PROJECT REPORT ON EXPORT PROMOTION OF POMEGRANATE FROM INDIA

UNDER GOI-UNCTAD DFID PROJECT ON STRATEGIES AND PREPAREDNESS FOR TRADE AND GLOBALIZATION IN INDIA

SUBMITTED TO

Strategies and Preparedness for Trade and Globalisation in India

A Project of Ministry of Commerce (GOI),UNCTAD and DFID

By

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PREFACE

A sound macro economic environment and effective trade policies are essential but not sufficient conditions for integrating developing countries in the multilateral trading system. There is also a need to enhance national and sub national capacity to formulate export strategies at selected product/sector level, based on realistic assessments of production and understanding of international commercial practices and standards. To facilitate and support this capacity building, the Government of India, UNCTAD and DFID/UK are jointly implementing a five-year programme titled "Strategies & Preparedness for Trade & Globalization in India". AFC feels privileged to have been associated as a Tier II partner.

The present study on identifying constraints and working out action plan to increase exports of Pomegranate has been conducted under the above project.

Although India is the 2nd largest producer of fruits in the world and first in Pomegranate production with the total Pomegranate production in the world is 10 lakh tonnes out of which India produces 5 lakh tonnes but exports only 5000 tonnes, whereas Spain produces 1 lakh tonne and export 75,000 tonnes annually. Pomegranate is a high value crop and its entire tree is of great economic importance. Apart from its demand for fresh fruits and juice, the processed products like wine and candy are also gaining importance in world trade.

Pomegranate is an important fruit crop of Maharashtra. It is cultivated in an area of 43,151 ha with a total production of 4, 31,510 tonnes producing about 85% of the total Indian production, thereby leading in Pomegranate production in the country. Within Maharashtra, production of Pomegranate is mainly concentrated in the Western Maharashtra region and the Marathwada region. The variety Ganesh, Bhagwa (Red Ruby) cultivated in Maharashtra is suitable for export purposes. At present fair amounts of exports of Pomegranate takes place from the state in Reefer containers by sea.

Pomegranate requires Good Agricultural Practices, Euregap Certification, Awareness among exporters for Export procedures, HACCP/ISO Certification etc and disease and pest management as per the recommended schedules by NRC Pomegranate, Sholapur will expedite the economical condition of the poor farmers and increase thepomegranate export from our country.

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ACKNOWLEDGEMENT

The Government of India (GOI), United Nations Conference on Trade and Development (UNCTAD) and Department of International Development (DFID), UK are jointly implementing a five year project titled 'Strategies & Preparedness for Trade & Globalization in India". APEDA has been selected by UNCTAD as Tier-I partner to facilitate the formation of a virtual network of existing national, regional and state level institutions dealing with the trade in agro products. In addition AFC as Tier II partners have also been identified to facilitate in increasing the level of awareness and building the capacities of the stakeholders at various levels to meet the opportunities and challenges of globalization. The initiative by APEDA for preparation of project report on Pomegranate export promotion from Maharashtra is a welcome step in achieving the said objectives.

AFC feels privileged and honoured to have been assigned the preparation of the project report on export promotion of Pomegranate from Maharashtra. AFC is extremely obliged to Shri T.C. Venkat Subramanian, Chairman & Managing Director, Export-Import Bank of India for his sagacious suggestions. The various issues such as global production – consumption pattern and its utilization and value addition prospects were discussed with Shri Ashish Kumar, Chief Manager, EXIM Bank.

A team under the leadership of Shri Niraj Kumar Jha, Manager, AFC was constituted to undertake the study. AFC is grateful to NRC, Pomegranate, Sholapur and Maharashtra State Agricultural Marketing Board, Pune and Maharashtra State Horticulture Mission for its high quality inputs on overall prospect of export promotion of Pomegranate from Maharashtra. AFC is also thankful to other State Government Officials, Entrepreneurs, wholesale and retail traders, secretaries of cooperative societies, growers association, Certification agencies who readily cooperated with the study team in providing necessary inputs.

CHAPTER I

INTRODUCTION

A. Background of the Project

The Government of India (GOI), United Nations Conference on Trade and Development (UNCTAD) and Department of International Development (DFID), UK is jointly implementing a five year project titled 'Strategies & Preparedness for Trade & Globalization in India". APEDA has been selected by UNCTAD as Tier-I partner to facilitate the formation of a virtual network of existing national, regional and state level institutions dealing with the trade in agro products. Agricultural Finance Corporation Ltd as Tier II partner have been identified to facilitate in increasing the level of awareness and building the capacities of the stakeholders at various levels to meet the opportunities and challenges of globalization. The Agricultural Produce Export Development Authority (APEDA) assigned the preparation of project report on export promotion of Pomegranate from India.

B. Objectives of the study

The specific objectives entrusted by the APEDA for preparation of the project report on export promotion of pomegranate from India were as follows:

a. To prepare a detailed report on export promotion of Pomegranate from India
b. To identify the constrains in export promotion of Pomegranate
c. To identify harvest and post harvest technologies for pomegranate including mechanization of harvesting and post harvest management
d. To study the existing arrangements for cultivation and prospects of contract farming
e. To identify constraints in profitability of pomegranate growers etc
f. To identify and suggests the action plan for the establishment of backward and forward linkages in the present scenario

C. Constitution of Team

For preparation of the project report on Pomegranate, a team of officers under the leadership of Shri Niraj Kumar Jha, Manager AFC was constituted. The different issues

on Pomegranate Production, Good Agricultural Practices, Harvest and Post Harvest Management and its Export potential during the field visits have been discussed with Shri Ashish Kumar, Chief Manager, EXIM Bank. In addition, field supervisor has been assigned the data collection task.

D. Methodology and Field Visit

Preparation of the project report on Pomegranate from India involved collection of primary as well as secondary data from published as well as unpublished sources. Since the project demanded for the complete study of the export promotion process of Pomegranate there was a need of lot of data which is both primary as well as secondary data.

The primary data is obtained from the sources like,

- Orchards farmers of Karnataka and Maharashtra,
- Service providers,
- Company persons,
- Fruit Mandis,
- Competitors stores etc.

The Secondary data is collected from different sources like,

- The National Research Centre for Pomegranate, Solapur, Maharashtra
- Maharashtra State Agricultural Marketing Board, Pune
- Maharashtra State Horticultural Mission, Pune
- MPKV, Rahuri
- FAO reports,
- India stat,
- India harvest,
- State Agriculture and Horticulture departments,
- Several other magazines and Search engines like Google, Msn etc.

In addition, the field visit by the team was made to Nashik, Pune, MPKV Rahuri, National Research Centre on Pomegranate Sholapur, Atpadi, Pandharpur, Shirdi, Shignapur, Sangola, Akluj, Ahmadnagar and Baramati in Maharashtra and Bijapur district of Karnataka. During the field visit, detailed discussions were held at National Research Centre on Pomegranate, Sholapur, Maharashtra State Agricultural Marketing Board, Pune, State Horticultural Mission Pune, MPKV Rahuri. Besides, 200 Pomegranate growers representing different variety & farm size were interviewed with structured interview schedule. In addition Exporters, Testing Laboratories, Export Houses, Maharashtra State Government departments were also interviewed with a structured format (Annexures).

Thus entire process of the cultivation and marketing of Pomegranate has been happening in the country has been carefully observed and studied. The data collected from different sources is interpreted and analyzed wherever necessary with the help of Microsoft Excel.

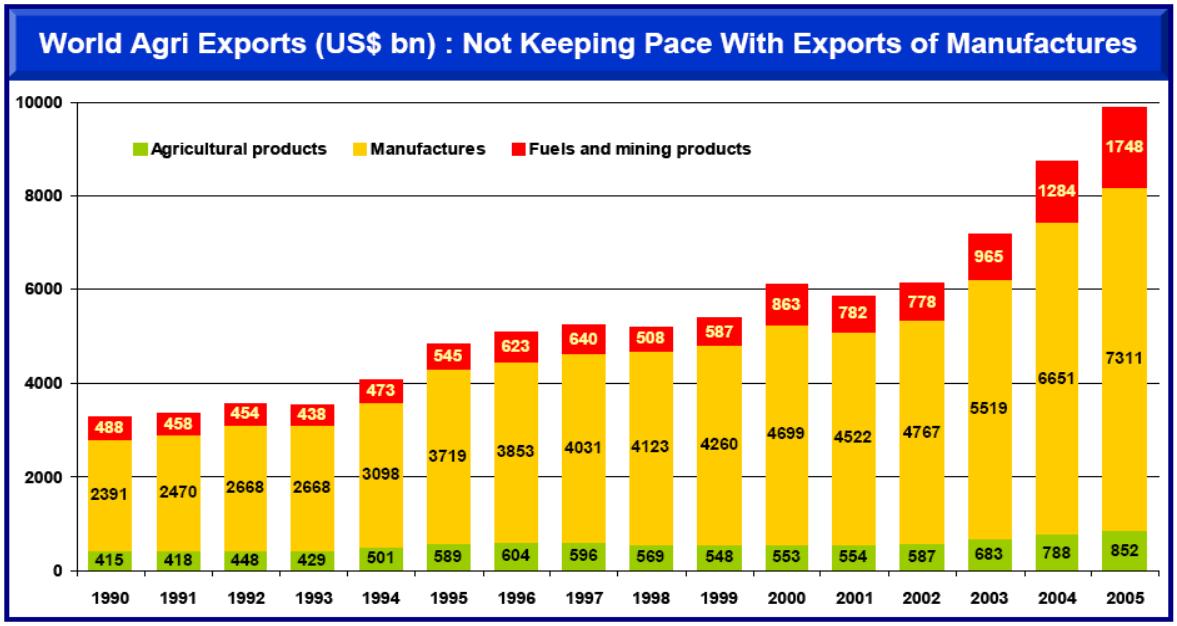
CHAPTER II

POMEGRANATE CULTIVATION

A. A Global Perspective on Agriculture

Agriculture plays a multifunctional role with every 1% rise in agricultural productivity cutting poverty by an estimated 0.6%. Notwithstanding this, world agriculture exports have not kept pace with the growth in exports of either manufactured products or mining products. Although world agricultural exports picked up in 2005 growing by 8.1% in value terms, they totaled only US$ 852 bn. Over the years, the growth in agricultural

trade has been less strong than total merchandise trade, thereby resulting in its share decreasing from 12.6% in 1990 to only 8.6% in 2005. As against this, exports of manufactures have more than trebled from US$ 2.4 trillion in 1990 to US$ 7.3 trillion in 2005. Similar increase can be seen in the case of mining exports, which have risen from US$ 488 billion to US$ 1748 billion during the same period.



Source: WTO Online Statistical Database

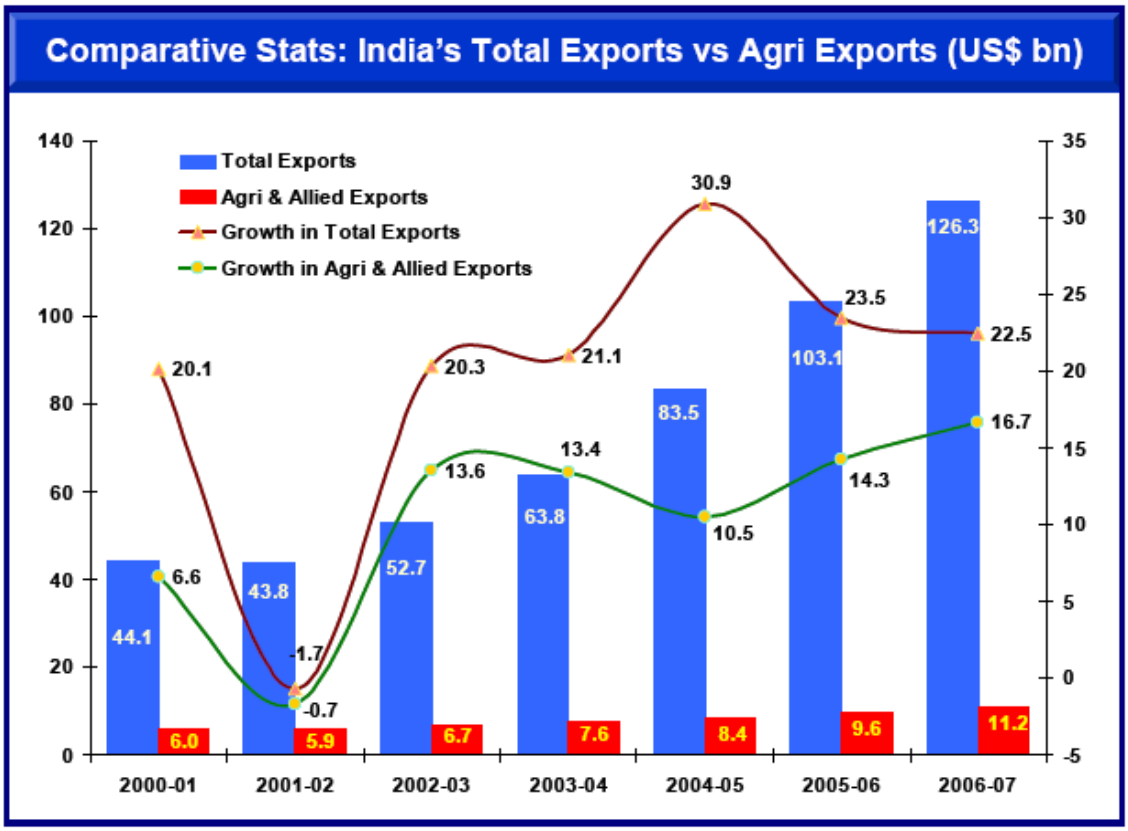
United States remains the largest exporter of agricultural products with exports totaling US$ 83 billion in 2005. Other major agro exporters included The Netherlands, Germany, France and Canada. It is interesting to note that during the period between 1990 and 2005, while the share of Brazil and China in world agro exports increased from 2.4% each to 4.1% and 3.4%, respectively, India's share only increased to 1.2% from 0.8% during the same period. The top five agriculture exporters accounted for more than one-thirds of global agro exports. As against this, India was ranked the 22nd largest exporter of agro products with exports totaling US$ 10.1 billion in 2005.

B. India's Agri Exports: An Overview

Agriculture forms the backbone of the India economy contributing more than one-fifth to the GDP and providing livelihood support to about two-thirds of country's population. In

fact, it is the single largest private sector occupation. Any change in the agriculture sector has a strong multiplier effect on the entire economy. The multiplier for food industry is much higher than that for industries such as power and telecom, reason being that the food industry directly and indirectly triggers growth in a number of other industries such as transport, refrigeration, pesticides and fertilizers.

The most significant positive aspect of our agricultural exports is that a majority of the items in the agriculture export basket are net foreign exchange earners, with negligible import content unlike high import content in many manufactured products. Export of agriculture products increased from US$ 6.0 bn in 2000-01 to US$ 11.2 bn in 2006-07. However, the share of agriculture and allied products in total exports has come down from 13.6% to 8.9% during the same period. During the period 2000-01 to 2006-07, India's overall exports grew faster than agro exports. The difference has always been substantial except in 2001-02 where both experienced negative growths.



Source: CMIE India Trade Database

India's major agro exports (apart from marine products) include rice, oil meals, cashew, spices, tea, and wheat. The non-traditional exports include horticulture and floriculture products such as vegetables, fruits and their processed products. Star performers have in fact been the traditional agro exports like basmati rice, oil meals and castor oil. To be precise, share of oil meals in India's agriculture exports jumped to 8.6% in 2004-05 from 4.6% during 2001-02. Share of basmati rice also shot up from 6.3% to 7.6% during the same period. This was due to a significant average growth rates experienced over the last three years of 62% and 22%, respectively. This trend clearly reflects increasing importance of traditional agro exports, necessitating the need to diversify into non-traditional export products.

In terms of production, India, with an arable land of 162 mn ha remains a major player in the global market. India, with a production of 47 mmt of fruits and 80 mmt of vegetables, is the second largest producer of fruits and vegetables after China. In fact, the country ranks first in the production of banana and mangoes and second in eggplants. However, processing of fruits and vegetables is estimated at only 2% of total production. India's agro exports have not been commensurate with its production. The fruits and vegetable sector has not leveraged on the export market as a proactive source of revenue. This clearly calls for a strategy that focuses on the international market, not as a residual but as a prospective source of revenues.

C. Trends in Exports of Fruits and Vegetables

Within the agricultural sector, it has been the fruits and vegetable segment that has shown dynamism. India is the second largest producer of the fruits and vegetables in the world after China. Since the 1980s, the international trade in fruits and vegetables has expanded rapidly. The numbers of commodities as well as the number of varieties produced and traded have drastically increased during the past 25 years. There is an overall increase in the demand of fruits and vegetables for consumption both in fresh and processed form. There is also a wide diversification in production pattern globally. Income in this sector is increasing which is driving the supply.

In spite of being one of the largest producers of fruits and vegetables in the world, the export competitiveness among the Indian producers remains low. But with new marketing initiatives, the post-harvest losses and wastage due to poor infrastructure facilities such as storage and transportation are reduced to a considerable extent, yet a lot needs to be done in this sector. In 2005 total area under fruits and vegetables had been 11.72 million hectares and total production had been 150.73 million tonnes (NHB, 2005). As a result of this huge spurt in horticulture produce, India has become the second largest producer of fruits and vegetables in the world next only to China. Annual area and production growth under fruits and vegetables in the period 1991-2005 in India was 2.6 per cent and 3.6 per cent respectively. This growth is quite significant compared to the decline in area under cereals and cereal production which is growing at the rate of 1.4 per cent per annum only in last one and a half decade. Share of fruits and vegetables in the total value of agricultural exports has increased over years from 9.5 per cent in 1980-81 to 16.5 per cent in 2002-03. But India is still lagging behind in actual exports of these produce. For example, India produces 65 per cent and 11 per cent of world's mango and banana, respectively, ranking first in the production of both the crops. Yet India's exports of the two crops are nearly negligible of the total agricultural exports from India. Horticulture contributes nearly 28 per cent of GDP in agriculture and 54 per cent of export share in agriculture.

The major fruits exported in terms of quantity are mango (53.5 thousand tonnes), grapes (38.9 thousand tonnes), orange (31.5 thousand tonnes), apple (23.2 thousand tonnes), banana (12.8 thousand tonnes), other citrus fruits (11.4 thousand tonnes) and lemon (10.5 thousand tonnes). In value terms grapes and mango exports earn the maximum foreign exchange for India. However, there is immense potential to diversify this product basket, and one such fruit is pomegranate – the focus of this study.

D. Pomegranate – the Fruit

Pomegranate is a high value crop and its entire tree is of great economic importance. Apart from its demand for fresh fruits and juice, the processed products like wine and

candy are also gaining importance in world trade. All parts of pomegranate tree have great therapeutic value and are used in leather and dying industry. The calorific value of the pomegranate fruit is 65. Its juice is easily digestible and contains about 15 percent invert sugar. It is a rich source of sodium and also contains a good amount of riboflavin, thiamin, niacin, Vitamin C, calcium and phosphorous. Protein and fat contents are negligible.

Demand in the international market has widened the scope for earning higher dividends from this crop. Profits upto 1.5 lakhs/ha/annum have been demonstrated by some growers. It is, therefore, a highly remunerative crop for replacing subsistence farming and thus alleviating poverty levels, particularly in regions such as Maharashtra. It is an ideal crop for the sustainability of small holdings, as pomegranate is well suited to the topography and agro-climate of arid and semi-arid regions. In addition, it provides nutritional security, has high potentials to develop wastelands widely available in the region and an ideal crop for diversification. Moreover, it can make higher contribution to GDP with a small area.

There has been a steady increase in area and production of pomegranate in the country. It is estimated that by the year 2025, the area under pomegranate is projected to increase to 7.5 lakhs ha, from 1.25 lakhs ha at present. Consequently production is expected to increase by 10 folds and export by nearly seven folds by the year 2025.

To achieve these targets, coordinated and sustained efforts are required by all concerned with pomegranate research and development. There is a need to orient the current research programmes to develop sustainable technologies by making best use of the opportunities to meet the increasing demands and challenges. Potential areas for pomegranate cultivation need to be identified and non traditional areas need to be explored for its cultivation. Though pomegranate can tolerate water stress, it responds well to irrigation. Developing hi-tech micro-irrigation systems for water management would therefore be a priority. Desirable traits need to be introduced in existing commercial varieties and transgenic lines need to be developed through biotechnology.

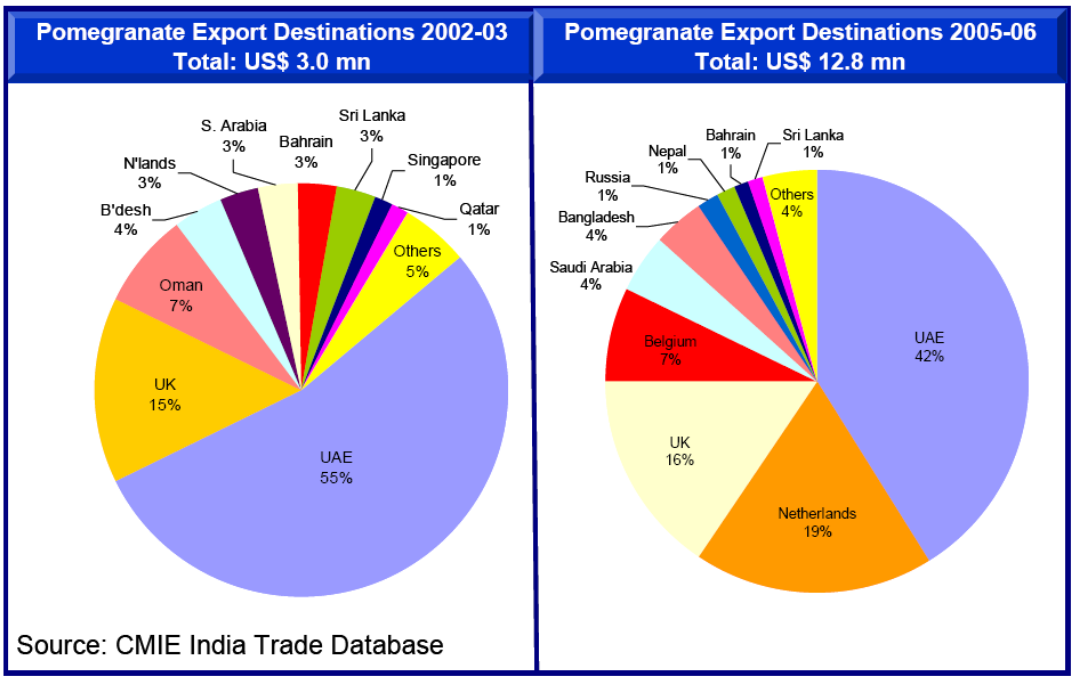
Rapid multiplication of desired propagating material could be achieved through tissue culture technology.

E. Pomegranate – A Global Scenario

The cultivation of pomegranate was introduced quite early in the Mediterranean and eastern countries like India. But in Spain, it was introduced after the Islamic influence there and it reached England in the thirteenth century. Much later, Spaniards took this important plant to the new world-Mexico and Florida. Its cultivation gradually spread to other countries too and now it is grown almost everywhere in the tropical and sub-tropical climate.

At the global level, Iran is the world's largest producer and exporter of pomegranates with an estimated annual production of 670,000 tons, In addition to Iran, other countries including India, Turkey, Spain, Tunisia, Morocco, Afghanistan, China, Greece, Japan, France, Armenia, Cyprus, Egypt, Italy and Palestine also cultivate this product. Pomegranate is native to Iran, although its wild forms are found in India, Afghanistan and Syria. Presently good quality pomegranate comes from Turkey, Iran, Afghanistan, Syria, Morocco and Spain. In India, Sholapur is famous for juicy pomegranate fruit known as Anar. In Turkey pomegranates are served during important feasts.

The global figure for trade in pomegranate can at best only be estimated, considering that the data for disaggregated level through UNCTAD's COMTRADE and PC TAS database (only sources of reliable data on international trade) is available at HS 6 digit level. Pomegranate comes at the 8 digit HS level under the 6 digit HS code 081090 (Other fresh fruits nec). Global exports under this 6 digit level amounted to US$ 751.4 mn in 2005-06 as against US$ 558.6 mn in 2003-04. Assuming that 25% of exports under this category comprises pomegranate, one can work out a rough estimate of global exports of pomegranate at US$ 188 mn in 2005-06. The main exporters under this category include Thailand, Spain, the Netherlands, Hong Kong and France.



As against this, India's exports of fresh pomegranates amounted to US$ 12.8 mn in 2005-06, up from US$ 3.0 mn in 2002-03, thereby registering an impressive compound annual growth rate of 62.8%. The major export destination for India's pomegranates are UAE, the Netherlands, UK, Belgium and Saudi Arabia. As is evident from the above exhibit, during the period between 2002 and 2006, the export destinations for pomegranates has more or less remained same except for the shares of Netherlands and Belgium, which have become important destinations for the country's pomegranate exports. Further, the country's dependence on UAE as the largest destination has reduced. Thus, India's share in global exports of pomegranates is about 6.4%, although the country is the largest producer of pomegranates. This clearly calls for making the product more export oriented, particularly in light of the fact that per unit realization in international markets is far higher than the domestic market.

According to National Horticulture Mission, exports of fresh pomegranates have increased from 4,773 tonnes in 2001-02 to 6,303 tonnes during 2002-03. It is exported mainly to Gulf and SAARC countries. Its export to European countries has just started. It is expected that it will further accelerate with the availability of superior fruits of

Mridula, Ruby, Arakta, Bhagwa, etc. India is the largest producer of pomegranates in the world, but it has only 7% share of total world exports. Total world trade of pomegranate is 1,00,000 -1,12,000 tonnes. Spain is biggest exporter to European Union and to some extent to Gulf countries, trading 60-70% of the total world exports. Iran exports about 15,000 tonnes every year. At present, excellent cultivars with good quality fruits are available, thus India can supply almost throughout the year and can become a good player in its export.

Spain exports pomegranates from September to December months which decrease from January onwards. Major exports from Spain are to European Union. Iran exports are mainly to Gulf countries and supplies are at peak during October-December and it decreases from January onwards. In India, its peak production is during December-March and continues up to April-June. Thus, India can export pomegranates from February to June months when there will be no competition from Spain. To enhance exports, increasing production of exportable quality fruits and providing post-harvest handling facilities, are required to be taken up. Then only India's share in exports of pomegranates can increase to 20% in next 7-10 years.

F. Pomegranates in Maharashtra & Karnataka

Pomegranate is an important fruit crop of Maharashtra. It is cultivated in an area of 43,151 ha with a total production of 4, 31,510 tonnes producing about 85% of the total Indian production, thereby leading in Pomegranate production in the country. Within Maharashtra, production of Pomegranate is mainly concentrated in the Western Maharashtra region and the Marathwada region. Pomegranates are commercially cultivated in Solapur, Sangli, Nashik, Ahmednagar, Pune, Dhule, Aurangabad, Satara, Osmanabad and Latur districts. The variety Ganesh, Bhagwa (Red Ruby) cultivated in Maharashtra is suitable for export purposes. At present fair amounts of exports of Pomegranate takes place from the state in Reefer containers by sea.

For production of quality planting material one nursery of 4 ha has been proposed to be established in the Solapur district under private sector and another small nursery of 1 ha in the public sector in Pune district. The new areas should be brought under Ruby, Bhagwa and Arakta varieties. Considering the importance of pomegranate, the National Horticulture Mission has proposed to bring 10,000 ha area under new plantation and rejuvenation of 5000 ha of area is also proposed.

Plantation of ruby variety should be encouraged for export oriented production. Though Maharashtra leads in the production of pomegranate, post harvest infrastructure of the state needs to be strengthened. The present post harvest infrastructure already existing in the state should be utilized along with proposed pack houses, cold storage and reefer vans.

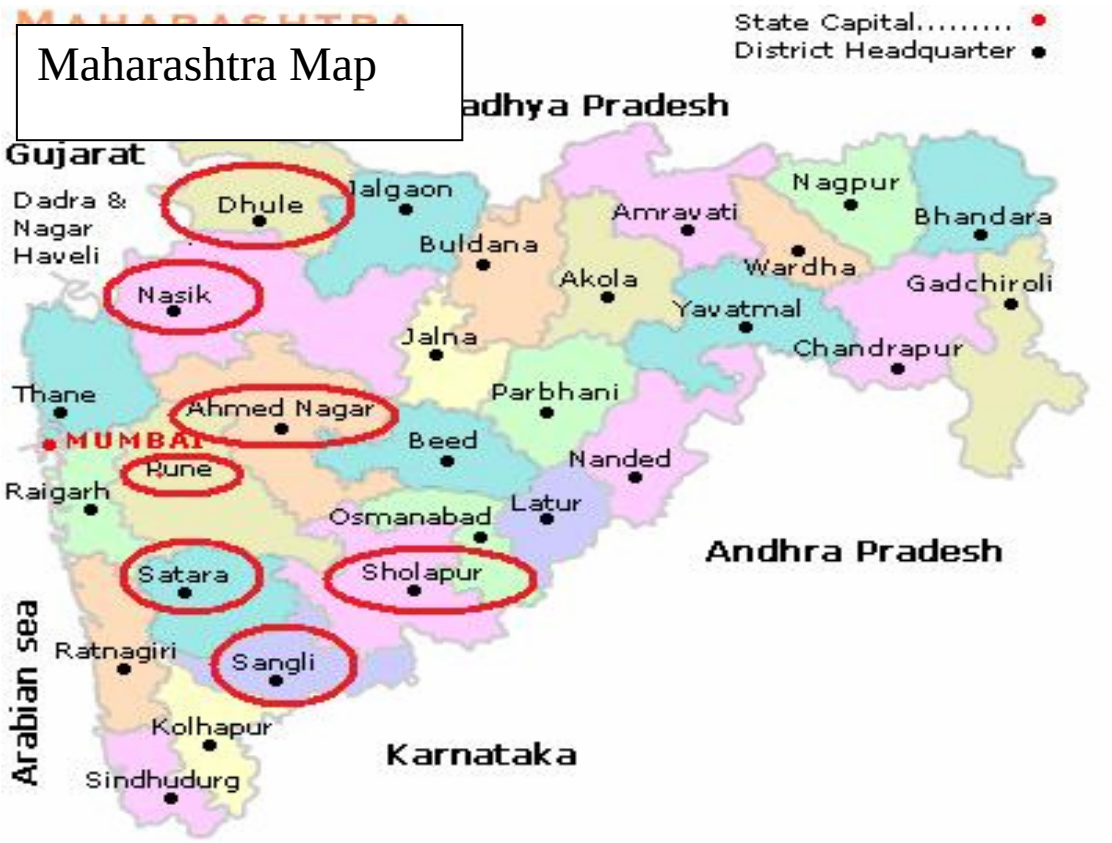
Intervention for Pomegranate

S. N0.	Component/Activity	Location/District	Rate of assistance/ Unit (Rs.)	Total Cost (Rs. lakh)
1.	Production of planting material			
(a)	Model Nursery (4 ha.) private sector – 1	Solapur	9.0	9.0
(b)	Small nursery (1 ha) Public sector	Nasik	3.0	3.0
2.	Plantation of new Orchards (10,000 hectares	Nasik, Ahmednagar, Pune, Solapur, Satara, Sangli	Rs. 22,500/-hac.	1125
3.	Rejuvenation of old orchards (5000 ha)	Nasik, Ahmednagar, Pune, Solapur, Sangli	Rs. 15000/ha	750
	Post-harvest infrastructure			
4.	Pack house (20 Nos.)	Nasik-5, Ahmednagar-3, Pune-3, Solapur-5, Sangli-3, Satara-1	Rs 2.5 lakh each. Subsidy @ 25% for general area and 33.33% for Tribal/Hilly areas	12.5
5.	Mobile pre cooling unit (2 no.)	Nasik, Solapur	24 lakh/unit	48
6.	Multi commodity Cold Storage	Solapur	Rs 2.0 crores each subsidy @ 25% of the capital	50
7.	Reefer Van	Solapur	Rs. 24 lac each	24
9.	IPM (3200 ha)	Nasik (1000 ha), Ahmednagar (250 ha), Latur (500 ha), Solapur (500 ha), Sangli (700 ha), Satara (250 ha)	Rs. 1000/ ha	32
			Total	2053.5

Source: Maharashtra State Horticulture Mission

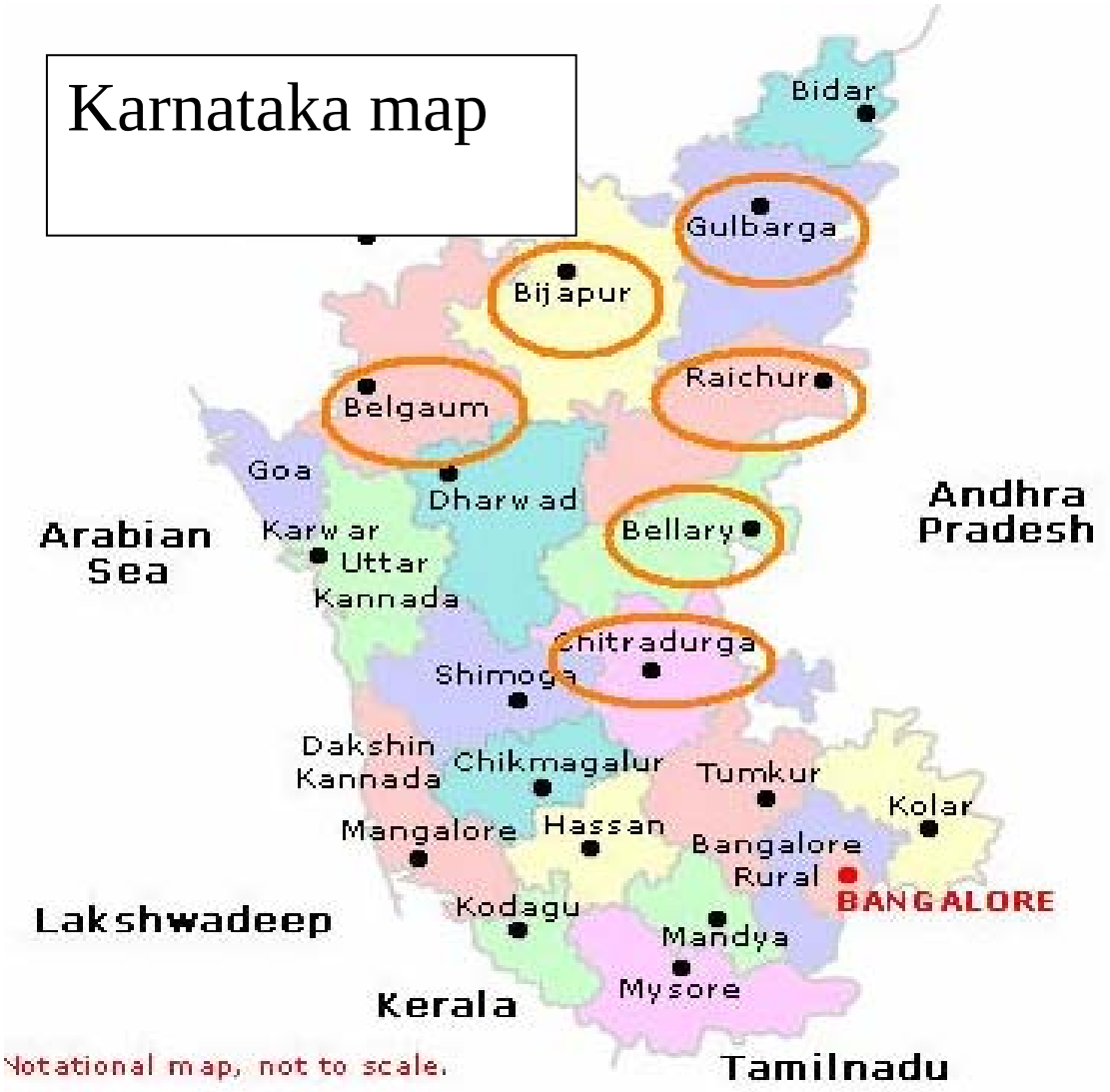
Most of the pomegranate is marketed as a fresh fruit, although some quantity of its produce is also stored in cold stores since it has good shelf-life. Maximum arrivals of pomegranate in Delhi markets are during January – February but prices are usually the lowest during November – December. Lowest arrivals in Azadpur market, Mumbai, Ahmedabad and Bangalore are during April to June months. It costs Rs.5000- 8000 per quintal in Delhi markets as against Rs. 3000 - 6000 per quintal in Maharashtra. An AEZ for Pomegranate has been set up in districts of Solapur, Sangli, Ahmednagar, Pune, Nasik Osmanabad and Latur for integrated development of this crop.

<u>Major Pomegranate growing areas in Maharashtra are marked below:</u>



Solapur, Nasik, Sangli, Ahmednagar, pune have the maximum amount of area under pomegranate in Maharastra and Bellary, Bijapur, Chitradurga have maximum area under this crop in Karnataka. The Pomegranate cultivating area has been increased by five times and the quantity has been increased by 166.64% in Maharashtra

Major Pomegranate growing areas in Karnataka are marked below:



G. Agronomical Practices for Pomegranate

Climate: It can grow up to an elevation of 1600 meters. It prefers hot dry summers and cool winters. Pomegranate is a hardy plant and can withstand considerable drought and frost but can do well in irrigated conditions.

Soil: It is not particular about its soil requirements it can grow on soils which are considered unsuitable for other crops. It can tolerate alkaline and wet soils also.

Propagation: Seed propagation is common. Hard wood stem cuttings are easy. It can also be propagated by simple layering or through root suckers.

Planting: The rooted cuttings or layers are usually planted in the beginning of the monsoon or in spring season in square or hexagonal system.

Spacing: 3-5 m apart.

Pruning: The plant produces suckers from base which do not bear any crop. The suckers are to be removed as soon as they arise. The fruits are born terminally on short spurs arising from mature shoots

Flowering: Ambe bahar, Mrig bahar and Hasta bahar are the flowering seasons. Farmers of Pomegranate are advised to take Hasta Bahar flowering by pruning in August and harvesting in March. This practice helps to prevent bacterial blight (*Xanthomonas axonopodis cv. Punicae)* problem.

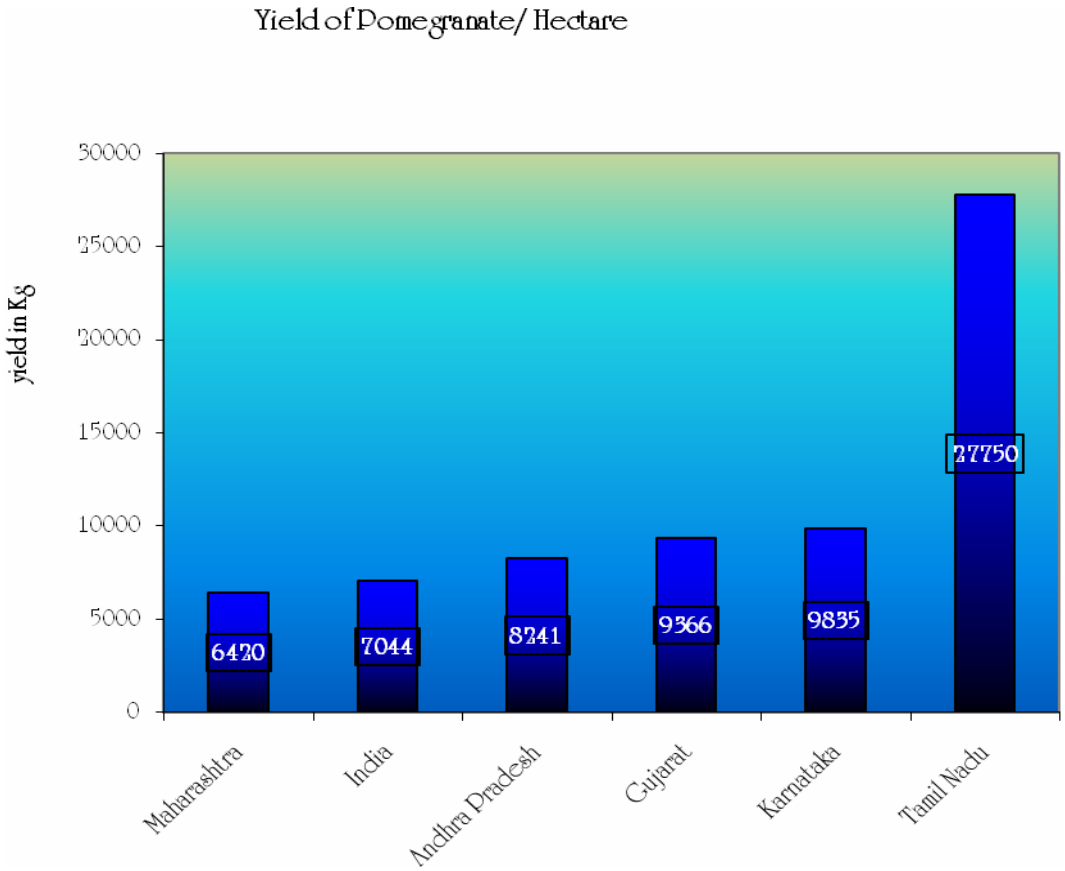
Economic value: The edible part of the Pomegranate is the juicy out growth of the seed called Aril. The fruit juice is considered to be useful for patients suffering from leprosy. The bark and the rind of the fruit are commonly used against dysentery and diarrhoea.

Food Value Per 100 g of Edible Portion*	
Calories	63-78
Moisture	72.6-86.4 g
Protein	0.05-1.6 g
Fat	Trace only to 0.9 g
Carbohydrates	15.4-19.6 g
Fiber	3.4-5.0 g
Ash	0.36-0.73 g
Calcium	3-12 mg

Phosphorus	8-37 mg
Iron	0.3-1.2 mg
Sodium	3 mg
Potassium	259 mg
Carotene	None to Trace
Thiamine	0.003 mg
Riboflavin	0.012-0.03 mg
Niacin	0.180-0.3 mg
Ascorbic Acid	4-4.2 mg
Citric Acid	0.46-3.6 mg
Boric Acid	0.005 mg

*Analysis of fresh juice sacs made by various investigators.

H. Productivity of Pomegranate in India



The Indian average is 7044 kg/ha. Only Maharashtra is below Indian average whereas all other states are showing a better average than Indian average. But because of very less contribution in terms of production from other states, the overall average is not that good. Encouraging aspect in this is that the areas which are taking up Pomegranate cultivation are having high yields and their contribution is increasing which is further supporting India's scope. Also the National Resource Centre for Pomegranate at Solapur is aiming development of diseases resistant varieties and high yielding varieties.

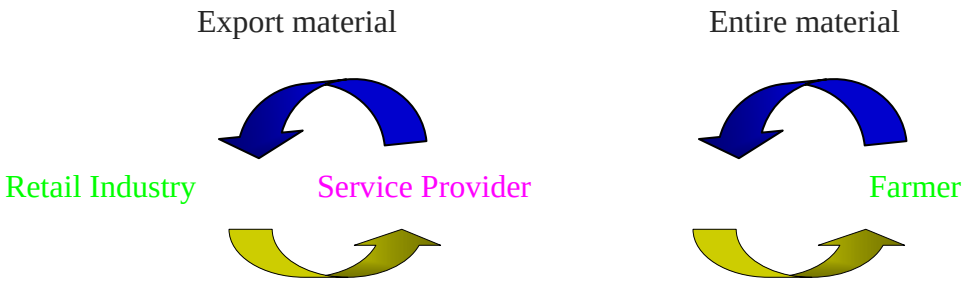
CHAPTER III

CRITICAL OBSERVATIONS ON POMEGRANATE PROCUREMENT

A. Present Procurement strategy adopted by various Retail Industries:

At present the procurement of Pomegranate is done only for the export purpose. Since the cultivation of the Pomegranate in India is done in patches, the major areas of concentration for procurement of the Pomegranate by the Field Fresh are Maharashtra and Karnataka. The reasons for their selection was, those two states account for more than 90% of the total Indian Pomegranate production. Also the farmers in those two states are progressive and have a fair understanding of the crop. The soils and climate are also very much congenial for Pomegranate growth.

A retail industry procures the fruits from the farmers through the Service providers. Initially they identify the major prospective areas and appoint the service providers. The service providers have fair contacts with the Pomegranate farmers and arrange the ground for the procurement. The concerned industry personnel visit the field and estimate the amount of the export quality produce that can be obtained from the field. The service provider will purchase the entire produce of the field from the farmer. Out of the entire produce which ever is of the export quality, that is separated and procured by the concerned buyers and the amount is paid on ‘per Kg’ basis. The company personnel, one from the procurement department and the other from the quality control, closely monitor the entire procedure from harvesting to packing.



Retail Industry carton for export

Filler material

After the packing is done, the following details are marked by the company person on the carton.

- ✓ Net weight
- ✓ Fruit count inside the carton.
- ✓ The cold storage where it is being sent.
- ✓ And a stamp impression.

For example if the impression shows **005970420**, 0059 stands for the farmer

Code given by the Company, 7 stands for the year 2007, 04 stands for the month April and the last two digits 20 stand for the date. This helps in tracing back the produce of a particular carton, to know the field from which it was brought.

There are four forms which are used during procurement process as follows:

1. Procurement Order Slip
2. Goods Received Note
3. Weighment sheet
4. Delivery Challan

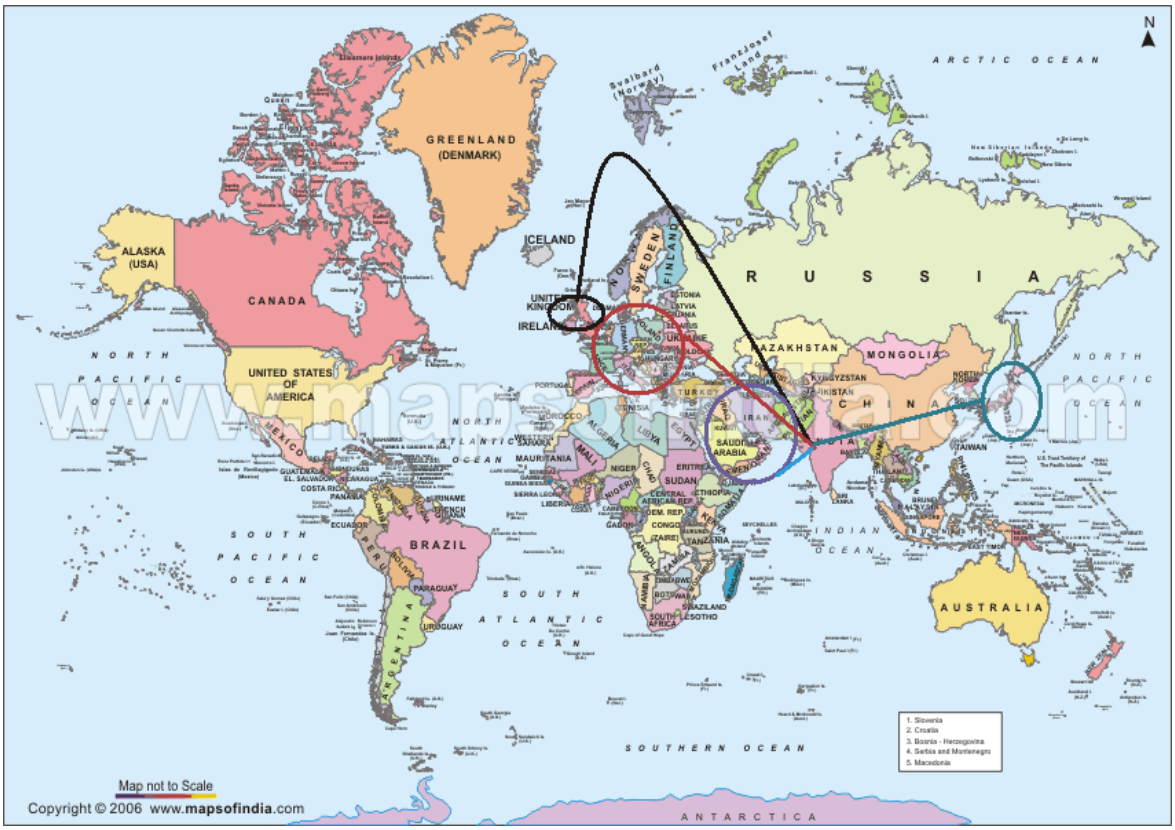
Procurement Order slip: It is given by the company to the farmer or other source of the produce. Terms and conditions, quality and quantity requirements of the company are all mentioned in this procurement order slip.

Goods Received Note: This is given by the company after receiving the produce from the farmer or service provider. It gives the details about the how much material received and how much rejected and also description of the material if any.

Weighment sheet: As the name describes, it tells about the weighment details of the produce.

Delivery Challan: It has the details about the shipping location, type of delivery whether it is a sales despatch, stock transfer, wastage disposal etc. It also mentions the details of the vehicle by which it is being transported to the shipping location. The containers filled with the material are then exported to different parts of the world like United Kingdom, Middle Eastern countries and some European countries.

Export destinations:



Presently the major clients for the filed fresh are Middle Eastern countries and European countries. The specifications of the countries vary from one another the European exports need high quality produce compared to the Middle East and so the price offered by the company to the farmer for the two qualities. Field fresh should find new markets like Far East for its Pomegranates.

B. Procurement: Here the procurement of Pomegranate is dealt in five heads as

1. Quality

2. Quantity
3. Price
4. Time
5. Source

1. QUALITY

In order to maintain high quality levels and food safety standards, retail industries has partnered with SGS, a world leader in quality control. Their farms are HACCP, EUROGAP, BRC and AVA accredited.

The desirable fruit characters of fresh **Pomegranate for export purpose are**

- Dark rose pink colour of the fruit.
- Fruit weight around 500 Gms.
- Round and globose shape of the fruit.
- Uniform size and shape of the fruit in a pack or box.
- Dark rose pink arils.
- Softness of the seeds.
- Higher sugar content near about 16-17 Brix.
- Free from scars, rossetting, disease spots, insect injury, scratches, etc.
- Smooth cutting at the stem end.
- Pleasant flavour and aroma
- Bracts/calyx without any damage and having freshness.

Consumer's Preference:

- Consumer preference is changing from time to time and from country to country.
- Earlier, Ganesh variety with big sized fruits was the preferred one, and the fruits were exported to the Gulf countries.
- Now, in Europe and other parts of the world, varieties such as Bhagwa (Kesar), Mridula are the suitable and accepted ones.

Soft seeded, coloured varieties with high per cent of juice with easy to remove arils are preferred. Fruits weighing more than 500 Gms with superior qualities have immediate and ready acceptance in the international market.

Company has quality control persons to look after the quality aspects of the fresh fruits. Quality aspects include,

- Size of the fruit
- Shape of the fruit
- Colour of the fruit
- Sunburn effect
- Thrips attack
- Mealy bug
- Bacterial spot.
- Sugar content

Size of the fruit: The size of the fruit that is to be procured depends upon the requirements of the importer located abroad. Generally the Pomegranate is graded depending upon its size. Different grades in Pomegranate are as follows

International Grading based on size and colour.

S.No	**Name Given**	**Description of the fruit**
1	Super size	Fruits are free from spots and fruit weight is more than750grams
2	King size	Fruits are attractive and fruit weight is 500-700 grams

3	Queen size	Fruits are attractive, red and fruit weight is 400-500 grams
4	Prince size	Fruits are attractive, red and fruit weight is 300-400 grams.

Mandi Grades:

Export quality – 10 counts, 12 counts, and 15 count of superior quality which are more than 220 gm.

12 S – 12 fruits weigh 5 kg (416 gm)

12 A – 12 fruits weigh 5 Kg but not as good as 12 S in quality. (416 gm)

27 A – 27 fruits weigh 9 Kg (330 gm)

24 A – 24 fruits weigh 6 Kg (250 gm)

48 F – 48 fruits weigh 9 Kg (190 gm)

Loose – fruits in 9 Kg packs (<190 gm)

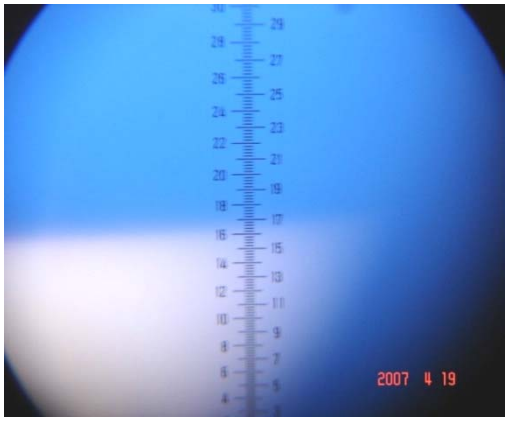
 # The weight in brackets is the average weight of each fruit of the respective grade

Shape: The fruit should be globosely and round in shape and firm.

Colour: Dark rose pink colour of the fruit and dark rose pink arils are preferred. As the temperatures increases the colour of the arils decreases. So the colour of the arils is dark red in the months of November and becomes light as it proceeds towards the hotter months of May and June.

Sugar content: The fruit should neither be over ripen nor under ripen. The sugar content should be above 15 Brix at 20 degrees. Brix reading is taken by a Refractometer. The juice taken from the arils is put in the Hand refractometer and the reading is taken. If it is above 15, it is considered to be suitable for export. The testing is done at random in the field.

Hand refractometer



Refractometer reading

Sunburn effect: The fruits are checked for any sunburn damage. Sunburn damage can be identified by the black colour on the surface of the fruit .The fruits affected by the sunburn rot internally.

Thrips attack: The fruits damaged by thrips shows scraping of the colour on its rind. The rind of the fruit looses its smoothness.

Mealy bug: Bracts/Calyx should not be damaged and should appear fresh.

Immediately after harvesting and grading fungicide Captan 50% WP is diluted at 2 gm per litre water and all the fruits are wiped off with a clean and soft white cloth before packing into the cartons to prevent the fruits from fungal infections.

TECHNIQUE USED:

SYSTEMIC RANDOM SAMPLING

ESTIMATING THE PRICE FOR AN ORCHARD:

Step: 1- Know the size of the orchard (no. of plants)

Step: 2- Survey the orchard for the homogeneity, the more the heterogeneity the large should be the sample size.

Step: 3- Decide the sample size

Step: 4- Find the number of rows in the orchard

Step: 5- Divide the sample size by the number of rows (gives the no. of samples to be taken per each row)

Step: 6- Find the no. of plants in a row and divide it by no of samples to be taken in a row, we get a number, say 'n'

Step: 7- Select any plant in a row and take the samples from every 'n'th plant

SAMPLING DETAILS:

	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13	S-14
EXPORT(X)														
12-S (a)														
12-A (b)														
27-A (c)														
24-A (d)														
48-F (e)														
LOOSE(f)														
TOTAL														

AVG QTY OF EACH GRADE PER PLANT X AVG WEIGHT OF EACH GRADE X AVG PRICE OF EACH GRADE = VALUE OF EACH GRADE PER PLANT

SUM OF THE VALUES OF ALL GRADES = VALUE OF EACH PLANT

VALUE OF EACH PLANT X TOTAL NO. OF PLANTS IN AN ORCHARD = VALUE OF THE ORCHARD

* Avg price of grades are as per the mandi price of that day

2. QUANTITY:

The quantity to be procured depends on the orders from the foreign countries. Presently, since field fresh is engaged only in the export of the fresh Pomegranate we are looking at the procurement of only the export quality. The recovery of the export quality fruit from the orchards vary from one to the other depending upon the variety, management and the age of the orchard. An orchard which can give an export quality of around 40% is desired. Entire export material is filled in cartons with different counts. Carton-counts may be 10, 12 and 15.

12 COUNT

15 COUNT

If the size of the fruit is big only 10 may get into a carton. Some customers specify only 10 counts and 12 counts.

200 cartons are required to make a pallet. A pallet contain 20 layers and with each layer having 10 cartons.

a20 pallets can be loaded in a big container and 9 pallets in a small container. There fore 4000 cartons are needed to fill a big container.

4000 X 4(Net wt of each carton) = 16 tonnes (approx).Pallets help in retaining the structure of the cartons and also protects the fruits from getting damaged while transportation.

PALLET:

A pallet is made of 200 cartons packed together in 20 layers of 10 cartons each.

Pallets in Cold storage

1	2
4	3
5	6
8	7
9	10
12	11
13	14
16	15
17	18
20	19

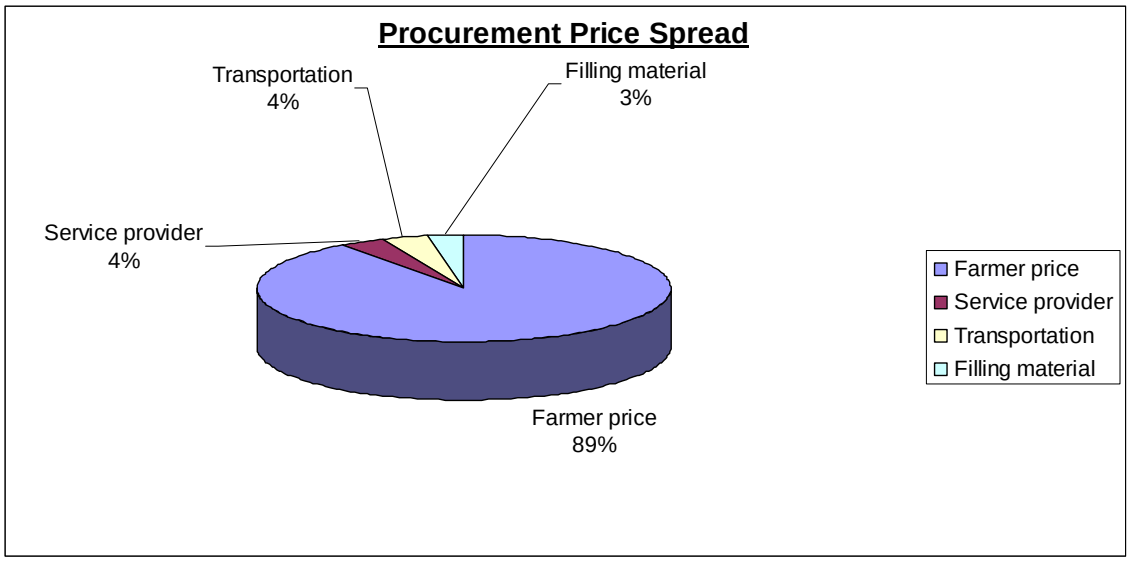
layout in Container

These pallets are loaded into the container in the layout shown above. The pallets are formed with the help of wood and card boards which prevent the cartons from getting damaged while transportation. Presently the palletisation is being done by the carpenters and no specialists for doing that were employed. If it is not properly done, it is very difficult to fit these pallets into the container.

3. PRICE

Pricing of the orchard generally depend on the quantity of the export quality fruit that can be recovered from it. There is no scientific method of calculating the price of the orchard. It is only the experience which allows a person to estimate the price of an orchard. But to arrive closely at determining the price of the orchard here is one method.

Retail industries are procuring the Pomegranate from the farmers through the service providers. The price that is offered by the filed fresh at present is 50/- per kg of export material. The entire pricing structure that is costing to the company for procurement of the fruit till it reaches the cold storage is as follows



Though the main cost of the procurement is the pomegranate itself, the other costs involved are the transportation costs from the orchard to the cold storage, the service provider commission and the cost of the filler material like the white coloured cut paper which provides cushion to the fruit and also to absorb the unwanted moisture.

4. TIME:

Fresh fruit of Pomegranate is available from October onwards. Best quality fruits are available from November to March due to low temperatures. The required quantity to fill a container is about 4000 cartons. Each filled carton weighs around 4.5 Kg which include the weight of filling material and the carton weight.

KAPPEC, Bijapur

If the net weight in every carton is taken as 4 Kg, the total fruit requirement to fill a single container is 16000 Kg (4000 * 4). Our present export target is 30 containers. So, the quantity required is 16000 * 30 = 480000 Kg (480 tons).

This total quantity is to be procured in about seven months. It is desired to fill a container (16 tons) as quickly as possible to reduce the container charges as well as the cold storage charges. The cold storage charges at KAPPEC (Karnataka \Agricultural Produce processing and Export Corporation Limited) at present for Pomegranate is 3.50/-per Kg/10 days. Presently the KAPPEC is having a capacity of 40 and 25 metric tonnes in its two spaces. There will be additional charge if the produce is to be stored for a period of more than 10 days.

Some other cold storages which retail industries is utilising are

Jai vaibhav cold storage – Sangli, Maharashtra

Targaon – Mane Rajuri Road, Basumbe

Bhandari cold storage, Nasik

Pre-cooling chamber and cold storage

Inside the cold storage

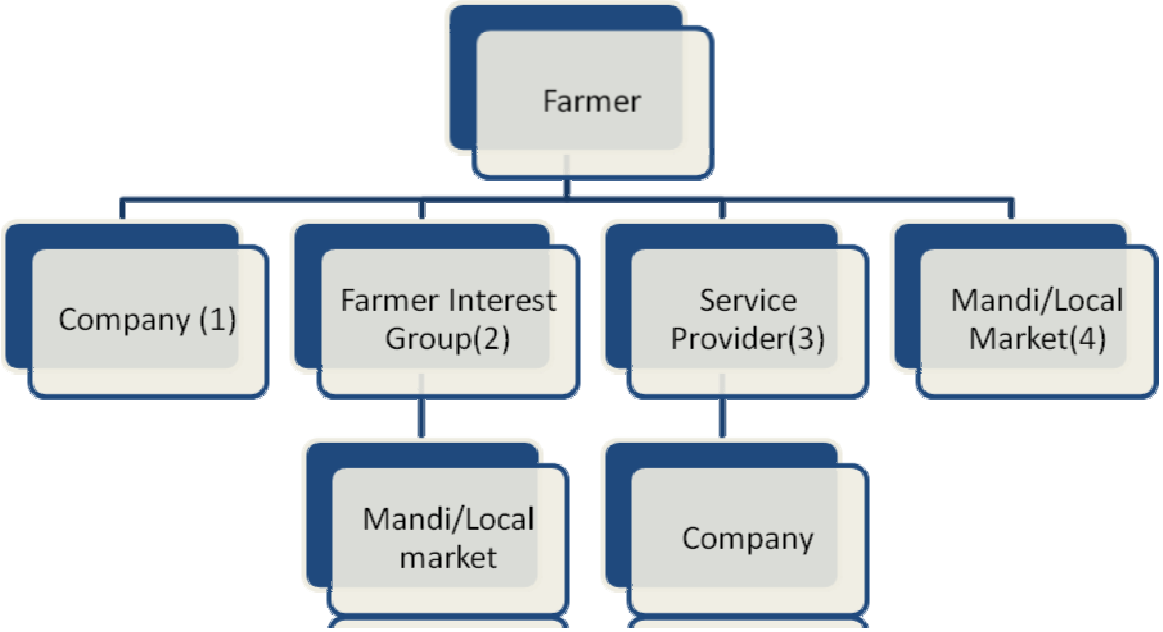
The pallets are loaded into the container for transportation to the shipping point. It is to be checked that the container's inside temperature is around the 5-6 degrees centigrade before loading the pallets into it. It is then sealed and sent to the shipping location.

5. SOURCE:

The source of the procurement is farmers of the Karnataka and Maharashtra. During the months of November, December, January the major sourcing is from Sangola and Pandharpur of Maharashtra. February onwards the areas like Kustagi, Bellary become the sources. In June Satana, Malegaon, forms the sources of Pomegranate. Service providers appointed by the company form the link between the Farmers and the Company.

C. SUPPLY OF HARVESTED PRODUCE

In the current scenario, after the harvest of the Pomegranate the farmer can send his produce to the market in four different ways. The advantage of each channel is given below both from the farmer as well as from the company side.



Channel-1: The Company comes in direct contact with the farmer and there is no middleman.

The advantage to the farmer is that he need not pay the commission to the agent as he is eliminated.

The advantage for the company is that he is close to the farmer and there is a relationship building between the company and the farmer. Even the company need not pay any commission to the service providers and it can pay a better price to the farmer to see that he is satisfied.

Limitation: The Company has to handle everything which needs more manpower and it is cumbersome. The company should spend lot of time in locating the pomegranate farmers and their harvesting schedules.

Channel-II: The farmers form a group of their interest for better bargaining and to distribute the cost of storage and transport expenses.

Farmers can derive better price since they are in a group.

The company can avail material from these farmer interest groups which also do not include middleman.

Channel-III: This involves a service provider in between farmer and the company or market.

Advantage: The farmers need not look into the packing and grading aspects. He need not bother about the transport and storage of the produce.

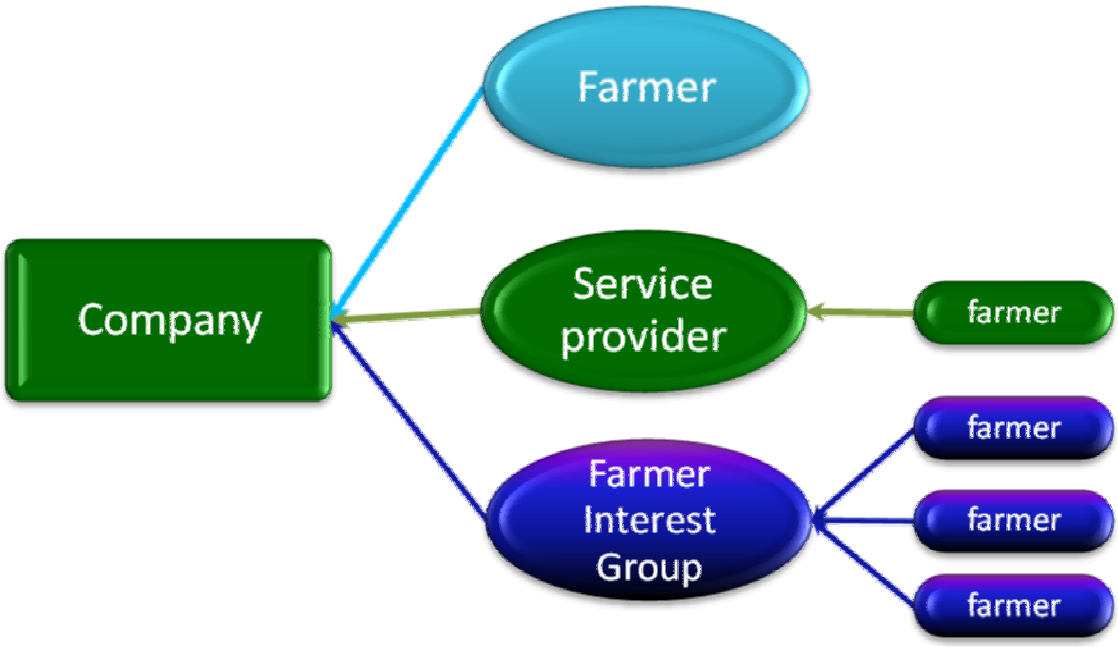
The advantage for the company is that it need not worry in finding the farmers and the harvesting schedules of different orchards. It also need not worry about the produce other than export quality as that is taken care of by the service provider

Channel-IV: Farmer directly sells his produce in the Mandi. In this, farmer have a little say about the price in the market and he may go for distress sale as he may not go back home with the produce keeping in view of the transportation and storage costs involved in it and also they are born by him alone.

Company perspective: Company can go in the below mentioned three ways to procure the pomegranate. Currently it is operating in the middle path. It can operate in the other

two paths to eliminate service provider which makes him to deal with the farmers directly and also helps in getting good rapport with the farmer.

Below: Possible ways that the company can procure the Pomegranate.



D. MARKETING OF POMEGRANATE

Here is an attempt to look at the total arrivals to the markets in Karnataka and Maharashtra and the price variation over a period of six months starting from December to the end of the may.

The daily market arrivals of Pomegranate are taken for those six months when the production is considered to be the highest, from agmarket.nic.in website and they are compiled monthly wise and analysed.

The markets taken into consideration are:

Karnataka:

Binny Mill (F&V), Bangalore

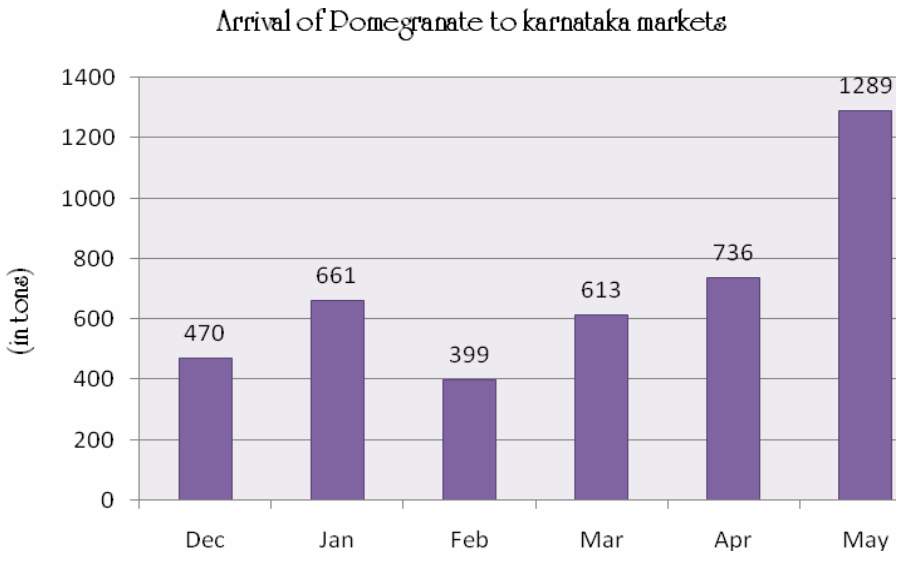
Maharashtra:

Nagpur, Nasik, Sangli (Phale, bhajipura market), Jalgaon, Parbhani, Aurangabad, Chandrapur, Kolhapur etc.

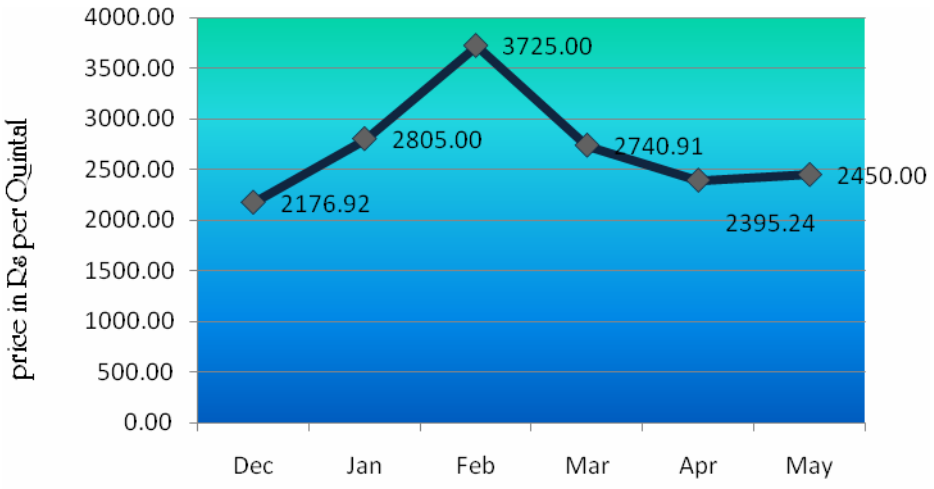
The arrivals are taken in tons and the price is per quintal.

Findings from the Data:

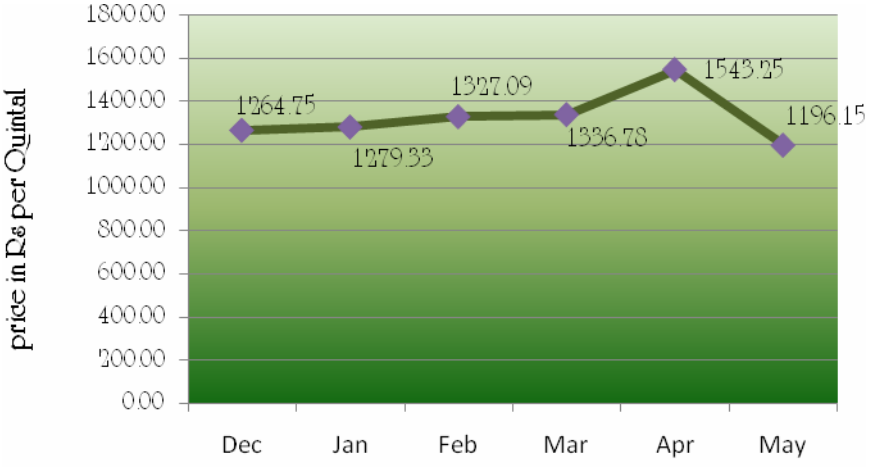
- Quantity wise the Maharashtra markets are receiving more material with about 6285.5 tons within a period of six months and Karnataka with 4168 tons.
- But the prices in Karnataka are higher compared to Maharashtra ranging from 2176 to 3725 per quintal with Dec being lowest and February being highest.
- While in Maharashtra the prices ranging from 1196 to 1543 per quintal with May prices at the lowest side and April being highest.
- Also the prices are more stable in Maharashtra but volatile in Karnataka
- The arrivals in the month of February are the least in Karnataka and it is second highest month in Maharashtra.
- But in both the markets month of May is the best in terms of arrivals.
- It is evident that the prices of Maharashtra are low because of their low quality but they are some what stable with not much variation. So company can try to increase the productivity of those orchards by providing them the technical support, and increase their efficiency of sourcing the fresh fruits from them.



Monthlywise arrivals of Pomegranate in Maharashtra markets



Pomegranate price fluctuations in Karnataka



Pomegranate Price fluctuations in Maharashtra

CHAPTER IV

TECHNOLOGICAL INITIATIVES IN POMEGRANATE

As per the directives from ICAR, surveys of pomegranate orchards in the Maharashtra state were carried out during July 3 to 5 2006 and February 19 to 22 2007 by the scientist of NRCP Solapur, MPKV Rahuri, IIHR Bangalore, Directorate of plant protection Nagpur and Bangalore to assess the damage to pomegranate crop due to importanat diseases and insect-pests prevalent in the region.

A. Research Achievements:

Crop improvement

- A national pomegranate gene bank has been established in 2006. More than 85 accessions collected from different places.

Crop production

- In all 75 orchards were surveyed, 15 in Nashik and 60 in Solapur district during December 2005 - July 2006.
- Ganesh, Bhagwa, Phule Arakta and Mridula were the important pomegranate cultivars grown in Solapur and Nashik with cv. Bhagwa covering the maximum area.
- Air layering (gootee) was the most common method of propagation.
- Multistem (2-4 branches) system of training was being followed by growers and plants were kept in proper shape through pruning.
- All pomegranate orchards revealed drip irrigation; in addition some orchards had also irrigation channels.
- Sole cropping system was more common. Intercropping with gram ,watermelon, onion and brinjal was also practiced in some of the orchards of 1-3 year age.
- Use of FYM and NPK fertilizers was common. However, some growers also applied neem cake at the time of bahar treatment.

- Majority of the growers practiced Hasta bahar , while others practiced Ambe and Mrig bahars.
- Analysis of soil samples, revealed that pomegranate was cultivated in all soil types in the state
- Soil pH varied between 7.6 to 8.1, EC between 0.16 to 0.31 dS/m, organic carbon between 0.92 and 1.43 %.
- Soil fertility status showed that available N, P and K ranged from 196 to 266, 8.61 to 19.2 and 179.0 to 627.0 kg/ha, respectively while soil Micro Nutrients Fe, Mn, Zn and Cu were present in sufficient range.

Crop Protection

- Surveys of 82 pomegranate orchards in the State were carried out to identify the major diseases , disorders and insect pests in the region .
- Diseased samples collected during the surveys were observed under the microscope and used for isolating the pathogens in pure culture.
- The main diseases observed during the surveys were bacterial blight caused by *Xanthomonas axonopodis pv. punicae* (upto 100.0% severity in some orchards) , Pomegranate wilt (70.0% severity), known to be a complex problem due to association of abiotic (improper drainage and heavy soils) and biotic (association of pathogens like *Fusarium oxysporum, Rhizoctonia solani, Ceratocystis fimbriata)* factors.
- Other diseases of minor importance were leaf and fruit spots (5-60% severity) caused by *Cercospora punicae, Colletotrichum gloeosporioides, Alternaria alternata,* and fruit rot (13.63%) caused by *Rhizopus s*p., and *Colletotrichum* spp.)
- The major disorders observed were i) Internal breakdown of arils ii) Sun scald and iii) Fruit cracking.
- No commercially growing cultivar was found resistant to either bacterial blight or pomegranate wilt.
- Amongst insect pests fruit borer (*Deudorix isocrates*) infestation was observed in 13.6% orchards . Stem borer (*Coelosterna isocrates*) and bark eating caterpillar *(Inderbela quadrinotata*) were also observed in some orchards.

- Besides, aphids, white flies, mites and nematodes were prevalent in isolated orchards.

B. Present Status

- Govt. of Maharashtra has announced the creation of an Agri Export Zone for Pomegranate covering the Districts of Nashik, Pune, Sangli, Solapur, Osmanabad, Latur and Ahmednagar.
- The MSAMB has been named the nodal agency by the Govt of Maharashtra.
- A Detailed Project Report (DPR) submitted by MSAMB has been approved
- MoU signed between Govt of Maharashtra and Govt of India on 9th June 2003.

  Maharashtra State Agricultural Marketing Board in coordination with State agricultural department, Local APMC and cooperative societies continuously arranging training and demonstration programs in rural area to increase export quality production. The training booklet prepared with the help of experts covering pre and post harvest technology of concerned crop is circulated freely among farmers likewise-
- During the year 2003-04, 2032 farmers were trained in 34 one-day training programs.
- During the year 2005-06, 2458 farmers were trained in 32 training programs.
- In the current year MSAMB has planned to conduct 60 one day training programs for farmers.
  Dist. (Latur)- Nilanga
  Dist. (Pune)- Valati, Gavdevadi, Sangli, Korhale, Rahu
  Dist. (Solapur)-Akluj
  Dist. (Nasik)- Deola, Nampur
  Dist. (Osmanabad)- Osmanabad

- **Investment-** MSAMB with the help of APEDA, New Delhi and APMC Baramati has started the Pomegranate export facility center at Baramati Dist.Pune. The facility have following different units-
  Precooling= 5 Mts.
  Cold storage= 60Mts.
  Mechanical Handling System= 1.5 Mts/hr.

C. EUREPGAP CERTIFICATION FOR GOOD AGRICULTURAL PRACTICES:

Due to global expansion in food trade, the World Trade Organization (WTO) has set as one of their objectives the opening up of trade between countries and aims to address restrictive trade barriers.
Sanitary and phyto-sanitary (SPS) issues have always been important in global trade and have become one of the most important potential Technical Barriers to Trade (TBT). Pests or pathogens may exist in one country but not in another, thus ultimately resulting in restrictive TBT. In addition, food safety has become one of the most important minimum requirements for future trade with developed countries. The rapid increase in newly reported cases of outbreaks of food-borne diseases particularly associated with fresh produce has been the primary drive towards establishing minimum food safety standards. To be part of global trade in fresh produce and food related products it will in future require compliance to some kind of food safety assurance system.

The global drive towards ensuring safe food supplies must also be seen as part of the focus on food security. Safe food must be ensured in both developed and developing countries and appropriate legislation needs to be put in place to address these concerns. The global emphasis on safe and secure food supplies must also be seen against a backdrop of an increasing number of immuno-compromises people (i.e. HIV / AIDS) as well as increased outbreaks of diseases such as cholera and typhoid, particularly in developing countries, which are often causes by inadequate sanitary measures and contaminated drinking water.

With respect to developed countries such as the European Union, the importance of food safety was emphasized by the recent outbreaks of BSE (Mad Cow disease) and Food and Mouth disease as well as traditional concerns with environmental pollution, particularly pesticides and the issues surrounding Genetically Modified Organisms (GMO). In contrast to this, the main focus of concern in the United States of America is the reported outbreaks of food borne diseases often associated with the consumption of fresh or processes food.

In this scenario the importance of microbial contamination is of major concern and has been the driving force behind the establishment of the USA Good Agricultural Practices (GAP) policies and surveillance systems. Currently, there are numerous systems that growers can adopt to ensure safe food production, which include amongst others Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), Hazard Analysis Critical Control Points (HACCP), Good Hygiene Practices etc.
One of the GAP systems that have taken off within the European community is EUREPGAP. Apart from Germany and France, most other countries within the EU support this system, as do the major retailers, which consider it the minimum standard for food trade. It is important to note that these global standards will hopefully be harmonized but for the time being, major retailers will still have their own set of requirements that growers will have to adhere to.

What is EUREPGAP CERTIFICATION?
EUREPGAP started as a retailer initiative in 1997 with major inputs and support from the chemical companies. EUREPGAP was established by the Euro-Retailer Produce Working Group (EUREP) with the aim of setting standard and procedures for the development of GAP.

What are the Objectives of EUREPGAP?
The main objective of EUREPGAP is, to lead the system to an EN 45011-based accredited certification system, referring to the cope of "EUREPGAP Fruits and Vegetables". Partners from the entire food chain for fruit and vegetable production have agreed upon the EUREPGAP certification document and procedures, which were achieved after extensive consultation over a three-year period.

Benefits -
Certification to EUREPGAP will become mandatory as from March 2003 for farms growing produce for export to Europe, although the EC may allow some latitude in this regard. At this point in time different certification systems could be required for export to other countries such as the USA, and Australia. As Europe is our largest export destination, EUREPGAP certification will in all likelihood become a minimum

requirement for entry into the EU market. However, it should be kept in mind that additional retailer requirements will still have to be met. Discussions are already underway to ensure harmonization between the different food safety schemes and benchmarking will be essential to link the various systems. While certification to EUREPGAP will result in additional costs to growers, there will be numerous benefits. Long-term benefits include more motivated farm workers due to improved facilities, training and better working conditions with a subsequent increase in living standards. This would obviously also result in better productivity and outputs to the ultimate benefit for the grower.

Other benefits include -

- More environmentally sound farming practices
- More judicious use of chemicals and
- Most importantly a cost benefit to the grower due to better management practices enforced by the standard.

It is important to note that EUREPGAP only covers produce up to the farm gate and thereafter other systems such as GMP, HACCP etc will become essential. All food industries must also implement GMP and GHP, both of which are prerequisite programs for HACCP. The South African fish industry, represent a classical case study in terms of its adoption of HACCP. The challenge is now for primary agriculture and the food procession industries to follow this example.

Besides the fruit and vegetables other EUREPGAP certification procedures have been developed for fresh flower, while draft documents covering animal production protocols which includes beef and lamb; pig meat; poultry; eggs; dairy; fish farming; and game/exotic foodstuffs, have been issued. Other drafts for crops, such as barley, beans, wheat, linseed, maize, soybeans, etc. have also been prepared for release. Feed is also in the process of being addressed due to the many food scares over the past few years.

Maharashtra State Agricultural Marketing Board the autonomous apex body has been working effortlessly for Export Promotion M.S.A.M.B. helps to boost exports of farmers by setting up of the Infrastructural facilities required for exports. For exporting certain fruits to some European countries the farmers require to have Eurepgap (European Retailer Parties for Good Agricultural Practices)certificate for exporting their produce. M.S.A.M.B. by realizing the need of time has taken the initiative under the project of FICCI and NORAD organization to issue the Eurepgap certificates to the farmers. This has helped the farmers from Maharashtra State in getting their Eurepgap certificates which will pave the path to capture the European markets for Mangoes & Pomegranates in the near future.

List of Pomegranate Growers Who got Eurepgap Certification through MSAMB

Sr. No.	Name	Address	Contact No.	File No.	Certificate No.	Validity untill
1	Mr Chandane P. Sadashiv	A/P - Akhatpur Tal- Sangola , Dist- Solapur	02187/ 220553/260285 9423066638	EG-433	IS FI 433.4272	2 nd July 2008
2	Mr.Bele Suresh Gangaram	A/P Akhatpur Tal- Sangola , Dist- Solapur	02187/283130 9423065332	EG-434	IS FI 434.4273	2 nd July 2008
3	Mr. Shahaji Ganpat Patil	A/P- Atpadi Tal- Atpadi, Dist- Sangli	02343/220377/ 221250 9423829952	EG-432	IS FI 432.4271	2 nd July 2008
4	Mr. Vithalrao Atyaba Jadhav	Behind Panchayat Samitee A/P- Atpadi, Tal-	02343/220633 9422408510	EG-427	IS FI 427.4269	2 nd July 2008

		Atpadi, Dist- Sangli				
5	Mr. Rajendra Maruti Deshmukh	At- Piliv Tal- Malshiras Dist- Solapur	02185/259015/ 259132 9421021901	EG-429	IS FI 429.4370	10 July 2008
6	Mr. Baburao Ramchandra Gaikwad	A/P- Sangola Tal- Sangola Dist- Solapur	02187/220137/ 220050	EG-428	IS FI 428.4270	2 nd July 2008
7	Mr.Shivaji Dagadu Gund Patil	A/P- Takli-Sikander Tal- Mohol Dist- Solapur	02189/246477/ 246251 9822007744	EG-439	IS FI 439.4276	2 nd July 2008
8	Mr. Kondiba Ramchandra Shid	A/P- Waki-Shivane Tal- Sangola Dist- Solapur	02187/243225/ 9423067105	EG-435	IS FI 435.4371	10 July 2008
9	M/s Deccan Agro Farm Ms Sangeeta Kundalik More Gat no.	725/2 vil Chikmahud Tal- Sangola Dist- Solapur	9850374113/ 9423032613	EG-438	IS FI 438.4275	2 nd July 2008
10	Mr. Ashok Patil Taware/ Ms.Bhagirathi Farm	At post- Shivnagar, Tal- Baramati, Dist- Pune	02112/254672 9325311772	EG-437	IS FI 437.4274	24th July 2008

List of Eurepgap certification agencies in India -
EUREPGAP has recognised this need and intends to provide input from the experiences gained in other sectors to draw similar draft documents. Approved Certification Bodies :-

Name of the	Address & Contact	Contact Person & Email

Certification Agency	Number	Address
Control Union Certifications	Summer Ville, 8th Floor, 33rd-14th Road Junction, Khar (W), Mumbai-400 052, India Tel: +91-22-67255390/91/92/93 Fax: +91-22-67255394/95 Website: www.controlunion.com	Mr. Sanjay Sailas, Sr. Inspector Email: sailas@controlunion.com cuc@controlunion.in, ssl@controlunion.in
ECOCERT India	Sector - 3, S-6/3 &4, Gut No. 102, Hindustan Awas, Walmi – Waluj Road, Nakshatrawadi – 431 002. Aurangabad. Maharashtra State, India. Telefax: +91-240-2377120, 2376949. Website: www.ecocert.in	Dr. Selvam Daniel Country Representative and Director Certification Operations-India Email: office.india@ecocert.com ecocert@sancharnet.in
EUROCERT INDIA	Plot No 372, Phase I, Industrial Area 134113 Panchkula Tel: 172580467, 572900 Fax: 172 569849 Website: www.eurocert1.com	Ravinder Kakkar agri@iclcertifications.com
FoodCert India (p) Ltd	3-6-157 Himayatnagar, 4th floor Victory Vihar Appartments 500 029 Hyderabad Tel: + 91 40 66256146, 23221393 Fax: + 91 40 66256145 www.foodcertindia.com	Srihari Kotela srihari@foodcertindia.com
IMO CONTROL (Pvt.) Ltd.	No. 26, 17th Main, HAL A II Stage 560008 Bangalore Tel: +91 80-52 01 546 Fax: +91 80-52 72 185 www.imocontrol.net	Umesh Chandrasekhar imoind@vsnl.com
INDOCERT	Manikhyanagar Flat No 3, Saket Apartment Katte Galli, Dwarka Nashik 4220011	Sachin S Lambe Inspector cum PRO e-mail: info.nasik@indocert.org

	Phone: 0253-6454109	
SGS India Pvt. Ltd.	2nd Floor, Ridhi-Sidhi App., Near Agarwal Petrol Pump, Sanjivani Nagar Ozar (mig), tal: Niphad nashik-422206 Tel: +91-2550329887 Fax: +91-2550274913 www.sgs.com	Mr. Swapnil kadam Email: Swapnil_Kadam@sgs.com nasik_sgs@sgs.com
TUV SUD South Asia	Off Saki Vihar Road, Saki naka, Andheri (E), Mumbai – 400 072 Tel:+91-22-3082 3082/9797 Fax: +91-22-3082 9595 www.tuv-sud.in	Mr. Mahesh Deshpande Email: Mahesh.Deshpande@tuv.sud.in

D. International Food Safety Standards & Non Tariff Barriers

Undoubtedly, the thrust of any intervention in future has to be on improving quality of pomegranates as defined and understood in international markets. The activities of Agriculture Export Zones, like sourcing of inputs, production, processing, infrastructure development, should be in conformation with international quality standards including compliance of SPS and TBT regulations. Necessary pomegranate information, testing facilities may be provided to exporters and be made known to all stakeholders, including farmers. Thus, the role of Agriculture Export Zones should also include effective quality control and supply chain management beginning from planting suitable varieties to marketing and promotion.

Food safety and agricultural health risk management should be considered as a core competence in India's competitiveness strategy, especially in the context of trade in high-value processed pomegranate. Although new or more stringent standards can serve as a

trade barrier, they act more often as a catalyst for progressive change. Stricter standards can provide a stimulus for investments in supply-chain modernization, provide increased incentives for the adoption of better safety and quality control practices in agriculture and food manufacturing, and help clarify the appropriate and necessary roles of government in food safety and agricultural health management. Rather than degrading the comparative advantage of developing countries, the compliance process can result in new forms of competitive advantage and contribute to more sustainable and profitable trade over the long term.

Government and the private sector should adopt a strategic approach to food safety, agricultural health, and trade, one that takes into account broad commercial and developmental objectives. Among the factors that must be considered are the long-term costs and benefits of compliance and the wider distributional and societal impacts of the available responses. Strategic approaches can be crafted by individual private entities or public agencies, or through various types of collective action.

E. Challenges, Concerns & Strategies

At a macro level, the first challenge is to shift the government's priorities from heavy support and protection to promotion of agricultural diversification, processing, and commercialization. Farmers are not going to get rich by growing cereals when there are already national surpluses, demand growth is slow, and world markets are glutted with the subsidized production of rich-country farmers (providing agri subsidies of nearly US$ 1 bn per day). A set of public policies and investments is required that must include additional public investment in the kinds of rural infrastructure and technologies needed for these new high-value activities, improvements in marketing and distribution systems for higher-value and more perishable foods, and further liberalization of the agro-industrial sector.

The pomegranate supply chain involving the entire network of raw material handlers, transportation of produce, temporary storage and retail marketing are plagued by intermediaries. This leads to a cost build up, which in turn is passed onto the end

consumers, thereby increasing retail prices of pomegranates. Farm gate price of the processed product is only about 35% of the retail price. In other words, the margin at each level leads to an overall price increase of pomegranates. Thus more the intermediaries, more will be the mark-up at each level. Issues that plague supply chains in India include non-transparent pricing, limited financial capability, primitive sorting and grading facilities, rampant wastage, lack of quality and hygiene packaging and absence of market determined prices.

The private business sector can and should play a dominant role in these higher-value market chains, and public policy must strengthen the enabling environment. Although some of the funding for these new investments will come from the private sector, new public investments are also needed. The needed funds might be obtained by reducing some of the huge subsidies that are still maintained on fertilizers, credit, and water for the agriculture sector and that no longer serve a useful purpose.

Another challenge for the “new” high-value agriculture including agro processing is to make it pro-poor. Left to market forces alone, the major beneficiaries of the new high-value agro and agro processing will be mostly the larger and commercially oriented players, as well as farms that are well connected to roads and markets. There is a need to guide the new high value agriculture so that small farms and even many less-favoured regions can be major participants. Achieving broad participation will require improving infrastructure and education in many less favoured regions and communities, ensuring that small farms get the technologies and key inputs they need, and promoting producer marketing organizations that can link small farmers to the new market chains (supermarkets, contractors, processors, exporters etc).

A major effort must be made to reform the rural credit delivery system to reach smallholders. Innovative institutions promoting vertical coordination between farms, firms, and forks (supermarkets) would reduce transaction costs and market risks and would also act as a conduit to funnel more credit into this venture, especially for smallholders. Public policy can make a major contribution by facilitating farmer

organizations, standardization, transparent food safety policies, and contract security between farmers and the processing and retail industry.

It is imperative to develop a network of cottage and small-scale food processing enterprises in rural areas for primary processing of pomegranates to provide opportunities of employment and income generation, good quality raw material to local/rural population at relatively lower rates and primary processed good quality raw material to large industry in cities. Attracting capital infusion into the food processing sector calls for initiatives from the government in playing an enabling role, both at the policy level as also in terms of providing suitable institutional framework. Factors that can help in facilitating the growth of the food processing sector through, inter alia, increased investment flows include Contract Farming, Infrastructure Development and adequate flow of Institutional Credit and Farm Insurance.

Technologies that can be upscaled with relatively lower amount of investments should be promoted with full thrust. In this context, promotion of small and medium enterprise (SME) projects based on Central Food Technological Research Institute (CFTRI) technologies in overseas market, locating suitable partners for facilitating R&D collaboration abroad and technology transfer to foreign companies in the area of food processing, particularly for fruits and vegetables, would be useful.

At present, hardly 2% of the fruits and vegetables produced in the country go through the processing route. Hence, strategies for diversification of agriculture would involve a separate road map for value addition and processing in the fruits and vegetable sector. The government of India is setting up food parks in different parts of the country. The idea behind setting up food parks is to enable small and medium entrepreneurs to find access to capital intensive facilities, such as cold storage, warehouse, quality control labs, effluent treatment plants, etc. The development of such facilities is expected to increase the efficiency of the processing industry.

To encourage and enable the farmers to grow pomegranates in Maharashtra of appropriate and acceptable quality, backward linkages need to be promoted. This calls for strengthening the link between the processing industry and the farmer. The existing institutional infrastructure like local bodies, cooperatives and self-help groups can work in unison to effectively strengthen the backward linkages. There is also a need to establish strong linkage between the processor and the market in order to effect cost economies by elimination of avoidable intermediaries. Establishing a marketing network with an apex body to ensure proper marketing is crucial. The approach should aim at the development of marketing capabilities both with regard to infrastructure and quality, in order to promote competitive capabilities, to face not only the WTO challenge but also to undertake exports in a major way.

The role of ICT in agribusiness is now seen to be indispensable. Case studies have demonstrated significant benefits to small and marginal farmers in almost every respect. To be of use to farmers, the information should be rendered into locality specific knowledge that pomegranate farmers can use to plan their activities and maximize the benefits. R&D requires multi-dimensional focus to improve the capability of the food processing sector to service export markets. Some of the activities, where R&D interface increases export competitiveness include understanding the overseas market requirements and opportunities, developing commercially successful production varieties of pomegranate, identifying new applications/usage of pomegranates to gain consumer acceptance in overseas markets, cold storage facilities, supply chain management for improving the quality and shelf life of produce, high-tech packaging to extend the shelf life, and application of disinfestations technology to reduce the use of chemicals and integrated pest management technology to meet international residue standards for pomegranate.

F. The Way Forward

The experience of many countries world over suggests that export orientation of the agriculture sector is one of the prerequisites for its success in global trade. Further, it has also been observed that export orientation of agriculture sector is sustained when

complemented with a sizeable processing industry and strong internal market. As India lacks these requirements, much success on the export front has not been achieved, though India is at the forefront of production under various segments including pomegranates. To provide a push to agri exports, there is a need to follow a five-pronged strategy. This includes Product Segmentation, Market Diversification, Market Penetration, Value Addition and Agriculture Infrastructure Upgradation. Pomegranate farmers also need to be given risk protection across various aspects like market risk protection and production risk protection.

The two golden rules for successful development of the pomegranate sector are to ensure consistency in supply and provide recorded and demonstrated traceability of products. Thus, production strategies are the most crucial in strategy development.

Producer strategy should be designed based on financial resources, managerial skills and entrepreneurial capacity. The development strategy should be based on innovation. Production innovations initially focused on efficiency and effectiveness in order to increase yields and lower costs. Now it is important that the production innovations should focus on developing sustainable production techniques for pomegranates, and also focus on adding value in terms of packaging and processing.

Development of pomegranate sector should be accompanied by the growth of the food processing industry in Maharashtra. The opportunity exists to promote the industry by intensifying production of a required, appropriate variety of pomegranates for the products like juice, concentrates etc. Thus the production strategy should target not only meeting domestic and export demand of fresh pomegranate products but also of the processed products. There is the need to improve post-harvest operations related to handling, storage and marketing of fresh and processed produce.

Volumes saved in post-harvest losses are actually the surpluses generated, without additional cost. The pomegranate sector has an immense potential of generating employment. An additional employment can be generated by the development of

pomegranate-based agro processing units. This sector needs to be developed as an organized industry and has to be run collectively by all the stakeholders with farmers as the entrepreneurs. Sale of the fruits is generally through pre-harvest contactors, so that the farmer gets an advance payment and covers his risk. The marketing cost of pomegranates in Maharashtra is almost 50 per cent of the total cost of production, thus, there is a need to set up institutional agencies that can advance credit to farmer and motivate them to market the produce themselves. Post-harvest losses in pomegranate crops range from 15-50 per cent. At micro level these losses increase the marketing cost of the product and at macro level they also reduce the per capita availability. Thus there is need to develop technologies, methods and mechanics to reduce these losses. There is need to remove the distortions in the present supply chain, create more integration between the different links of the supply chain and reduce these losses. This will result in net gain to producers, consumers and to the nation.

Farmers usually procure inputs from the retail market and end up selling their produce in the wholesale market. Buying at retail price and selling at wholesale price is the most uneconomic way of business. Thus the involvement of an institutional structure in coordinating the demand of individual farmers of the village can reduce the total cost of inputs to them. The market needs to be demand driven rather than supply driven. The price of the produce should not be based on the prevailing wholesale price but on the basis of cost of cultivation of that produce. Farmers should be their own price setters rather than price followers. There is also an immediate need to integrate the production, marketing and processing processes of the produce to get maximum benefits from pomegranate cultivation. Further successful implementing of the core marketing strategies will help in future expansion of the domestic and international markets.

CHAPTER V

RECOMMENDATIONS

- Good Agricultural Practices as recommended by National Research Centre, Sholapur should be promoted. In addition, special attention is needed on black cells and spots (Tailia, common name) & mealy bug disease management. As the disease has affected on large scale and the farmers are uprooting the plants on large scale.

- Awareness generation on harvesting and post harvest management with due attention on mechanized harvesting, sorting, grading, precooling, waxing, packaging, palletisation etc. The export consignments for Europe require proper palletisation and fumigation. The pomegranates are required to be packed in trays and usage of paper cuttings to be discouraged.

- The pomegranate farmers/traders and even exporters are not aware about the pesticide spray schedule for exports as out of common 43 chemicals under different trade name with different active ingredients are used on large scale. There is need for creating awareness about the chemicals viz trade name Bavistin, Kavach, M-45, Redomil, Polyram, Antracol, Z-78, Cuman-L, Benofit which should be avoided. There is high chance of residue detection.

- Awareness generation on EurepGap Certification and promotion of Organic farming in phased manner should be encouraged. The pomegranates growers should be registered with the horticulture/agriculture department of the concerned states to ensure traceability from farm level to the consumer end.

- It is recommended to strengthen the residue testing system especially for fresh pomegranates for exports.

- There is need for backward and forward linkages by adopting contract farming in pomegranate.

- Contract farming based on centralized model may be adopted. As the processor buys the commodity from a large number of farmers under contract with the firm.

- Institutional credit facilities during pest management should be ascertained to the small farmers.

- The Agri- Export Zone on Pomegranate could be promoted to include export promotion of fresh pomegranates as well as processed products. The pomegranate growers/processors, value adding processing firms can get fiscal incentives in terms of tax concessions under the schemes of government of India.

- The traders/wholesalers/retailers are not aware about the procedures of export and HACCP/ISO Certification. Hence, it is recommended to make them aware regarding the export procedures/ISO/HACCP etc certification.

- It is also recommended to develop literature on pomegranates for distribution in international exhibitions and the exporters should be encouraged to participate in exhibitions/fair etc on horticultural crops.