mango export from India during the period of 1990-2009. The results of the same *viz.* mean, CV and growth rates in respect of export of mango are presented in Table 11.

Mean

On an average the export of fresh mangoes for Period I worked out to be 23356.510 MT/annum. However export during Period II, III and IV were 33995.320 MT, 46714.480 MT, 72265.990 MT, respectively. During the overall Period the export was 44083.080 MT observed. This indicates that the volume of export of fresh mangoes from India during Period IV increased as compared to Period I, II, III. The country wise export of mangoes from India for the Period I showed that the highest export to UAE (10984.490 MT) and followed by Saudi Arabia (4964.719 MT). For Period II of the study highest export of mangoes was observed UAE (10274.350 MT) and followed by Bangladesh (7741.580 MT). Bangladesh was highest importer of mangoes from India followed by UAE during Period III. Similar trend was observed during Period IV. During overall Period UAE and Bangladesh was highest importer mangoes from India the import was to the tune of 14631.020 MT and 16635.670 MT, respectively.

Coefficient of variation

The coefficient of variation for the total export of mangoes from the country for the Period I, II, III and IV were 11.384, 30.584, 21.689, 15.641 per cent, respectively. During overall the Period the CV was 46.679 per cent. This showed that, there is moderate fluctuations in exports of mangoes.

The country wise CV of exports for Period I revealed that, it was highest in Bangladesh (88.64%) and lowest in UAE (13.420%), whereas for the overall Period it was highest in USA (95.757%) and lowest in UK (43.481%).

Table 11: Country wise export of mango fresh from India *(Qty in MT)*

Period	Countries											
	UAE	Bangladesh	Saudi Arabai	Kuwait	UK	Bahrain	Qatar	Netherlands	Singapore	USA	Others	Total
Mean												
I	10984.490	2095.084	4964.719	1220.182	1010.866	1324.448	632.636	179.158	140.380	97.190	707.424	23356.510
II	10274.550	7741.580	6571.412	1829.844	1683.184	1149.748	972.692	502.474	320.820	365.228	2584.292	33995.320
III	13019.450	22430.760	2657.168	687.772	1252.668	678.266	200.646	620.984	263.118	516.500	4387.232	46714.480
IV	24245.590	34275.270	1933.012	468.734	2166.509	795.488	226.754	169.708	397.612	120.760	7566.540	72265.990
V	14631.020	16635.670	4031.579	1051.468	1228.307	986.988	508.182	368.059	255.483	224.945	3811.372	44083.080
Coefficient of variation												
I	13.420	88.641	13.079	39.288	33.908	22.411	16.874	79.934	81.652	64.416	64.812	11.384
II	12.787	66.214	37.708	29376	29.557	49.218	46.161	64.372	23.204	78.867	81.831	38.584
III	40.426	30.561	28.203	46.235	20.090	26.406	33.737	55.293	24.912	55.919	41.761	21.584
IV	8.038	32.307	38.559	53.633	38.630	46.827	113.221	47.384	20.112	66.643	21.325	15.646
V	43.740	86.932	56.559	62.699	43.481	44.561	80.240	83.229	40.458	95.757	78.582	46.679
Linear growth rate												
I	-1.434	49.125*	-5.659	9.008	12.968	-0.750	-5.520	43.773*	47.917	36.221*	30.442	5.061
II	-2.144	34.297*	10.848	4.832	15.280*	18.860	21.290	27.309	3.509	18.432	15.582	13.342
III	11.679	11.108	4.819*	-27.501**	8.545	12.528	-9.856	15.562	-14.628	-28.291	19.361	10.460
IV	0.278	1.101	20.609	32.397	22.753**	23.893*	62.251*	-24.428	10.983*	32.044	-5.145	2.020
V	5.588***	13.160***	-5.708	-5.840	4..707***	-3.186	-6.491	1.566	3.483	1.486	11.463***	7.210***
Compound growth rate												
I	-1.263	131.730*	-5.333	11.103	15.592	0.399	-6.296	80.940	71.518***	43.332**	42.921*	5.457
II	-2.146	63.602*	11.573	4.795	16.892***	25.470	26.603*	27.518	2.429	33.674	32.373	16.056
III	14.083	10.041	4.486*	-28.255**	10.257	14.594	-7.557	22.415	-14.597	-46.152	21.804*	10.965
IV	0.375	0.979	20.676	54.079	32.727*	25.104	94.486**	-21.677	11.843*	161.594	-5.140	1.971
V	5.100***	26.261***	-6.576	-7.348	4.709***	-3.167	-9.751	3.375	6.289***	-3.777	18.290**	7.752**

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

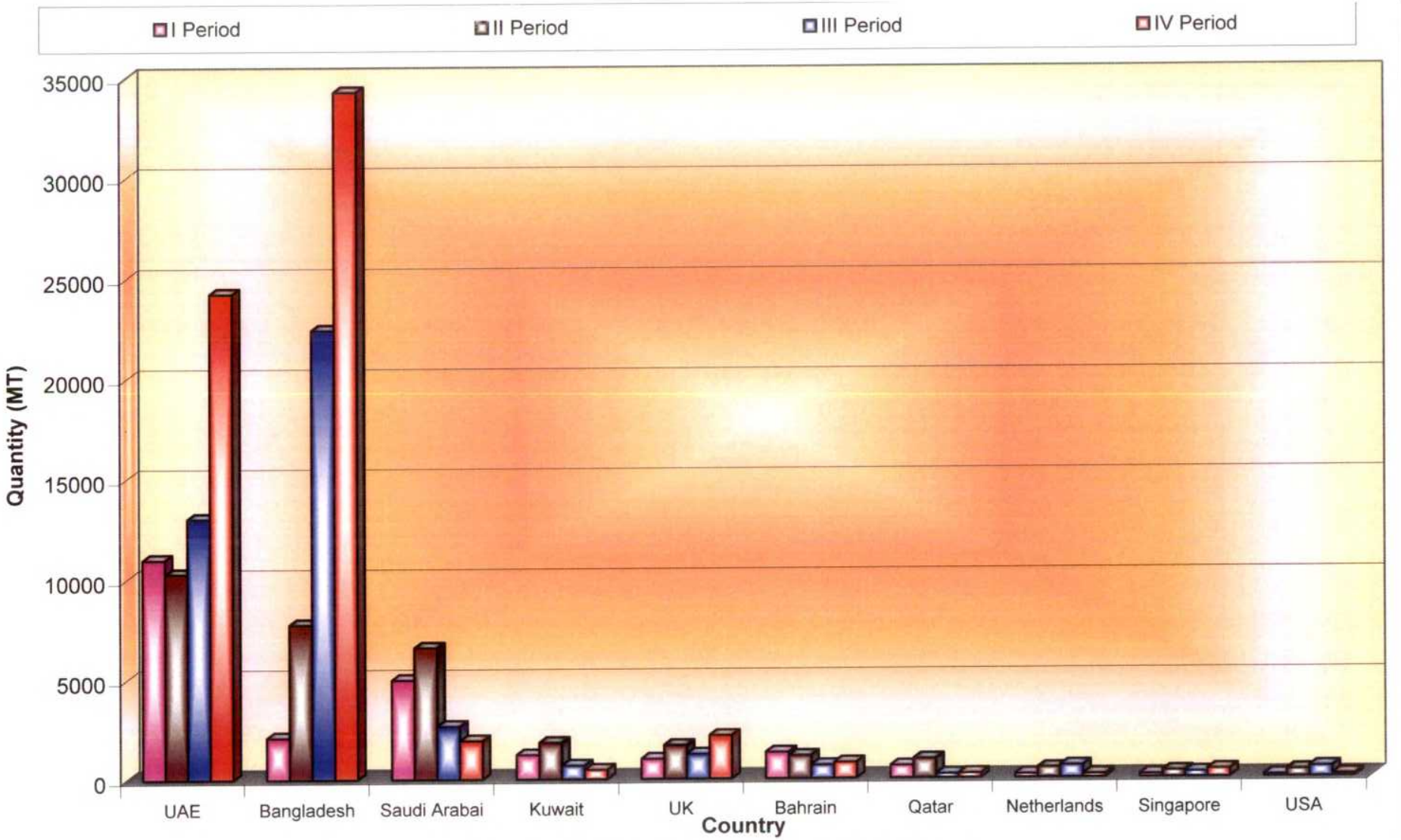


Fig. 5 : Export of mango from India (volume)

Growth rates

The linear growth rate of exports of from India during Period I, II, III and IV revealed that positive growth rate. The country wise performance of exports of mangoes from India indicated that for Period I export to Bangladesh, Netherland and Singapore registered positive and significant growth rates. During overall period positive and significant growth rates seen in were registered by UAE, Bangladesh, UK and Singapore. The compound growth rates of export of mangoes for the overall period was positive and significant for UAE, Bangladesh, UK and Singapore which were to the tune of 5.100, 26.261, 4.709, 6.289 per cent per annum, respectively.

4.2.2 Pomegranate

UAE, Bangladesh, Saudi Arabia, UK, Kuwait, Bahrain, Qatar, Canada, Sri Lanka, Oman, Nether land were the major importing countries of pomegranate from India are presented in Table 12.

Pomegranate is grown in tropical and subtropical region of the world. Export of pomegranate has increased from 6303 tonnes in 2002-03 to 33415 tonnes in 2009-10. This is more than five fold increase in export from India. There is tremendous potential for export of pomegranate from India.

Mean

On an average the annual export of pomegranate for Period I worked out to be 2195.967 MT per annum. During Period II, III and IV the export was 4795.930 MT, 7977.800, 28944.790 MT per annum, respectively. During the overall Period export was 10978.620 MT observed.

Table 12: Country wise export of pomegranate from India *(Qty in MT)*

Period	Countries												
	UAE	Bangladesh	Saudi Arabai	UK	Kuwait	Bahrain	Qatar	Canada	Sri Lanka	Oman	Netherlands	Others	Total
Mean													
I	944.573	398.675	509.146	29.989	62.444	153.821	32.302	4.162	7.061	8.066	0.441	45.306	2195.967
II	2091.430	890.885	839.108	249.494	154.068	207.222	101.070	35.032	130.321	21.980	10.324	184.898	4795.930
III	4319.092	457.348	342.448	538.716	47.278	327.954	26.825	17.324	207.408	305.606	153.814	875.988	7977.800
IV	12904.580	2967.716	1876.886	1492.822	295.732	528.532	137.088	272.790	308.208	315.084	3581.214	4264.256	28944.790
V	5064.980	1124.156	891.897	576.255	139.881	304.382	74.521	82.327	163.249	162.684	1033.948	1342.612	10978.620
Coefficient of variation													
I	60.369	91.133	45.998	99.299	83.849	55.224	41.787	109.169	138.517	66.500	223.100	52.261	57.715
II	38.049	64.125	28.516	28.694	41.078	28.567	192.961	60.377	85.902	79.976	119.471	85.910	16.543
III	36.953	81.238	74.288	85.452	132.792	46.086	82.152	108.194	49.322	41.801	138.919	90.205	51.565
IV	26.447	58.473	36.181	23.505	78.630	32.643	55.365	77.190	22.482	55.502	60.353	48.352	26.339
V	101.199	113.932	79.941	109.617	110.551	60.800	107.479	181.639	83.588	111.551	179.154	151.385	105.416
Linear growt rate													
I	34.848**	49.342*	27.749**	42.269	51.700***	15.857	-15.193	57.283*	77.964**	27.625	99.773	23.880	34.289**
II	16.238	-38.330	13.289	7.940	-3.817	-1.024	-12.078	34.854**	51.476**	47.111**	-49.067	25.280*	600.268
III	22.020**	47.737**	28.540	50.248**	-54.846	27.237**	2.962	-50.673	27.315*	-2.863	71.875*	50.918	30.975**
IV	15.475**	28.936*	10.553	8.959	46.614**	18.488**	33.428**	15.381	10.377	30.224**	7.773	9.879	14.050*
V	15.216***	12.792***	8.526***	15.673***	9.457**	8.722***	6.670	18.849***	12.775***	14.835***	21.461***	19.723***	15.325***
Compound growth rate													
I	45.244**	78.588**	38.055**	42.914	109.734**	16.321	-17.596	554.377	1797.957*	31.768	366.106	27.553	44.541**
II	16.537	-39.660	13.088	9.473	-0.736	-0.737	-26.103	67.871*	98.813**	66.236	-84.778	35.139	6.280
III	23.630***	84.143*	34.750	70.326***	-56.335	32.053**	4.565	-47.448	33.769	-4.416	111.336**	86.526	35.881***
IV	16.439**	32.948*	16.351	-9.649	118.599**	19.147**	42.752***	145.079	11.057	52.407*	12.832	13.394	16.598*
V	19.936***	13.377***	7.223**	30.318***	5.463	9.056***	5.897	35.781***	76.244**	31.878***	137.302***	35.364***	18.3873***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

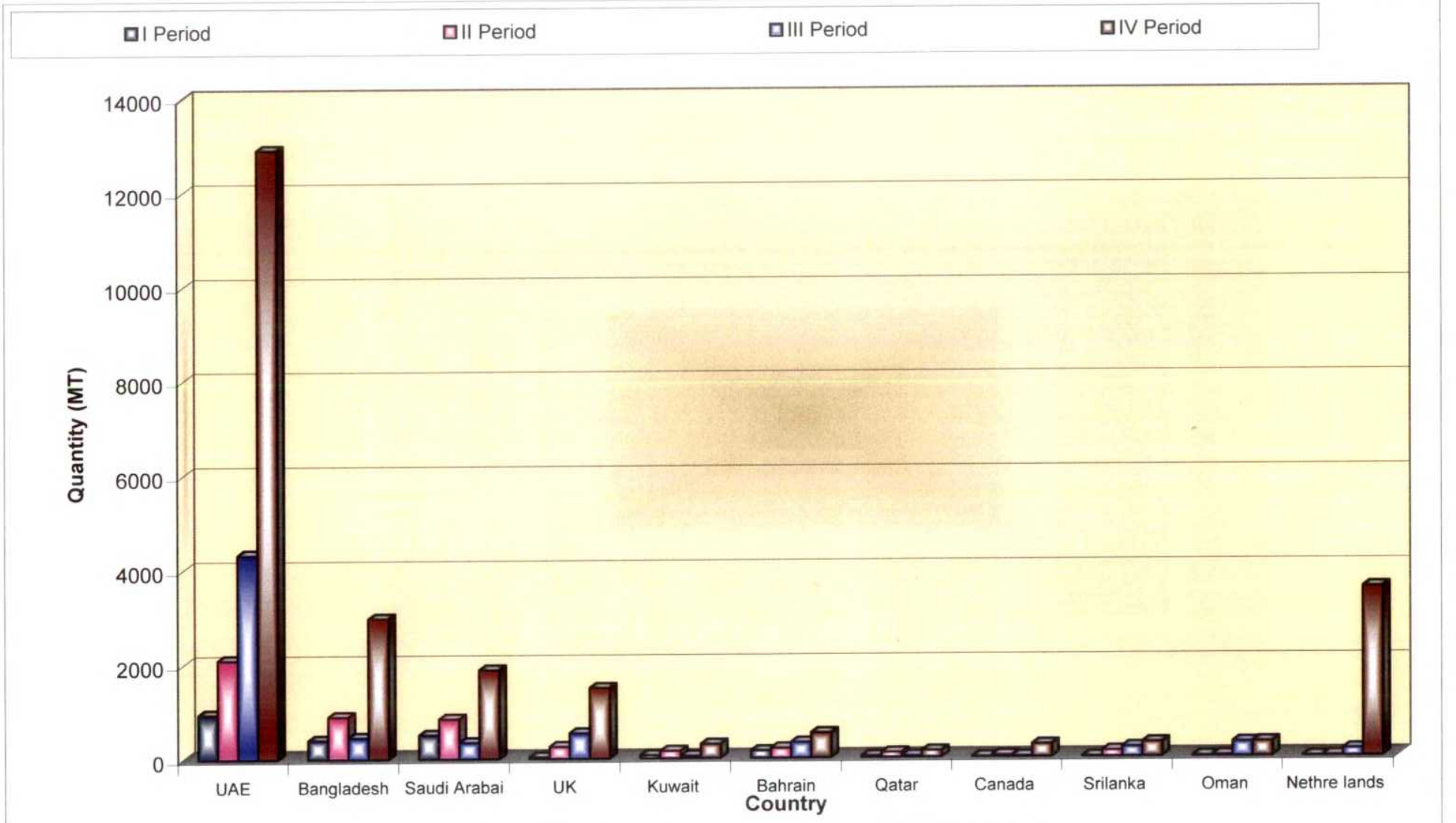


Fig. 6 : Export of pomegranate from India (volume)

This indicates that the volume of export of pomegranate from India during period IV increased as compared to Period I, II, III. This might be attributed to export promotion policy of the Government of India. The country wise export of mangoes from India for the period I showed that the export to UAE and Saudi Arabia were respectively to the tune of 944.373 MT and 509.146 MT. During Period II of the study Period export in mangoes of UAE and Bangladesh were the order to 2091.430 MT and 890.885 MT, respectively. For the period III UAE (4319.092 MT) was the highest importer pomegranate from India followed by UK (532.716 MT), respectively. UAE and Netherlands the highest export in terms of volume was observed for 12904.580 MT and 3581.214 MT during Period IV respectively. Overall during Period showed that UAE and Bangladesh were highest importer of pomegranate from India which was to the tune of 5064.920 MT and 1177.156 MT, respectively.

Coefficient of variation

The coefficient of variation for the total export of pomegranate from the country during the Period I, II, III and IV were 57.715, 16.543, 51.565, 26.339 per cent per annum, respectively. The CV for overall during the Period at a national' level was showed that 105.416 per cent. This showed that, there is high fluctuations in export of pomegranate from the country.

The country wise CV for exports during Period I revealed that, it was highest for Netherlands (223.140%) and lowest for Bahrain (35.224 %) whereas for the overall Period it was highest for Canada (181.039%) and lowest for Bahrain (60.800 %).

Growth rates

The linear growth rate for export of pomegranate from India during Period I, II, III and IV revealed an positive and significant

trend of pomegranate export. The country wise of export growth rates pomegranate from India indicated that for Period I export to UAE, Bangladesh, Saudi Arabia, Kuwait, Canada and Sri Lanka were positive and significant. The overall growth rate was positive and significant in case of UAE, Bangladesh, Saudi Arabia, UK, Kuwait, Bahrain, Canada, Shrilanka, Oman and Netherlands. The compound growth rate for export of pomegranate for the overall period was positive and significant for the UAE (19.936 %), Bangladesh (13.377 %), Saudi Arabia (47.223 %), UK (30.318 %) Baharin (9.056 %), Canada (35.781 %), Shrilanka (76.244%), Oman (31.878) and Netherlands (137.302 %) per annum respectively.

4.2.3 Tamarind

UAE, US, UK, Saudi Arabia, Bahrain, Kuwait, YAE, Pakistan, Germany are the major importing countries of tamarind from India. The values of Mean, CV and growth rates for volume of tamarind exported from India during period 1990-2009.

Tamarind though dry land fruit crop it also attract foreign exchange though export to various countries of the world including developed and developing. It is exported in various forms such as fresh, dried, seed, paste, powdered, etc. Out of this the fresh tamarind, dried tamarind and total (fresh + dried) were taken into consideration for study purpose.

4.2.3.1 Fresh tamarind

UAE, US, UK, Saudi Arabia, Bahrin Kuwait, YAE, Pakistan, Germany are major fresh tamarind importing countries from India. The values of mean CV and growth rates of volume of fresh tamarind exports from India during period 1990-2009 are shown in Table-13.

Table 13 : Country wise export of tamarind fresh from India *(Qty in MT)*

Period	Countries										
	UAE	US	UK	Saudi Arabia	Bahrain	Kuwait	YAE	Pakistan	Germany	Other	Total
Mean											
I	346.590	14.234	97.740	91.264	7.322	4.890	71.810	1870.924	44.272	263.492	2812.536
II	41.048	0.208	60.576	40.410	8.312	7.622	30.264	2664.740	136.846	823.520	3813.526
III	469.614	20.468	58.262	407.340	38.584	59.124	129.784	436.688	28.140	1031.586	2679.584
IV	487.316	272.250	98.600	861.266	93.724	200.124	105.330	218.146	36.418	3549.510	5922.682
V	336.142	76.790	78.794	350.070	36.985	67.940	84.293	1297.625	61.419	1417.027	3807.083
Coefficient of variation											
I	90.182	58.190	80.811	61.668	27.835	87.121	66.985	85.607	65.762	66.641	64.677
II	87.780	212.836	58.671	153.550	110.365	149.065	94.411	55.193	44.710	91.417	50.333
III	48.392	79.465	113.811	71.254	100.231	71.130	62.747	87.077	81.141	30.145	36.268
IV	55.393	59.404	62.859	35.248	23.776	40.132	29.296	109.740	47.269	50.738	23.992
V	84.511	179.685	77.298	118.328	112.834	134.767	72.410	112.154	91.658	111.752	51.665
Linear growth rate											
I	-11.971	-15.358	7.739	-16.470	19.626	-2.229	-20.902	28.600	35.971*	23.813	20.182
II	27.534	-95.192	12.195	13.806	-21.944	-67.843	-39.876	-11.120	17.834	22.694	-2.099
III	28.426**	32.802	26.027	43.356***	55.837**	28.729	13.283	-11.331	43.486	-4.219	11.455
IV	12..487	-0.001	35.224**	-11.670	-1.260	24.039**	4.567	-58.858	21.775	17.505	9.247
V	5.492*	19.528***	1.244	14.660	15.524***	11.953***	4.372	-10.318	-2.567	14.231***	4.577**
Compound growth rate											
I	-5.994	-17.352	11.353	-24.842	3.396	-34.039	-19.703	92.946	41.827**	23.607	40.144
II	31.686	-60.189	23.282	-74.352	-74.146	-77.844	-82.534	-7.033	16.901	7.517	-1.051
III	38.798**	406.524	22.322	68.477***	693.705*	40.083	18.786	-54.042	196.832	-4.517	13.097
IV	8.230	8.118	43.388**	-11.030	-0.681	27.858***	5.796	-57.555	21.682	25.136	10.785
V	9.685*	31.488*	1.744	21.899*	23.901*	38.803***	8.554	-24.906	-3.682	18.415***	5.789**

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

Mean

During the study period of 1990-2009 quantity of fresh tamarind exported from India was 3807.083 MT per annum. Whereas, the period wise exports of fresh tamarind for Period I, II, III and IV were worked out to be 2812.536 MT, 3813 MT, 2679.584 MT and 5922.682 MT per annum, respectively.

The analysis country wise exports of fresh tamarind from India showed that, for the overall period Pakistan was the leading importer of Indian fresh tamarind, followed by Saudi Arabia and UAE. These three countries had maximum share in the total exports of fresh Tamarind from India.

Coefficient of variation

The coefficient of variation in the export of fresh tamarind from India for the study period 1990-2009 was estimated as 51.665 per cent. The period wise CV revealed that, Period I, II, III and IV were worked out to be 64.677, 50.333, 36.268, 23.992 per cent, respectively. The highest fluctuations in the exports of fresh tamarind were recorded for US (179.685 per cent) while the export to witnessed the least fluctuation YAE (72.410%).

Growth rates

The present study revealed that, for the overall period (1990-2009) the export of fresh tamarind from India registered positive and significant growth rates. Linear and compound growth rate was to the tune of 4.577 per cent and 5.789 per cent per annum, respectively. The country wise export growth rate of fresh tamarind from India for the overall Period Saudi Arabia, Bahrain and Kuwait were significant and positive. Amongst them highest growth rate in export was found for Kuwait.

4.2.3.2 Dried tamarind

UAE, US, UK, Saudi Arabia, Baharin Kuwait, YAE, Pakistan, Germany are major importing countries of dried tamarind from India. The values of mean CV and growth rates of volume for dried tamarind export from India during period 1990-2009 are shown in Table-14.

Mean

On an average the annual export of dried tamarind for Period I worked out to be 2719.582 MT, for Period II, III and IV it was 5709.960 MT, 6649.517 MT and 12253.740 MT, respectively. During the overall Period it was 683.448 MT. This indicate that the volume of export of dried tamarind from India during IV increased as compared to Period I, II, III. This might be attributed to export policy of the Government of India. The country wise export of dried tamarind from India for Period I showed that the export to UAE and Saudi Arabia were to the tune of 861.030 MT and 532.876 MT. During period II, III and IV of the study export of dried tamarind to UAE was highest followed by Saudi Arabia. For overall Period export was highest to UAE (1735.556 MT) and lowest in Bahrain (78.817 MT).

Coefficient of variation

The coefficient of variation for the of export dried tamarind from the country for the Period I, II, III and IV were 23.429, 16.417, 23.295 and 13.592 per cent, respectively. During overall period the CV was 54.552 per cent.

The country wise CV for exports during Period I revealed that, it was highest for the Pakistan (210.500 %) and lowest for YAE (10.809 %) where as for the overall Period in V it was highest for Germany (217.139 %) and lowest for UK (42.757).

Table 14 : Country wise export of tamarind dried from India *(Qty in MT)*

Period	Countries										
	UAE	US	UK	Saudi Arabia	Bahrain	Kuwait	YAE	Pakistan	Germany	Other	Total
Mean											
I	861.030	93.616	180.570	532.876	42.844	18.586	215.100	8.500	21.844	744.522	2719.582
II	1453.262	144.440	255.878	845.886	64.054	90.538	316.442	395.088	326.362	1818.010	5709.960
III	1639.390	304.310	308.692	785.242	82.894	81.738	351.412	654.952	6.410	2154.502	6649.517
IV	2935.556	424.324	494.476	1079.474	425.426	220.956	606.734	483.570	6.244	6181.980	12258.740
V	1735.556	241.673	309.904	810.870	78.817	102.954	397.482	310.528	90.227	2724.734	6834.448
Coefficient of variation											
I	29.194	73.534	28.943	30.115	42.806	32.769	10.809	210.500	66.424	48.824	23.429
II	26.636	59.361	32.523	48.838	39.641	75.809	46.811	72.805	91.285	27.526	16.417
III	21.916	38.572	19.691	42.975	67.797	50.212	24.984	115.769	143.682	35.312	23.295
IV	27.219	24.099	10.903	30.711	30.242	14.162	25.204	100.334	188.979	24.457	13.592
V	52.251	66.355	42.757	44.170	58.801	82.742	47.144	146.520	217.139	83.391	54.552
Linear growth rate											
I	8.047	31.247	-15.193	10.517	23.001*	16.905*	-1.209	-4.682	23.440	18.950	10.420
II	11.711	22.445	-12.476	-12.198	-12.458	-1.264	-6.505	39.098*	22.260	15.295**	9.509**
III	-7.125	8.566	6.174	-18.987	31.831	31.559***	-3.219	15.465	-29.204	4.145	0.085
IV	1.743	-6.037	-6.177	11.884	0.714	0.893	-9.494	-41.460	-90.535	11.900	5.893
V	7.147***	9.347***	5.688***	3.535**	6.911***	11.358***	5.835***	5.620	-6.473	12.172***	8.471***
Compound growth rate											
I	11.742	25.013	-14.523	14.702	28.064	19.875	-1.165	-65.343	30.300	26.628	12.936
II	13.043	24.013	-13.913	-14.738	-10.286	-2.813	-6.145	123.160	62.140	16.664**	10.192**
III	-8.186	10.093	7.445	-17.408	29.206	45.320	-4.165	-81.592	29.095	5.523	0.292
IV	3.358	-5.774	-5.931	12.692	1.888	1.672	-10.824	-87.894	-87.902	12.991	6.536
V	7.777***	12.238***	6.000***	3.918	7.575***	16.188	6.321***	22.237	-29.428	14.440***	9.729***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

Growth rates

The linear growth rates of export of dried tamarind from India during Period I, II, III and IV revealed that Positive growth rate of which during period II it was significant. The country wise export of dried tamarind from India indicated that for Period I Bahrain and Kuwait registered significant growth rates. The overall growth rate was positive and significant for UAE, US, UK, Saudi Arabia, Bahrain, Kuwait and YAE. The compound growth rate of export of dried tamarind for the overall period was positive and significant for all countries except Germany which indicates the scope to export bright tamarind to this countries.

4.2.3.3 Tamarind total (fresh + dried)

UAE, US, UK, Saudi Arabia, Baharin Kuwait, YAE, Pakistan, Germany are major importing countries of tamarind fresh from India. The of mean CV and growth rates for volume of tamarind total export from India during period 1990-2009 are shown in Table-15.

Mean

On perusal of Table 16 it was observed that on an average the export of tamarind total from India for the period 1990-2009 was 10641.930 MT, period wise analysis for export of tamarind from India revealed that during the Period I the export of tamarind was 5533.718 MT per year and in the Period II it rose to 9523.486 MT per year. For Period III observed 9329.099 Mt per year and period IV it was observed in 18181.420 MT per year. During overall period country wise export volume was highest in UAE (2053.502 MT) and lowest was Bahrain (115.802 MT).

Table 15 : Country wise export of tamarind total (fresh + dried) from India *(Qty in MT)*

Period	Countries										
	UAE	US	UK	Saudi Arabia	Bahrain	Kuwait	YAE	Pakistan	Germany	Other	Total
Mean											
I	1207.620	107.850	278.310	624.140	50.216	23.474	286.910	1879.418	66.166	1008.030	5533.718
II	1494.510	144.640	316.354	886.294	72.362	98.158	346.702	3059.828	463.208	2641.530	9523.486
III	2109.004	324.776	366.954	1197.962	121.480	140.862	581.196	1091.718	34.546	3186.086	9329.099
IV	3402.872	696.574	593.074	1920.746	219.150	421.080	629.598	493.702	42.658	9731.490	18181.420
V	2053.502	318.460	588.723	1157.286	115.802	170.893	461.102	1631.166	151.645	4141.784	10641.930
Coefficient of variation											
I	38.626	59.378	30541	25.163	43.333	33.157	20.526	85.834	62.039	49.280	42.503
II	26.772	59.240	29.756	51.667	42.485	70.148	49.336	44.493	72.694	37.643	21.041
III	17.704	34.818	24.187	21.548	66.193	53.672	30.179	94.535	73.4446	26.012	25.690
IV	23.412	16.222	4.793	19.442	20.717	21.929	38.391	84.738	43.735	26.816	14.599
V	48.526	80.087	37.200	60.435	69.844	97.618	47.693	90.300	159.682	88.638	49.108
Linear growth rate											
I	2.302	25.096	-7.140	6.571	22.509*	12.916	-6.138	29.445	31.825*	20.220	15.364
II	12.130	22.276	-7.751	-11.013	-13.551	-6.436	-9.418	-4.636	20.952	17.601	4.861
III	0.790	10.094	9.326	2.752	39.451**	30.372**	0.466	4.749	30.006	1.437	3.351
IV	2.998	-3.678	0.706	1.446	-0.130	11.893*	-14.934	-32.107	5.331	13.945*	6.986
V	6.831***	11.802***	4.787***	6.830***	9.662***	14.378***	4.685***	-6.777	-4.891	12.876***	7.077***
Compound growth rate											
I	7.721	20.738	-8.366	8.062	24.884*	15.722	-5.149	92.388	38.210*	26.947	23.315
II	13.591	23.886	-9.305	-14.544	-11.282	-8.680	-1.774	-2.887	36.906	16.374	4.658
III	0.614	12.079	10.538	3.656	49.188***	43.091**	-1.321	-54.767	157.460	2.771	3.749
IV	3.501	-3.386	0.682	1.223	-0.021	11.819*	-15.651	-57.509	6.749	16.468*	7.797
V	7.422***	14.440***	4.778***	7.389***	10.745***	19.890***	4.803***	-13.803	-6.693	15.539***	7.938***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

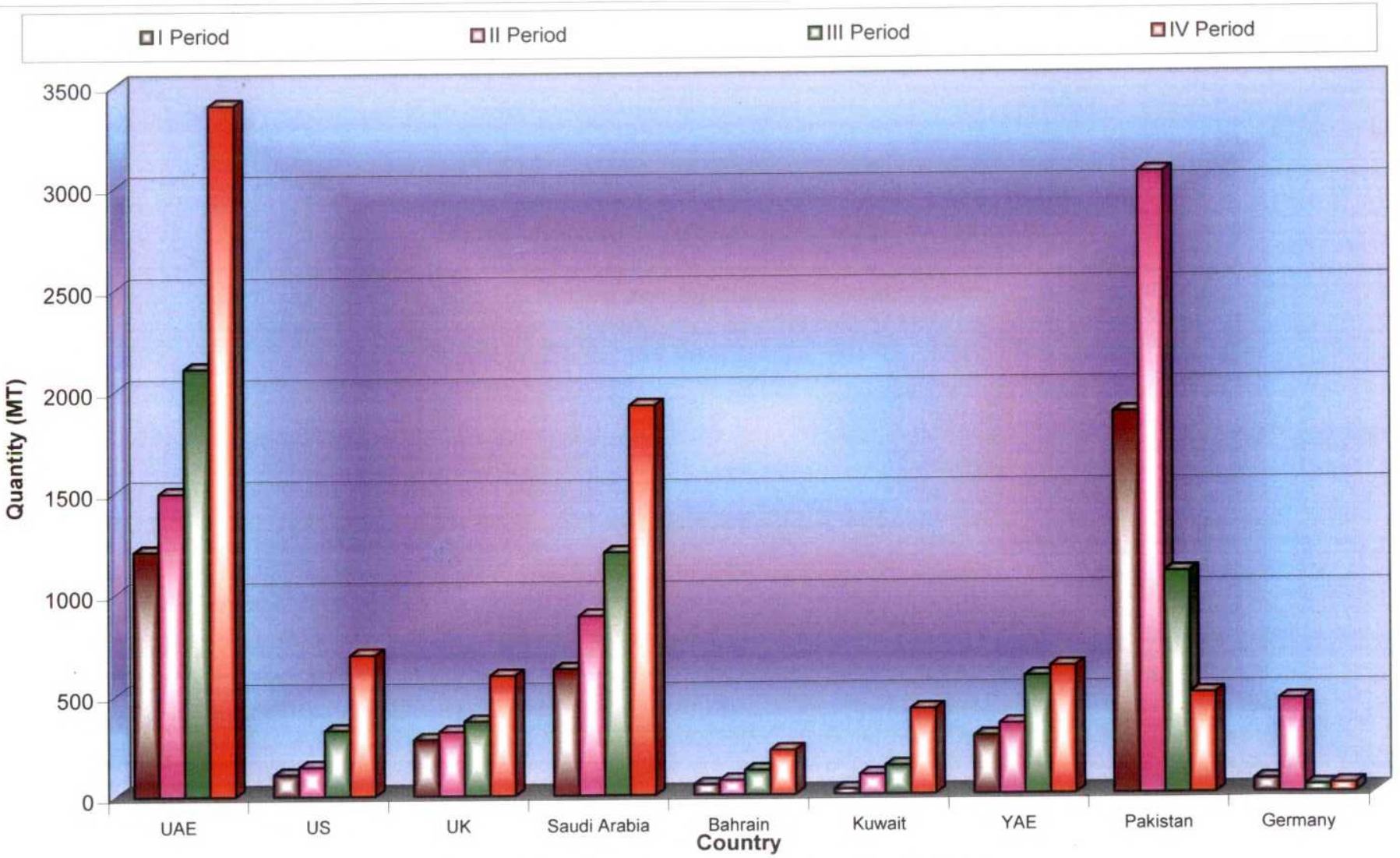


Fig. 7 : Export of tamarind from India (volume)

Coefficient of variation

The coefficient of variation for the export of tamarind total from the country for Period I, II, III, IV and V were 42.0503, 21.041, 25.690, 14.599 and 49.108 per cent, respectively.

The country wise CV value of exports for Period I revealed that, it was highest for Pakistan (85.834%) and lowest for YAE (20.526 %). Whereas, for the overall Period it was highest for Germany (159.682%) and lowest UK (37.200%).

Growth rates

The present study revealed that for the overall period (1990-2009) the growth rates for export of tamarind from India registered positive and significant. Linear and Semi-log growth rate for period I, II, III and IV were 15.364, 4.861, 3.351 and 6.986 per cent per annum, respectively. During overall period the compound growth rates for UAE, US, UK, Saudi Arabia, Baharian, Kuwait and YAE were significant and positive. The highest growth in export was found for Kuwait followed by US.

4.2.4 Cashewnut Kernal

USA, Netherlands, UAE, UK, Japan, France were the major importer of the Cashewnut Kernal from India. The country wise and period wise mean, CV and growth rates for export by volume of Cashewnut Kernal from India during the Period of 2000-2009 are given in Table 16.

Table 16: Country wise export of cashew nut kernal from India *(Qty in MT)*

Period	Countries							
	USA	Nether lands	UAE	UK	Japan	France	Othres	Total
Mean								
I	50506.200	14266.400	5129.200	6197.800	4845.600	2632.400	20220.400	103798.000
II	39893.400	15129.00	12550.000	4536.600	4923.800	3743.600	32156.600	112933.000
III	45199.800	14697.700	8839.599	5367.200	4884.700	3188.000	26188.500	108365.500
Coefficient of variation								
I	15.434	11.286	30.177	13.982	13.678	16.916	22.210	13.433
II	15.480	25.313	31.206	23.693	10.216	6.090	6.358	3.696
III	19.191	19.096	64.464	23.669	11.387	21.140	27.108	9.996
Linear growth rate								
I	8.403***	-1.776	17.488**	-0.169	1.465	6.101	13.136**	7.481**
II	-8.620	-14.936	19.403***	10.453	5.128	2.599	3.485***	-1.865
III	-3.342	-1.183	17.289***	-5.784	1.045	6.262***	8.728***	1.910*
Compound growth rate								
I	8.818*	-1.816	20.156**	-0.389	1.590	5.791	13.917**	7.560**
II	-8.693	-14.328	21.711***	-9.179	5.187	2.697	4.069***	-1.858
III	-3.597	-1.521	19.944***	-5.955	1.106	6.696***	9.808***	2.050*

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

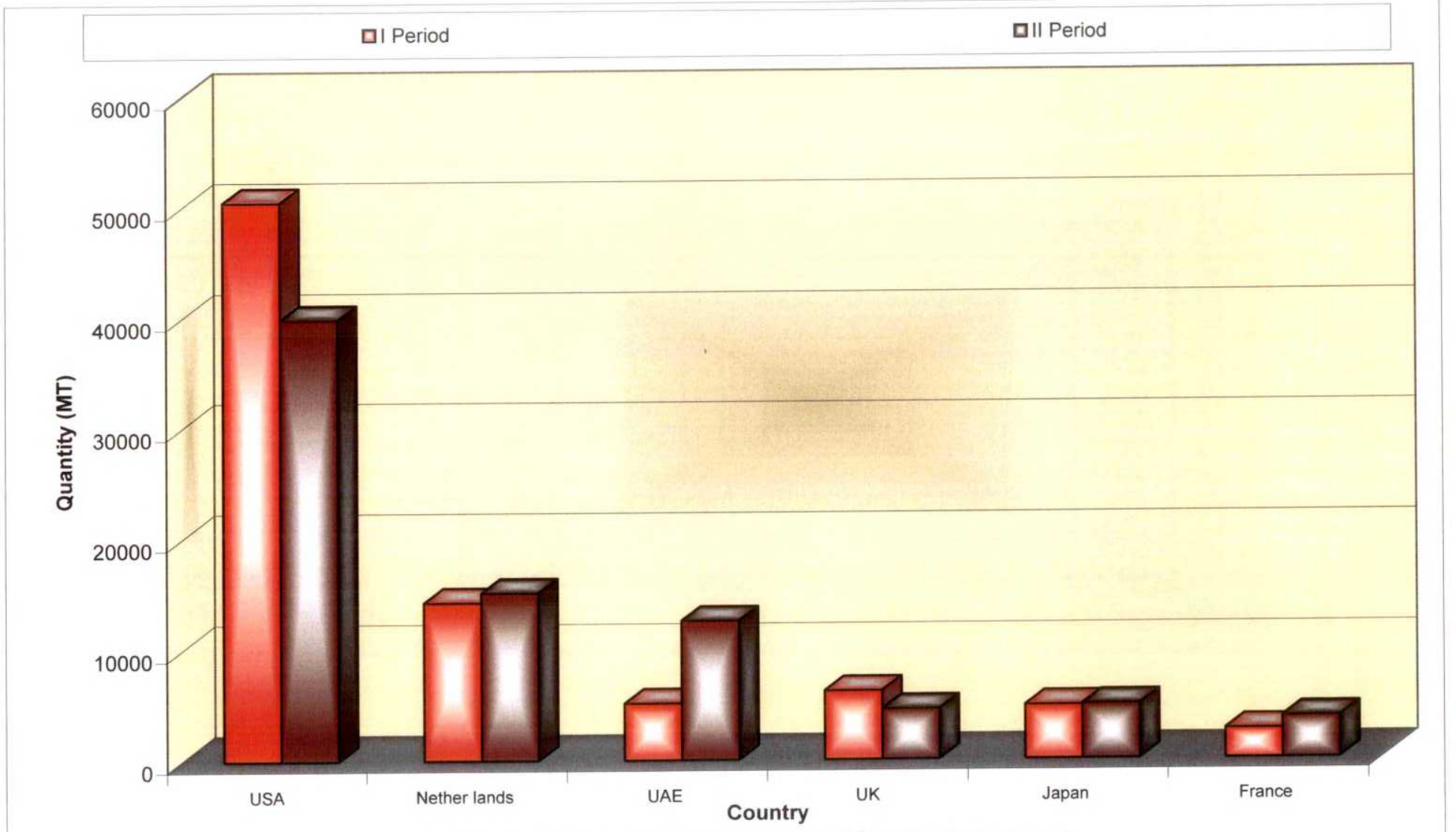


Fig. 8 : Export of cashewnut kernal from India (volume)

Mean

After examining Table 16 it was observed that on an average the annual export of cashewnut kernal from India. For the period 2000-2009 was 108365.00 MT. Whereas, period wise mean for exports during Period I and II were 103798.000 MT and 112933.000 MT, respectively. This indicated that the volume of export for cashewnut kernal for Period II increased as compared to Period I. the country wise breakup of the total exports of cashewnut kernal from India for the period 2000-2009 revealed that USA alone had imported 50506.200 MT out of the total cashewnut kernal exported from India. Export to the Netherlands (14266.400 MT), UAE (5129.200 MT), Japan (4845.600 MT), France (2632.400 MT) during Period I. During overall period of cashewnut Kernal was highest for USA 45199.806 MT and lowest France (3188.000).

Coefficient of variation

The coefficient of variation in export of cashewnut kernal for the study Period of 2000-2009 was 9.996 per cent whereas for Periods I and II it was 13.4333 per cent and 3.696 per cent, respectively. A fairly high growth rate was accompanied by high value of CV for the first two periods.

The highest CV for export of cashewnut kernal was observed to for USA and UK which was 54.464 per cent and 23.669 per cent for the study period of 2000-2009.

Growth rates

Positive linear growth rate was observed during Period I and Period II for USA, UAE, Japan, France and UAE, UK, Japan, France, respectively. During overall Period it was observed in UAE, Japan, France and out of this significant are UAE (17.289 %) per annum

and France (6.262 %) per annum. In case of compound growth in overall period also UAE (19.944 %) per annum and France (6.696 %) per annum positive and significant growth rate observed.

4.3 Country wise export of dry land horticultural fruits from India (value)

4.3.1 Mango

The country wise growth rates of export value terms from India during period 1990-2009 are given in Table 17.

Mean

The total export value of mangoes during I, II, III and IV were Rs.3827.662 lakh, Rs.6153.684 lakh, Rs.8679.044 lakh and Rs.15354.420 lakh, respectively. The countrywise export earing from mangoes revealed that in Period I the highest value was received from UAE (Rs. 1810.648 lakh per annum) and the lowest from USA (Rs. 21.562 lakh per annum). In Period II also export earning from UAE was the highest (Rs. 2284.130 lakh per annum). In Period III highest export value was received from UAE (Rs. 3237.406 lakh per annum). and lowest from Qatar (Rs. 65.248 lakh per annum). In Period IV highest export value was received from UAE (Rs. 7681.520 lakh per annum) and lowest from Netherlands (Rs. 84.872 lakh per annum). During overall period export earning from mango export to UAE, Bangladesh, Saudi Arabia were much higher.

Coefficient of variation

The coefficient of variation for the total export of fresh mangoes from the country for the Period I, II, III and IV were 18.386, 29.993, 17.672 and 20.574 per cent, respectively and during overall the Period it was 56.377 per cent.

Table 17: Country wise export of mango from India *(Values Rs Lakhs)*

Period	Countries											
	UAE	Bangladesh	Saudi Arabai	Kuwait	UK	Bahrain	Qatar	Netherlands	Singapore	USA	Others	Total
Mean												
I	1810.648	167.238	734.020	285.874	241.630	229.696	104.110	47.802	37.140	21.562	147.942	3827.662
II	2284.130	517.022	1035.310	407.398	492.308	192.068	152.344	170.326	121.144	105.432	676.202	6153.684
III	3237.406	2271.234	696.608	263.034	558.932	204.762	65.248	288.766	115.816	123.418	918.820	8679.044
IV	7681.520	3147.632	701.184	315.452	1362.190	263.592	146.128	84.872	147.814	157.506	1346.450	15354.420
V	3753.426	1525.785	791.780	317.940	633.765	222.530	116.958	131.692	105.499	101.980	772.354	8503.703
Coefficient of variation												
I	23.892	90.732	37.429	50.681	20.066	13.911	28.916	81.295	72.066	85.699	51.435	18.386
II	16.908	60.975	49.166	26.149	41.602	54.824	73.004	64.226	24.324	63.246	52.972	29.993
III	34.787	25.022	23.357	36.083	31.134	18.673	26.290	44.410	21.519	65.367	17.823	17.672
IV	21.113	32.455	56.884	49.417	41.228	37.714	142.374	44.621	15.538	82.585	11.881	20.574
V	68.360	90.469	45.631	14.000	77.991	33.994	98.588	76.956	47.957	88.742	62.989	56.377
Linear growth rate												
I	12.168*	47.697*	4.078	5.469	-0.057	-1.901	-15.803	44.258*	44.295***	43.605	27.357*	10.769**
II	6.325	32.852*	16.029	9.11	25.682***	28.017*	29.337	30.362	4.186	24.333	26.371	16.301*
III	12.735	5.054	11.695	-16.669	19.308***	8.963	-5.090	15.295	-12.717	-31.568	5.151	8.257
IV	9.626	3.653	31.665**	31.048***	19.673	17.845	72.144*	-13.789	15.009**	45.803**	5.110	11.373*
V	9.905***	13.649***	-0.089	0.176	10.846***	1.738	2.0302	3.439	6.238***	8.855***	9.993***	8.888***
Compound growth rate												
I	13.950*	163.100*	3.543	8.013	0.418	-1.557	-17.404	85.774*	69.502***	48.610**	39.057*	11.668**
II	6.788	59.156*	17.310	10.583	31.783***	40.117*	39.048	32.346	3.508	41.662	44.191*	19.789*
III	15.299	4.378	13.413*	-17.801	22.549***	10.311	-5.086	19.811	-12.061	-39.178	5.015	8.809
IV	9.152	3.798	33.757**	43.965**	29.205	17.825	106.882**	-12.201	17.717**	274.250	5.501	11.492*
V	9.879***	29.484***	-0.082	0.257	11.360***	1.743	-1.855	7.554*	10.416***	5.067	16.465***	9.692***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

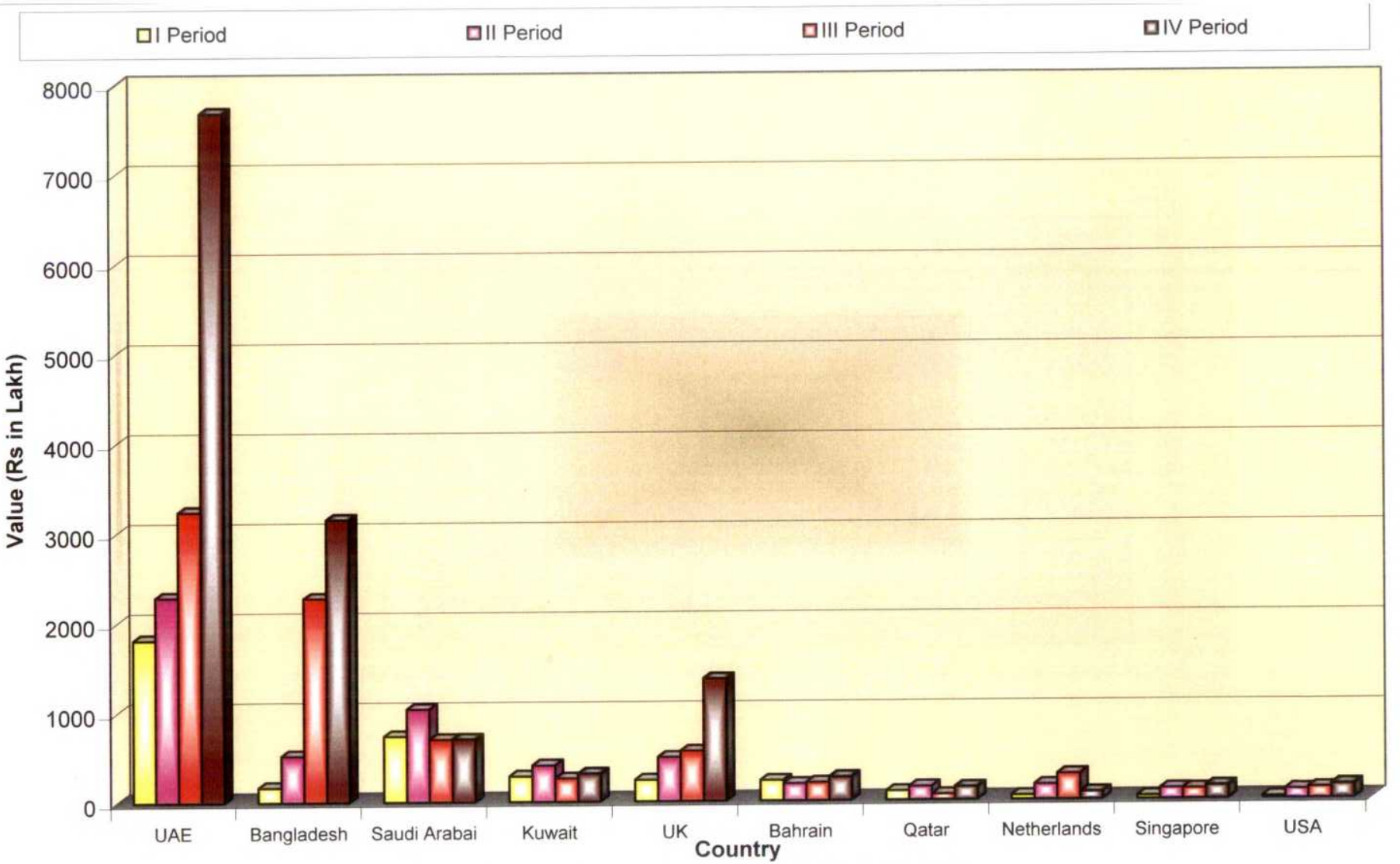


Fig. 9 : Export of mango from India (value)

The countrywise export of CV for Period I revealed that, it was highest for Bangladesh (90.732 %) and lowest for Bahrain (13.911) whereas during overall Period it was the highest for Qatar (98.588 %) and the lowest for Bahrain (33.944 per cent).

Growth rates

The export earning from mangoes registered significant linear growth rate for I, II, III, IV and overall periods. For period I linear growth rate for UAE, Bangladesh, Netherlands and Singapore were 12.168, 47.697, 44.258 and 44.295 per cent per annum respectively, for Period II it was observed Bangladesh, UK, Bahrain. UK (19.308 %) was having the significant linear growth rate during period III. For Period IV was observed linear growth rate Saudi Arabia, Kuwait, Qatar, Singapore and USA. During overall period significant growth rate in USA, Bangladesh, UK, Singapore, USA amongst these countries highest growth rates was observed for UK (10.846% per annum). The compound growth rate of export of mangoes during overall period positive and significant value observed for UAE (9.879 %), Bangladesh (29.484 %), UK (11.360 %), Netherlands (7.554 %) and Singapore (10.416 %).

4.3.2 Pomegranate

The countrywise growth rates of value received from export of pomegranate from India during period 1990-2009 are given in Table 18.

Mean

The values received from export of pomegranate during Period I, II, III and IV were to the tune of Rs. 290.600 lakh, Rs. 846.082 lakh, Rs. 1713.132 lakh and Rs. 9230.290 lakh per annum, respectively.

Table 18: Country wise export of pomegranate from India *(Values Rs Lakh)*

Period	Countries												
	UAE	Bangladesh	Saudi Arabai	UK	Kuwait	Bahrain	Qatar	Canada	Sri Lanka	Oman	Nethre lands	Others	Total
Mean													
I	131.426	34.856	71.903	5.675	8.854	22.595	4.034	0.471	1.097	1.554	0.163	7.922	290.600
II	406.892	85.580	119.152	81.306	26.172	31.610	10.582	7.594	20.298	6.190	4.012	49.714	846.082
III	837.832	45.106	62.792	248.00	9.554	60.658	6.842	4.384	35.466	78.094	185.588	168.134	1713.132
IV	3303.760	330.960	532.514	1069.092	99.812	144.388	39.622	111.988	89.232	94.818	1810.838	1613.266	9230.290
V	1169.227	124.121	196.590	353.518	36.098	64.813	15.285	31.109	31.523	45.164	500.150	452.432	3020.026
Coefficient of variation													
I	69.188	94.881	47.797	96.900	80.301	41.704	27.241	72.406	137.607	96.341	222.233	67.269	61.207
II	43.076	54.095	33.168	25.547	33.272	18.113	106.442	69.387	97.309	69.812	118.110	99.285	24.051
III	30.338	77.594	63.521	76.608	131.767	19.261	89.615	108.248	50.601	48.242	132.224	82.144	49.122
IV	37.852	48.433	32.096	24.559	89.294	49.301	54.182	63.347	23.836	53.765	27.766	37.237	27.961
V	121.476	118.768	110.439	131.251	157.552	91.945	121.575	186.663	93.181	114.725	164.217	164.573	129.814
Linear growth rate													
I	40.226**	53.416**	29.550***	41.792	50.163	11.243***	-11.887	43.901	73.029***	44.015	99.386	25.915	36.946**
II	22.358***	-33.102	15.363	13.154*	-0.00	0.680	-9.195	43.732	52.788*	33.796	-34.440	35.392	14.486**
III	17.980**	41.666*	28.838	47.109***	-50.136	5.051	2.865	-52.213	26.391*	-9.195	74.158**	47.392**	29.545**
IV	21.990**	25.229*	12.397	0.436	56.195	30.609***	21.271***	25.319**	12.132*	32.252**	14.071**	17.941	17.388***
V	17.310***	13.962***	13.020***	10.581***	15.666	12.602***	13.742***	21.541***	14.492***	15.509***	22.274***	21.625***	18.398***
Compound growth rate													
I	54.357**	106.103**	40.610**	9.010	114.473**	19.898	-12.633	313.601	982.727*	48.011	281.678	41.677	49.336***
II	22.485*	-31.203	14.691	15.180	1.917	0.678	-18.418	92.503	118.885**	57.265	-79.728	54.442	15.341***
III	18.513**	63.680	35.226	73.615***	-45.507	4.970	1.804	-39.252	30.626	-10.854	163.174	74.977*	33.801***
IV	23.302**	28.621*	19.057	1.310	148.981***	38.416***	50.118*	186.795	13.070*	43.111**	17.871*	24.587	20.379***
V	24.631***	16.012***	2.315***	41.968***	11.674*	13.116***	12.338***	42.171***	68.574*	36.637***	131.565***	42.012***	25.792***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

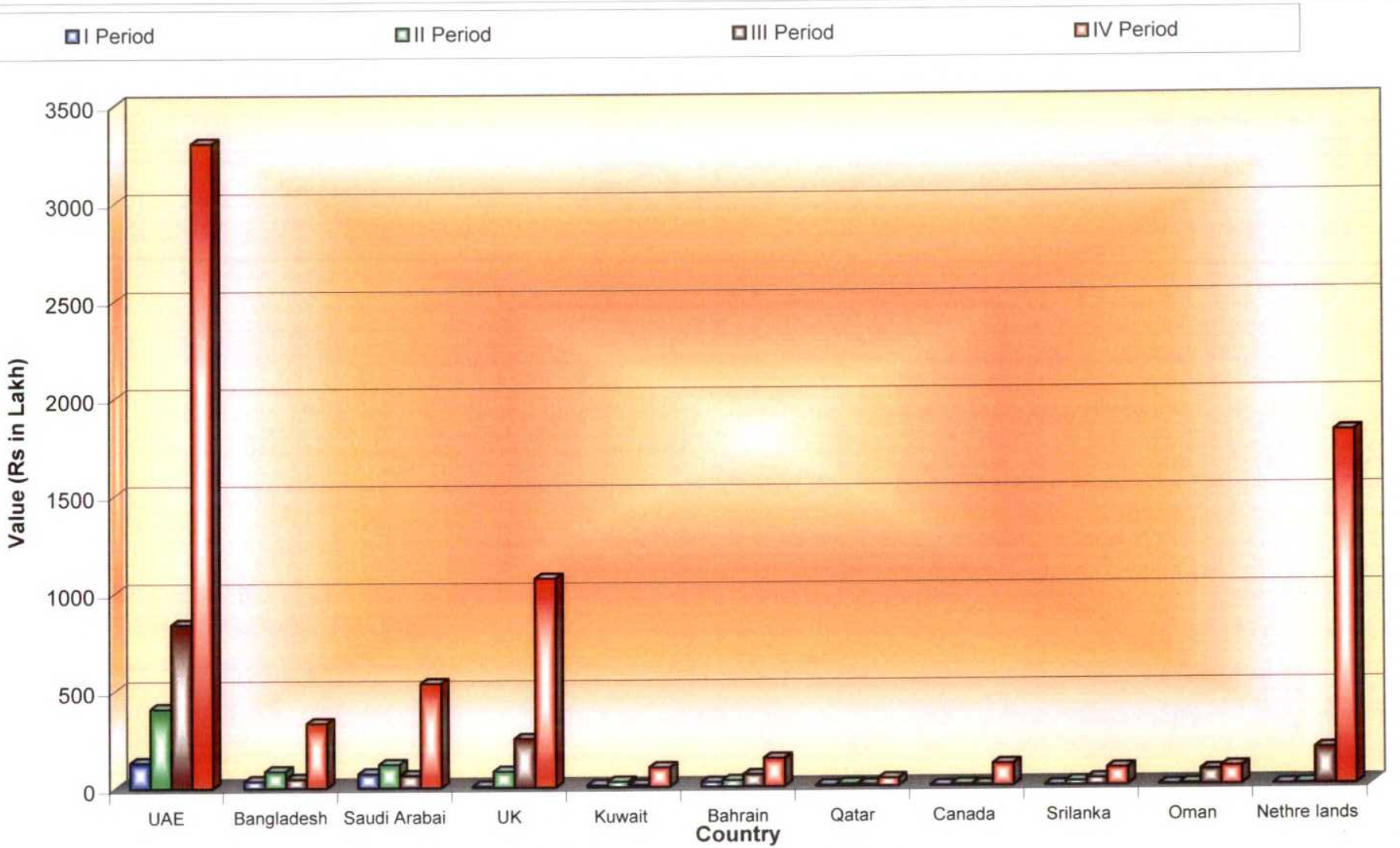


Fig. 10 : Export of pomegranate from India (value)

The country wise export earing from pomegranate revealed that during Period I the highest value received from UAE (Rs. 131.426 lakh per annum) and the lowest from Netherlands (Rs. 0.163 lakh per annum). In Period II also similar trend was observed. During Period III highest export value was received from UAE (Rs. 837.832 lakh per annum) and lowest from Qatar.

Coefficient of variation

The coefficient of variation for the Period I, II, III and IV were 61.207, 24.051, 49.122 and 27.961 per cent, respectively and during overall the Period showed 129.814 per cent.

The country wise export of CV value during Period I revealed that, it was highest for Netherlands (222.233 %) and lowest for Qatar (27.241 %) whereas the during overall Period was highest for Canada (186.663 %) and lowest for Bahrain (91.945 %).

Growth rates

The export earning from pomegranate registered significant linear growth rate for I, II, III, IV and for overall period. For period I linear growth rate for UAE, Bangladesh, Saudi Arabia, Kuwait, Canada, Sri Lanka was found be significant. For Period II UAE, Bangladesh, UK, Canada and Sri Lanka registered significant growth rate. During Period III observed that UAE, Bangladesh, UK, Sri Lanka and Netherlands registered significant linear growth rate. For Period IV linear growth rate for UAE, Bangladesh, UK, Sri Lanka, Netherlands were significant.

4.3.3 Tamarind

The country wise growth rate of fresh tamarind, dried tamarind and tamarind total (fresh + dried) in values terms from India during period 1990-2009.

4.3.3.1 Fresh tamarind

The country wise growth rates of export value of fresh tamarind from India during the period 1990-2009 are given in Table 19.

Mean

The annual export earnings from fresh tamarind during Period I, II, III and IV were to tune of Rs. 195.630, Rs. 448.996, Rs. 395.160 and Rs. 1052.800 lakh per year, respectively. Which an increasing trend.

The country wise value received from export of tamarind during Period I revealed that, it was highest for Pakistan (96.762 lakh per year) and lowest for Kuwait (Rs. 0.786 lakh per year). In Period II the highest export earning was observed from Pakistan (Rs. 283.218 lakh per year) and lowest from US (Rs. 0.030 per year). The highest export earning was found in UAE (Rs. 87.934 lakh per year) and lowest was Bahrain (Rs. 3610 lakh per year) during Period III. Whereas, in Period IV the highest export earning was from Saudi Arabia (Rs. 186.680 lakh per year) and lowest from Germany (Rs. 13.612 lakh per year). During overall period the highest export earning was observed from Pakistan.

Coefficient of variation

The coefficient of variation for export of fresh tamarind from India for the Period I, II, III and IV were 51.760, 61.647, 26.307, 24.989 per cent, respectively. During overall period 72.271 per cent CV was observed.

Table 19 : Country wise export of fresh tamarind from India *(Values Rs lakh)*

Period	Countries										
	UAE	US	UK	Saudi Arabia	Bahrain	Kuwait	YAE	Pakistan	Germany	Other	Total
Mean											
I	37.976	2.514	11.434	9.492	1.074	0.786	8.522	96.762	5.210	21.902	195.130
II	8.732	0.030	11.132	7.788	1.698	1.513	6.828	283.211	23.874	104.84	448.966
III	87.934	4.256	13.172	52.844	3.670	60.548	22.062	44.912	7.698	151.190	395.160
IV	102.900	55.710	19.452	186.680	14.512	44.220	21.188	32.312	13.612	562.216	1052.300
V	59.386	15.628	13.798	64.201	5.238	13.514	14.650	114.301	12.599	209.843	523.139
Coefficient of variation											
I	86.439	59.540	64.363	59.836	114.615	94.219	56.506	79.519	86.875	52.465	51.760
II	111.799	149.071	92.444	173.287	175.244	149.392	119.868	60.267	75.524	118.462	61.647
III	59.235	93.243	103.436	76.652	83.279	47.108	56.398	86.394	84.098	17.662	26.307
IV	60.757	42.109	57.275	21.065	28.180	75.205	34.690	96.022	72.531	49.382	24.989
V	94.503	167.568	76.278	123.855	118.925	177.402	73.085	119.078	99.301	121.876	72.271
Linear growth rate											
I	-7.586	-11.058	11.308	-15.845	36.778	16.794	-12.403	35.128	48.618**	18.660	18.785
II	35.055	-66.667	8.184	23.934	25.677	-63.715	-42.018	11.697	36.295	47.151	20.788
III	35.392**	21.499	22.032	46.792***	40.082	-2.054	23.171	-25.263	56.251*	-4.713	12.965
IV	10.030	12.741	29.976*	-8.924	11.322	43.422**	15.882	-47.920	37.188*	23.990	14.871**
V	9.726***	20.446***	4.747	17.110***	16.306***	20.993***	7.297*	-6.569	3.711	16.235*	10.018***
Compound growth rate											
I	3.401	-14.394	22.722	-23.229	11.620	-6.887	-15.772	109.401*	75.717**	20.072	34.022
II	42.797	-38.096	32.590	-59.857	-48.121	-67.884	-76.282	10.423	41.666	32.355	17.682
III	47.141**	225.707	20.424	71.123***	318.126	2.507	45.355	-59.533	161.915	-4.539	14.660
IV	5.715	17.797	34.056***	-8.013	11.103*	50.936***	18.062	-51.661	46.543	36.365*	17.262**
V	13.942***	31.180**	5.413	26.796***	24.902**	38.244***	10.819	-17.774	5.252	23.158***	11.973***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

The country wise CV for export of value during period I revealed that, it was highest for Bahrain (114.615 %) and lowest for YAE (56.506 %) whereas in overall Period it was observed to be highest for US (167.568%) and lowest for YAE (73.085 %)

Growth rates

The analysis of total export earnings from fresh tamarind revealed that in all Period which were 34.022, 17.682, 14.660, 17.262 and 11.973 per cent per annum, respectively. During overall period linear growth rates were significant for UAE, US, Saudi Arabia, Bahrain Kuwait and YAE.

4.3.3.2 Dried tamarind

The countrywise mean, CV and growth rates of export value of dried tamarind from India during the period 1990-2009 are given in Table 20.

Mean

The annual export earning from tamarind dried during Period I, II, III and IV were to the tune of Rs. 424.046 lakh, Rs. 1212.144 lakh, Rs. 1272.516 lakh and Rs. 3008.862 lakh, respectively.

UAE, US, UK, Saudi Arabia, Bahrain, Kuwait, YAE, Pakistan and Germany were found to be the major and regular importing countries of Indian dried tamarind. Among these countries in Period I the highest export earning were from UAE (Rs. 131.000 lakh per annum) and the lowest from Pakistan. In Period III highest export earning were from UAE (Rs. 301.642 lakh per annum) and lowest was from Germany. Whereas, during IV period highest export earning from UAE (Rs. 774.540 lakh per annum) and lowest was from Germany.

Table 20 : Country wise export of dried tamarind from India *(Values Rs lakh)*

Period	Countries										
	UAE	US	UK	Saudi Arabia	Bahrain	Kuwait	YAE	Pakistan	Germany	Other	Total
Mean											
I	131.00	19.408	30.554	84.486	7.398	3.424	25.640	0.576	3.490	118.076	424.046
II	350.916	46.234	69.672	182.260	15.576	14.618	54.240	41.880	58.380	378.368	1212.144
III	301.642	74.282	96.738	157.710	15.956	14.592	56.916	58.712	1.806	494.168	1272.516
IV	774.540	101.332	200.976	254.694	28.418	56.670	121.862	33.240	2.944	1434.176	3008.862
V	389.525	60.319	99.485	169.788	16.837	22.326	64.665	33.602	16.655	606.147	1479.392
Coefficient of variation											
I	36.365	77.019	19.573	34.930	54.732	52.997	21.711	207.388	68.536	52.697	33.370
II	34.548	68.755	28.794	48.599	36.826	57.352	43.157	93.667	85.853	33.857	23.794
III	25.465	21.903	33.983	46.728	40.291	31.498	17.739	111.152	140.865	16.050	13.006
IV	24.325	21.467	12.601	29.013	32.083	17.041	23.839	97.541	113.216	17.809	15.491
V	68.555	62.080	68.557	52.743	58.176	97.657	62.380	130.171	203.172	87.196	67.999
Linear growth rate											
I	19.029	36.670	-3.479	17.198	31.441***	31.367***	11.494	-4.514	20.487	23.105	18.825***
II	17.441	35.718	1.181	-8.471	0.295	1.874	-4.325	48.197	27.741	17.150	13.580
III	-13.207	-4.354	2.741	-20.547	11.250	14.563	-1.927	13.072	30.122	1.780	-4.164
IV	11.052	8.474	-3.149	13.239	18.207***	4.653	-3.737	-36.276	-68.487	10.458***	8.666
V	9.588**	9.257**	10.112**	5.385**	7.917**	13.858**	8.351**	7.129**	-5.176	13.230**	10.389**
Compound growth rate											
I	26.351	35.214	-3.881	24.781	42.092***	43.528***	11.271	.-41.011	28.404	36.718	25.102
II	19.852	42.028	0.676	-11.535	1.764	3.501	-3.449	120.555	76.621	19.776	14.848
III	-11.489	-5.0286	2.257	-18.703	7.435	21.343	-1.455	-72.439	53.305	2.071	-3.709
IV	14.498	8.632	-2.869	14.337	22.131	4.992	-5.128	-82.088	-85.789	11.239**	9.541
V	11.256**	13.262**	11.875**	6.425**	9.496**	19.356**	9.355**	24.075**	-20.047	17.684**	12.825**

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

Coefficient of variation

The coefficient of variation for export dried tamarind for the study period (1990-2009) was computed as 67.999 per cent, sub period wise values received higher fluctuation during period I, II, III and IV which were to the tune of 33.370, 23.794, 13.006 and 15.497 per cent per annum. Country wise CV export showed that Germany had recorded the highest CV in overall period.

Growth rates

The country wise linear growth rates of export value dried tamarind from India revealed that during Period I Bahrain and Kuwait. Registered significant growth rates. During overall period all studied the country registered positive significant growth rates.

Similar trend also observed in compound growth rates analysis.

4.3.3.3 Tamarind total (fresh + dried)

The country wise growth rates of value export received from tamarind total from India during the period 1990-2009 are given in Table 21.

Mean

The exports earning of tamarind during I, II, III and IV were Rs. 619.676 lakh, Rs. 1661.010 lakh, Rs. 1667.676 lakh and Rs. 4061.562 lakh, respectively. Country wise export earning from tamarind revealed that during Period I the highest earning was from UAE (Rs. 169.776 lakh per annum) and lowest from Bahrain (Rs. 472 lakh per annum). In Period II also export earning value the was highest from UAE and lowest was Kuwait. In Period III and IV the export earning was highest from UAE. During overall period export earning from tamarind from to UAE, Saudi Arabia, Pakistan, US were much higher as compared to other countries.

Table 21 : Country wise export of tamarind (fresh + dried) from India *(Values Rs in lakh)*

Period	Countries										
	UAE	US	UK	Saudi Arabia	Bahrain	Kuwait	YAE	Pakistan	Germany	Other	Total
Mean											
I	169.776	21.922	41.988	93.978	8.472	4.208	34.162	97.332	8.700	139.978	619.676
II	359.648	46.256	80.804	190.046	17.270	14.118	61.074	325.198	82.254	462.552	1661.010
III	389.576	78.526	110.036	210.562	19.624	22.140	69.984	103.502	9.500	645.318	1667.676
IV	877.440	157.062	220.384	441.374	42.822	100.890	143.050	65.548	16.552	1996.392	4061.562
V	449.110	75.942	118.303	233.980	22.647	35.339	77.068	147.895	29.251	811.060	2002.481
Coefficient of variation											
I	33.903	64.267	22.779	32.081	57.567	49.914	17.400	79.631	72.901	50.525	37.426
II	34.338	68.690	30.101	52.136	40.149	60.972	50.262	57.639	76.594	35.960	28.791
III	13.011	21.886	22.213	29.168	37.823	30.390	21.951	84.617	88.733	13.461	12.050
IV	20.210	18.383	10.671	15.484	28.645	38.690	18.501	88.346	47.869	23.610	17.178
V	64.119	74.784	62.549	62.174	68.490	123.248	59.655	100.931	147.746	94.116	67.915
Linear growth rate											
I	12.515	31.197	0.548	13.861	32.118**	28.636**	5.532	34.894	37.333*	22.409	18.813
II	17.869*	35.654*	2.146	-7.144	2.779	9.314	-8.550	16.424	30.223	80.816**	15.533*
III	-2.237	-2.944	5.162	-3.642	16.653	8.898	5.728	-3.491	43.053	0.268**	-0.105
IV	10.932*	9.988*	-0.212	4.161	16.045**	21.645**	-0.831	-42.021	18.385	14.269**	10.277**
V	9.589***	11.561***	9.459***	8.602***	9.896**	16.975***	8.175***	-3.458	-1.350	14.099***	10.292***
Compound growth rate											
I	20.699	30.633*	1.078	18.713	38.873**	38.128*	5.445	108.441	54.397	34.96	27.463
II	20.519	41.921	1.648	-11.161	3.990	9.329	-8.015	13.813	56.950	22.286**	15.897***
III	-2.038	-4.194	5.705	-3.033	16.848	13.031	5.599	-59.656	149.203	0637	0.242
IV	12.780*	10.033*	-0.202	4.124	17.760*	22.457**	-1.437	-56.524	18.282	16.596**	11.418**
V	11.079***	15.128***	10.705***	9.862***	11.601***	22.761***	8.845***	-7.791	1.489	18.812***	12.493***

** - Significant at 5 % *** Significant at 1% * - Significant at 10 %

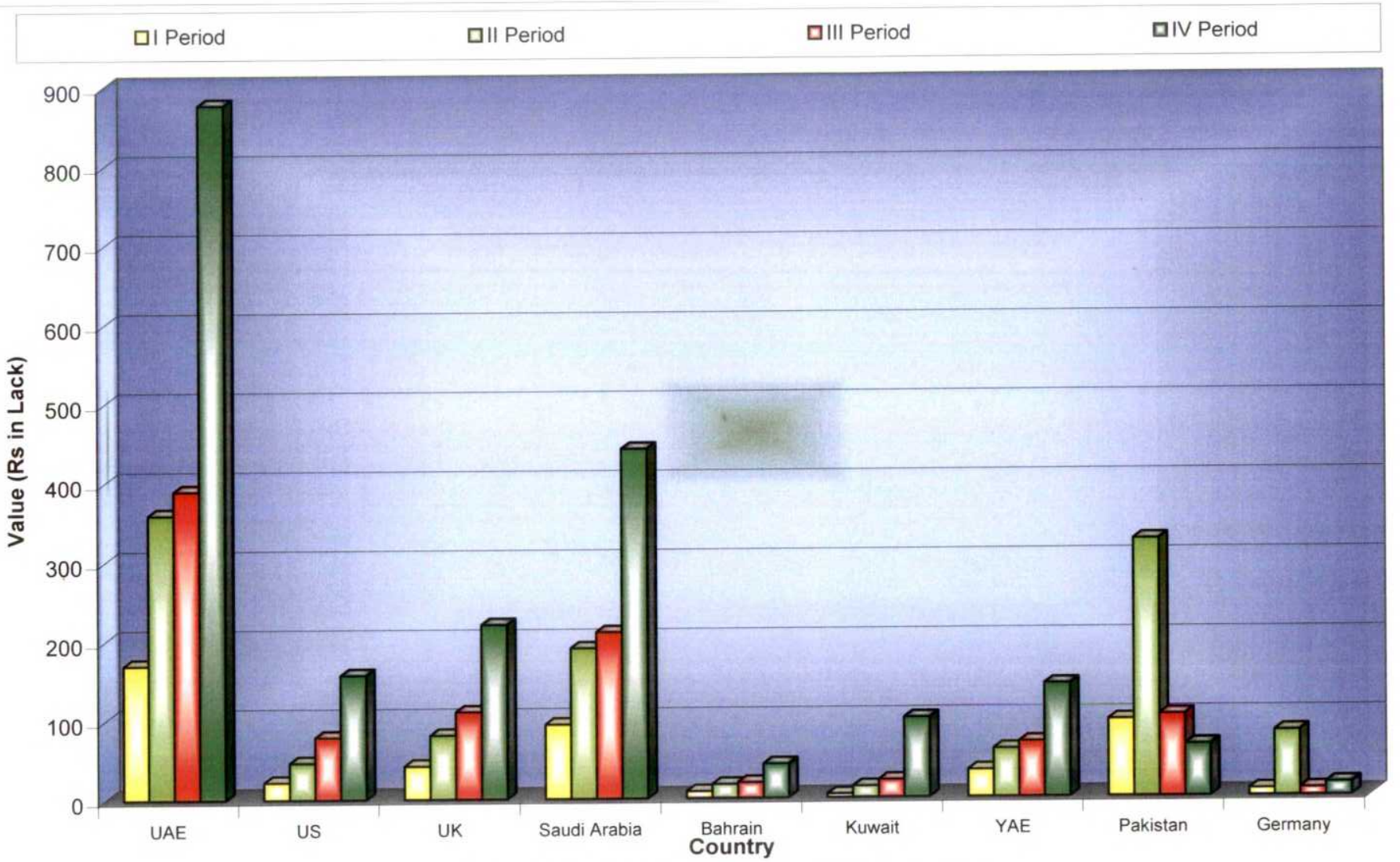


Fig. 11 : Export of tamarind from India (value)

Coefficient of variation

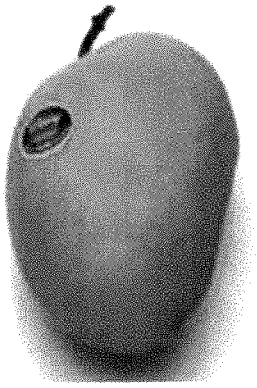
The coefficient of variation for the export of tamarind from the country for the period I, II, III, IV were 37.426, 28.791, 12.050, 17.178 per cent, respectively. During overall period it was 56.377 per cent.

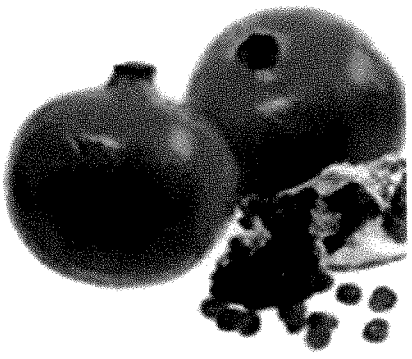
The country wise export of CV revealed that during period I, it was highest to Pakistan (17.631 %) during overall period in it was highest for Germany (147.746 %) and lowest from YAE (59.655%).

Growth rates

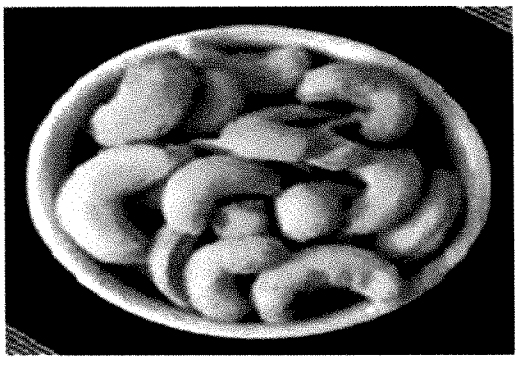
The export earning from tamarind registered significant linear growth rates for II, IV and V period which were 15.333, 10.277, 10.297 per cent per annum, respectively. Country wise linear significant growth rate was registered during period I for Bahrain, Kuwait, Germany. During period II linear significant growth rate was observed for UAE and US. Positive linear growth rate was observed in UK. Bahrain, Kuwait, YAE, Germany in III period. UAE, US, Bahrain and Kuwait, recorded during period IV. During overall period linear significant growth rate was registered by all the studied countries except Pakistan and Germany.

Compound growth rates for UAE, UK, Saudi Arabai, Bahrain, Kuwait, YAE, Germany were significant during overall period.





Summary & Conclusion



CHAPTER VI
SUMMARY AND CONCLUSIONS

In India-dry land agriculture accounts for nearly two-thirds of total cropped area and generates nearly half of the total value of agricultural output. Dryland agriculture in semiarid regions. 300 million people depends for their sustenance on dryland agriculture of which 30 to 40 % can be classified as poor. Although in the last decades the yield of dryland crop have increased. They are still much lower than the yields of irrigated crops. Improvement the productivity of dryland agriculture is necessary to maintain food security at National scale.

The important dryland fruits which play important role in the nutrition of humanbeing and also having aesthetic and medic values thouse are gown very extensively in different states of India and fruit like mango, tamarind, pomegranate, cashewnut etc.

Agriculture is backbone of Indian economy where it account agriculture sector (including allied activities) in India for 15.7 per cent of the GDP in 2009-10 compared to 18 per cent in 2004-05 and contributed approximately 10.2 per cent of total exports during 2009-10. countries exports lending for helping hand in earning valuable foreign exchange. Agriculture development in its comprehensive definition is central to all struggles for planned soico-economic development of any nations. There can be no sustainable growth of the Indian economy without the broad based progress of our agriculture, in our quest for accelerated growth we have to increase our agricultural growth we have to increase our agricultural growth rate in the long run.

Present study entitled "Export performance of dryland horticultural fruits crops" is undertaken with the following specific objectives

1. To study the statewise performance of dry land horticulture fruits in India.
2. To estimate country wise export performance of dry land horticulture produce in terms of quantity
3. To estimate country wise export performance of dry land horticulture produce in terms of value

The study was based on the secondary data for which stat wise area, production, productivity of selected dryland fruit crops were collected period 1990-91 to 2009-10 for mango, 1990 to 2009 for cashewnut, 1999 to 2009 for tamarind and 2003-04 to 2009-10 for pomegranate. This data was collected from horticultural statististics data base, brought out by National Horticultural Board, Ministry of Agriculture, Government of India and spices board, Cochin.

Countrywise time series data on export of dryland horticultural fruits from collected on different aspects required, APEDA, DGCIS etc this data available in period 1990-91 to 2009-10 were collected and divided into five period *viz.*, 1990-1995 (period-I), 1996-2000 (Peirod-II), 2001-2005 (Peiod-III) and 2006-09 (period-IV). Whereas, the whole study period (1990-2009) is termed as period V. countywise Export of cashewnut kernel and state wise area, production productivity of tamarind collected data divided into three period. *viz.*, (2000-2005) (period-I), 2006-2009 (period-II) and complete study period 2000-2009 (period-III). The pomegranate statewise data study in only one period (2003-2009).

Statewise area, production, productivity of dryland horticultural fruits, mango, pomegranate, Tamarind and cashewnut were studied.

Country-wise export of dryland fruits, mango, pomegranate, fresh Tamarind, dried Tamarind, total tamarind (fresh dried), cashewnut kernel were studied. The countries which were regular importer of the Indian fruits were selected purposively.

For an analysis of the data, the simple statistical tools *viz.*, arithmetic means, frequencies, percentage, ratio, CV etc. were employed to draw valued inferences. In addition to this for assessing the performance in growth rates for the dryland fruits linear and compound were estimated from the time series data. The significance of growth rates were tested by employing appropriate statistical tests.

Performance area, production, productivity of dryland fruits in India

Mango

On an average the annual area under mango in India for period I, II, III and IV were 1147.520, 1380.266, 1717.360 and 2311.960 thousand ha respectively. During overall period the area under mango was 1639.275 thousand ha. This indicates that area of mangoe in India during period IV increased as compared to period I, II, III. Statewise area under mango for period I to IV Andhra Pradesh is the leading state in under cultivation. The coefficient of variation area under grown mangoes in India for overall period was 29.320 per cent. It was highest in Maharashtra (96.973 per cent) and lower was Kerala (7.268 per cent). The linear and compound growth rate of area under mango in India revealed that during all the studied period was positive and significant. Statewise linear and compound growth rate of area for mango during overall period was positive and significant for the Andhra Pradesh, Gujrat, Kernataka, Kerala, Maharashtra, Tamil Nadu and West Bengal states.

On an average production of mango in India for the peiod 1990-2009 was 11189.690 MT per annum. Sub period-wise production of mango clearly indicate increasing trend in production. The coefficient of variation of production for mango in India during study period (1990-2009) was 15.982 per cent. The statewise CV value during the overall period observed to be highest in Karnataka and lowest in West Bengal. Positive and significant linear growth rates were registered during overall period all the states positive and significant among them highest growth rate was observed in Karnataka (10.146 per cent).

Productivity of mango in India on an average for the period 1990-2009 was 10798.100 kg/ha per annum. The statewise productivity of mango in India during period I to III was highest in Andhra Pradesh and lowest in Kerala. For Peirod-IV it was highest in Karnataka (8318.600 kg /ha per annum). The coefficient of variation for productivity of mango in India was 153.750 per cent during study period 1990-2009. CV during the overall period was highest in Karnataka (63.580 per cent) and lowest in Tamil Nadu (18.669 per cent). During overall period the productivity of mango in India registered negative growth rate, period-wise of productivity showed that in linear and compound growth rate for all period was negative except period-IV. Karnataka and Kerala registered positive and significant growth rates for productivity during overall period.

Cashewnut

On an average the area under cashewnut in India for period-I, II, III and IV were worked out to be 556.020, 588.00, 624.400 and 832.000 thousand ha per annum, respectively. During the overall period it was 1639.275 thousand ha. This indicates that area under cashewnut in India during IV period increased as compared to period-I, II, III. The state-wise area cashewnut during overall period was highest in Andhra Pradesh (130.135 thousand ha). The coefficient of variation

for area under cashewnut in India during overall period was 19.389 per cent. It was highest in Maharashtra (60.894 per cent) and lowest in Andhra Pradesh (28.760 per cent). The linear and compound growth rates of area under cashewnut in India revealed that, all period significant and positive except peiod-II. Statewise linear and compound growth rates of positive and significant in Andhra Pradesh, Karnataka, Maharashtra and Orissa, amongst them Maharashtra registered highest growth rate..

On an average production of cashewnut in Inida for the period 1990-2009 was 475.625 MT per annum. peirodwise production of mango increased at increasing rate during all the period. With regard to the statewise production of cashewnut, for period I and II: It was highest in Kerala as compared to other states. For period III and IV Maharashtra recorded highest in production. During the overall period indicate that highest production of cashewnut in Maharashtra 109.295 thousand ton per annum. The coefficient of variation production of cashewenut in the study period of 1990-2009 was 24.884 per cent. The statewise production of CV values during overall period it was highest in Maharashtra (61.758 per cent) and lowest in Karnataka (31.950 per cent). The present study revealed that, for during overall period (1990-2009) the production of cashewnut all period positive shown in linear and semi-log trend. Among them significant was period I and III. During overall period linear and semi-log trend showed that all the states are significant growth rates but except Kerala. amongst them highest in Maharashtra.

In case of productivity of cashewnut in India for period 1990-2009 was 729.800 kg/ha per annum. Statewise productivity of cashewnut in India observed for period I and II it was highest in Kerala. During period III and IV were highest observed in Maharashtra. During overall period highest observed in Maharashtra (1367.00 kg/ha) and

lowest was Karnataka (587.700 kg /ha). The coefficient of variation in productivity of cahsewnut for the study period of 1990-2009 was 15.574 per cent. Whereas the statewise productivity CV values observed during overall period highest in Maharashtra (38.100 per cent) and lowest in Kerala (18.030 per cent). Overall period (1990-2009) the productivity of cashewnut in India registered significant growth rate. The compound growth rate was observed for cashewnut during the overall period (1990-2009) was 1.791 per cent. Statewise productivity of overall period Karnataka and Orissa was significant.

Tamarind

On an average the area under Tamarind in India for period 1999 to 2009 was 59.688 thousand ha per annum. Statewise area during period 1999 to 2009 revealed that Tamil Nadu was having highest acreage under tamarind amongst all the studied states. The coefficient of variation in area of Tamarind for the study period 1999-2009 was 5.905 per cent. Highest CV was observed in Kerala (13.681 per cent) and lowest in Tamil Nadu. During study period of 1999-2009. During overall period all the studied states registered negative growth rate except Andhra Pradesh.

Production of Tamrind during I and II period was tune of 196.715 MT per annum and 186.467 MT per annum respectively. The statwise production during overall period highest from Karnataka. The coefficient of variation in production of Tamarind for the study period of 1999 to 2009 was 10.505 per cent. Positive linear and compound growth rates were observed for overall period in Maharashtra.

The productivity of Tamarind in India. for the period 1999-2009 was 3216.900 kg/ha per annum. Productivity of Tamarind in India for overall period was highest in Karnataka 5038.600 kg/ha.

The coefficient of variation in productivity of Tamarind for the study period of 1999-2009 was 9.988 per cent. The CV for statewise productivity of Tamarind was highest in Andhra Pardesh (21.981 per cent) and lowest in Kerala. During overall period linear and compound positive growth rates in Kerala, Tamil Nadu and Kernataka states.

Pomegranates

During study period 2003-2009 the area under pomegranate was 114.543 thousand ha. Amongst all studied state highest acerage under pomegranate was observed in Maharashtra (90.671 thousand ha). Highest CV was observed in Rajasthan (29.633 %), followed by Gujrat (18.898). Maharashtra, Karnataka, Gujrat, Rajastan states. Among them significant was Karnataka (5.126%) and Rajastan (11.154%) registered positive and significant growth rates.

On an average the production of pomegranate in India during the Period 2003-2009 was 809.529 MT per annum. The state wise production of pomegranate revealed that during period 2003-2009 highest production was observed in Maharashtra (585.429 MT per year). The highest CV for production of pomegranate during the period 2003-2009 was observed in Rajastan (50.02%).

On an average the annual productivity of pomegranate in India for period 2003-2009 was 7073.00 kg/ha. During overall period highest productivity of pomegranate was observed in Maharashtra (60302.00 kg/ha). Highest CV observed in Andhra Pradesh (24.993 %) and lowest for Maharashtra (5.406 %). Indicating there by stability of the crop in the state as compared to other state.

Country-wise export (Volume)

Export of mangoes from India during the period 1990-2009 was estimated at 44083.080 MT per annum. Export of mango increased from 23356.510 MT in period I to 72265.990 MT in period IV. The highest linear growth rate in export of mangoes was recorded in Bangladesh (13.160 per cent per annum) and the lowest by USA (0.092 per cent per annum).

Export of pomegranate from India was on an average 10978.620 MT per annum during the period 1990-2009. Export increased from 2195.967 MT from period I to 28944.790 MT during period IV. The countrywise export revealed that, Natherland, UAE Bagladesh were the major dsitnations for export of pomegranate from India.

Export of cashewnut from India during the study period 2000-2009, was 108365.300 MT per annum. Export of cashew Kernal From India, increased from 103798.00 MT in period I to 112933.020 MT period II. During in period I and II growth rate of export of cashew kernel registered 7.481 per cent and 1.910 per cent annum, respectively. USA is the major export market for Indian cashewnut.

During study period the quantity of fresh Tamarind exported from India was 3807.083 MT per annum. Export of Fresh Tamarind form India increased from 2812.356 MT from period-I to 5922.682 MT per annum in period IV. The tamarind from India for overall period registered positive and significant growth rates. Pakistan, Saudi Arabia, UAE are the major export destinations for Indian tamarind. .

Export of dried Tamarind form India during the study period of 1990-2009. was 684.448 MT per annum. Export of Tamarind dried from India increased from 2719.582 MT from period I to

12253.740 MT per annum in period IV. During overall period highest quantity of tamarind was exported to UAE (1735.556 MT) followed by Saudi Arabia, (810.870 MT).

On an average the export of Tamarind total from India for period 1990-2009 was 10641.930 MT per annum. Export of Tamarind from India increased from 5533.718 MT in period I to 18181.420 MT from period IV. The growth rate for export volume registered 15.364m 4.861, 3.351 and 6.986 per cent per annum during Period I, II, II, and IV, respectively. UAE was major, export destination followed by Pakisthan.

Country-wise Export (Value)

Export earning mangoes of during the period from 1990 to 2009 was estimated at Rs. 8503.703 lakh per annum. Export of mangoes from India increased form Rs. 3827.662 lakh in period-I to Rs. 15354.420 lakh in period-IV. The growth rate for export earnings registered 10.76, 16.301 and 11.373 per cent per annum during period I, II, and IV, respectively. UAE was the major, export exchequer earner followed by Bangladesh.

Export of pomegranate from India during the period from 1990-2009 was to the tune of Rs. 3020.026 lakh per annum. Export of pomegranate from India increased from Rs. 290.600 lakh in period-I to Rs. 9230.290 lakh in period IV. The growth rate for export earnings registered Rs. 36.946, 14.486, 29.545, 17.388 and 18.398 per cent per annum during period I, II, III, IV and V. Highest earning from export of pomegranate was from UAE (Rs.1109.227 lakh per annum).

Export of fresh Tamarind from India during the study period of 1990-2009. was Rs.523.139 lakh per annum. The growth rate for export earnings registered 18.785, 20.788, 12.965, 14.871per cent

per annum during period I, II, III and IV. During overall period highest export earning from Pakistan followed by UAE.

Export of dried Tamarind from India during the study period of 1990-2009 was Rs.1479.392 lakh per annum. Export earning of dried Tamarind from India increased from Rs.424.046 lakh in period to Rs. 3008.862 lakh in period IV. The growth rate for export earnings registered 18.825, 13.580 and 8.666 per cent per annum during period I, II and IV. During overall period highest Export of dried tamarind from UAE (Rs. 389.525 lakh per annum) and lowest was from Germany (Rs. 16.655 lakh per annum).

For the study period 1990-2009 value of tamarind total fresh + dried exported from India was Rs.2002.481 lakh per annum. Export of Tamarind from India increased from Rs. 619.676 lakh in period I to Rs. 4061.562 in period IV significantly growth rate was observed during period II and IV during overall period highest export earning from UAE (Rs.449.110 lakh per annum) lowest was Baharin (Rs. 22.047 lakh per annum).

CONCLUSIONS

The study concluded that

- On an average the annual area, production and productivity of mango in India during study period (1990-2009) were tune of 1639.275 thousand ha, 1189.690 MT and 10798.00 Kg/ha, respectively.
- Andhra Pradesh was having highest acerage under mango followed by Maharashtra and Tamil Nadu.
- The state wise performance of area, production and productivity in terms of growth rates of cashewnut was positive and significant.

- During the study period highest area under cashewnut was observed in Andhra Pradesh however production and productivity was seen in Maharashtra.

- Highest production and productivity of tamarind was observed in Karnataka however higher acerage was observed in Tamil Nadu.

- Anhdra Pradesh registered positive growth rate in respect area and production.

- During the study period area under pomegranate was 114.543 thousand ha with the production of 809.529 MT in the country. However, Maharashtra stood first by contributing of 79.15 and 72.07 per cent share in area and production respectively.

- Karnataka, Andhra Pradesh, Gujrat and Rajastan registered positive growth rates for area, production and productivity in respect of pomegranate.

- The growth rates from mango during study period was positive and significant from volume exported and value received.

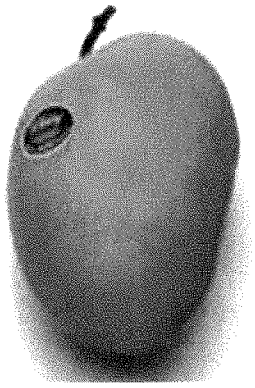
- UAE is the major export destination for mango, pomegranate, dried tamarind and total tamarind (fresh + dried).

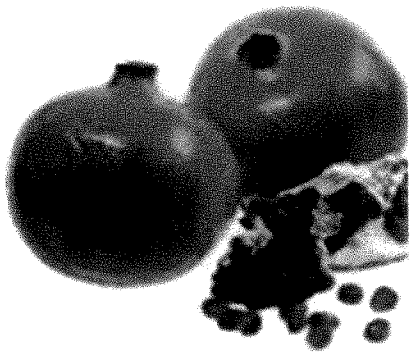
- In respect of pomegranate all the studied countries registered positive and significant growth rates for volume exported and value received.

- Highest volume of fresh tamarind was exported to Pakistan followed by Saudi Arabia. The similar trend was observed for value received.

- The export share of cashewnut kernal to USA from India was 41.71 per cent.

- During the overall period export of total tamarind positive and significant growth rates was observed in terms of volume and value.





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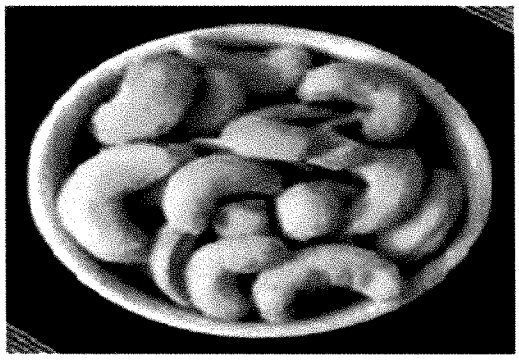

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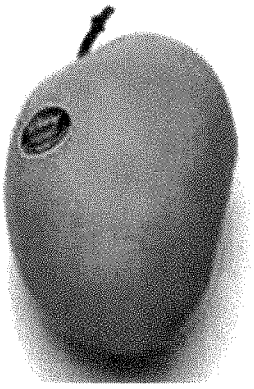
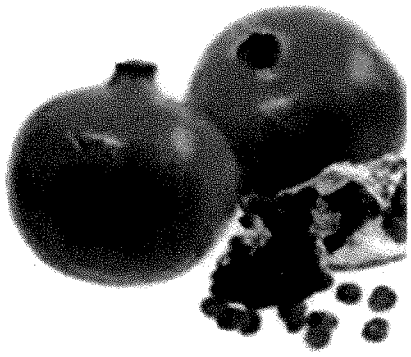
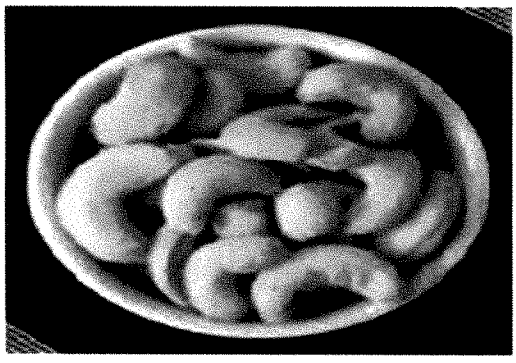




Thesis Abstract



ABSTRACT

Name of the student	:	PATAIT SANTOSH RAJENDRA
Reg. No.	:	49M/09A
Degree	:	M.Sc.(Agri.)
Year of admission	:	2009
Discipline	:	Agricultural Economics
Major field	:	Agricultural Economics
Minor field	:	Statistics and Extension Education
Major advisor	:	Dr. K.V. Deshmukh Associate Professor, Dept. of Agril. Economics and Statistics, MKV, Parbhani
Title of thesis	:	**EXPORT PERFORMANCE OF DRYLAND HORTICULTURAL FRUITS**

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High initial investment, long gestation period and high water demand discourage the cultivation for growing fruits. However, some of fruit crops such as mango, pomegranate, cashewnut, custard apple, tamarind, etc. come up reasonable well even under dryland cultivation. These crops not only grown in arid and semiarid regions but also earn a good profit to farmer if properly cared and maintained in arid regions. These crop bring use of the wasteland.

In context of above discussion the study is under taken with specific objectives to study statewise performance of dryland horticultural fruit in India, to estimate countrywise export performance of dryland horticulture fruit crops in terms of quantity and value.

It is revealed from the study that at overall period, on an average the area, production and productivity of mango were to the tune of

the 1639.275 thousand ha, 1189.690 MT and 10798.00 kg/ha per annum respectively. Andhra Pradesh, Maharashtra and Tamil Nadu were major mango producing states as compared to other states under study.

The state wise performance of area, production and productivity in terms of growth rates of cashewnut was positive and significant. During the study period highest area under cashewnut was observed in Andhra Pradesh however production and productivity was seen in Maharashtra. Highest production and productivity of tamarind was observed in Karnataka however higher acerage was observed in Tamilnadu. Anhdra Pradesh registered positive growth rate in respect area and production. During the study period area under pomegranate was 114.543 thousand ha with the production of 809.529 MT in the country. However, Maharashtra stood first by contributing of 79.15 and 72.07 per cent share in area and production respectively. Karnataka, Andhra Pradesh, Gujrat and Rajastan registered positive growth rates

The export of mango from India during 1990-2009 was 44083.080 MT and earning value from Rs. 8503.7 lakh per annum. The growth rates from mango during study period was positive and significant from volume exported and value received. UAE is the major export destination for mango, pomegranate, dried tamarind and total tamarind (fresh + dried).In respect of pomegranate all the studied countries registered positive and significant growth rates for volume exported and value received. Highest volume of fresh tamarind was exported to Pakistan followed by Saudi Arabia. The similar trend was observed for value received. Positive and significant growth rates were noticed during the overall export period of total tamarind in terms of volume and output.