

GROWTH ANALYSIS OF MANGOES IN INDIA

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1.1 Introduction

It is high time for growers and others who are engaged in marketing of mango in India to commit themselves whole-heartedly to adopt proper harvest practices. Adoption of proper methods and practices right from harvesting to final marketing would help in maintaining quality of fruit desired by consumer which can fetch the grower better prices and high profit. It is in the interest of grower to harvest produce by keeping in view the quality parameters desired by consumer and follow proper practices and thereby maintain quality and reduce losses in harvest phase.

Mango (*Mangifera indica* Linn) is the most important fruit of India and is known as “King of fruits”. The fruit is cultivated in the largest area i.e. 2,021 thousand ha and the production is around 12.5 million tons, contributing 40.1% of the total world production of mango. The main mango producing states in India are Andhra Pradesh (25%), Uttar Pradesh (21%), Karnataka (9.8%), Bihar (9.7%), Gujarat (6.1%) and Maharashtra (5.09%) Total export of mangoes from India is 79.06 thousand tons, valuing Rs. 141.9 crores during 2006-07. India exports mango to over 50 countries worldwide. India’s exports to UAE, Saudi Arabia, Qatar, Bahrain, UK, Kuwait, Singapore, Malaysia and Bangladesh together account for 97% of total exports of fresh mangoes from India.

Mango is a highly perishable, ripens fast during summer and becomes inconsumable very soon. As per an estimate about 30-35% of mango is lost in harvest and post-harvest phase. If proper care is taken from harvesting to final marketing to the consumers, considerable amount of losses can be reduced and better quality fruits can reach to the consumer which can help the growers to get remunerative prices. Hence, it was felt that a systematic study of present harvest marketing practices would be useful in identifying the most critical problem and steps necessary for their improvement. This study was conducted in growing area of Salem.

1.2 Process of the Mango Marketing

1.2.1 Maturity

Maturity is the stage at which fruit has completed its growth and development. Growers have the fair idea about maturity indices of the fruit. Maturity is judged from any one of combination of the following:

1. Changes in fruit shape i.e. fullness of the cheeks, building of shoulders, reduction in curvature between shoulder and lower side of the fruit.
2. Change in skin colour from dark green to light green to yellow.
3. Appearances of white powder like layer on the surface of the fruit.
4. Change in flesh colour to yellow.
5. When one or two naturally ripen fruits fall from the tree.

But it often happens that the growers’ mangoes before they attain optimum maturity for getting benefit of higher prices in the beginning of season. Harvesting of fruits before optimum maturity leads to development of white patches. It also results in reduced shelf life and quality i.e. lowering in total soluble solid, acid ratio, poor taste and flavour. Mango should be harvested at proper stage of maturity to enhance quality, storage life and marketing value and reduce post-harvest losses.

1.2.2 Sorting and Grading

Sorting is done manually by visual inspection. Immature, undersized, bruised, scarred, ripen, insect, pest infested and mechanically injured fruits are removed. Sorting is not done carefully. Slightly damaged fruits are not removed from the marketable produce. Fruits with latex spread on the surface are also ignored and allowed to remain in the sorted lot. Minimal grading is done at farm. Sometimes grower separates smaller fruits and markets them separately.

1.2.3 Field Heat and Pre-Cooling

Mangoes are generally harvested in the cooler part of the day. Sorted lot is arranged in heap in the field until loaded in the vehicle to send to market. Although mangoes are harvested during cooler part of the day, during April to June, the period in which mango harvesting and marketing are at peak, temperature in growing areas of Salem are usually around 40 to 42°C. At such a high temperature, rate of respiration is also high. It builds internal heat in the produce and accordingly the possibility of spoilage increases. Mangoes are neither washed to remove latex nor is it pre-cooled to reduce the buildup of field heat.

1.2.4 Ripening

Mangoes that are to be marketed in local area are ripening by traders at assembly market or by growers in village and fruits that are to be marketed in distant market are ripening after reaching the destination. Mangoes coming to Tamilnadu from within the state are ripen in growing area. Mango is ripening in a closed ventilated room. Temperature inside room is around 34 to 35°C. Fruits are placed in a single layer over paddy or wheat straw or dry grass spread 5 to 8 cm thick. Sometimes two to three layers are placed one above the other and covered with same material. Fruits turn yellow in 4 to 5 days due to temperature rise. Fruits are spread in single layer on the straw or dry grass mat as soon as they start turning yellow to complete ripening slowly. This avoids further temperature build up and spoilage. Calcium carbide is also placed in covered heap to speed up the ripening and to develop better colour. However, this hampers eating quality of fruit.

1.2.5 Storage

Growers do not store the produce for long; hardly have they held it for a day or two when it is unripe. This may be because of lack of proper storage facilities available in rowing area. Farmer cannot negotiate the best rate for his produce since he is not willing to carry the risk of holding the inventory of perishable items due to lack of proper infrastructure.

1.2.6 Packaging for Transportation to Market

Growers bring unripe produce to the nearby assembling market in bulk. No packaging is used for transporting mangoes from farm to assembling markets. Assembling markets are located in 100-km vicinity of the growing area. In assembling market fruits are weighed and loaded in to 5 or 10 trucks to send it to processing unit or to nearest big markets. Dry grass, paddy or wheat straw and mango leaves are used to cushioned the produce from mechanical hazards.

1.2.7 Transportation

A three wheel motorized carrier. Alternatively, tractor or light commercial vehicle or camel cart is used. Transport vehicle is covered with tarpaulin to protect the produce from environmental hazards. The road-vehicle-load system in general is poor. During the course of journey, produce encounter numerous road discontinuities such as pot whole, bumps, rail track. Most of the damage are latent and could be visible only after ripening. Further, improper loading and unloading practices contribute sizable proportion of damage. This results into poor quality fruits. Transport damage is directly correlated to transport distance. Destination being at longer distance more would be the damage to the produce.

1.2.8 Marketing

Following marketing chain has been identified for mango in the present study.

1. Producer to pre-harvest contractors' traders in assembling market and or to commission agents in APMC;
2. Producer to village trader to traders in assembly market and or to commission agents;
3. Producer to traders in assembling market;
4. Producer and or traders in assembling market to commission agents;
5. Trader in assembling market to processing unit;
6. Producer and or traders in assembling market to wholesaler or sub-wholesaler;
7. Producer to retailer and consumers.

Most of the growers usually sell their produce to traders in assembling markets or to local traders. If the yield is low produce is sold to the sub-wholesaler or retailer or directly to the consumer. Valapady and Attur are the main assembling markets in Salem region. Growers from surrounding area bring their produce here for sale. Generally each producer would go to the particular trader because of the previous contacts or due to the loan taken from the trader. This system also prevails when the producer send produce directly to commission agents. Large buyers also procure from these assembling markets. Rest is sent to the distant markets like Tamilnadu. Sometimes fruits are ripened here and then sent for sale depending upon the market demand and supply. Mango meant for processing are also brought, weighed and loaded in 5 to 10 tonnes capacity trucks to send to processing factories located nearby or farther.

1.3 Statement of the Problem

Non availability of pest resistant quality suckers, unawareness of the different diseases that affect Mango plant and of the pesticides to be used to control the diseases, lack of knowledge about crop insurance scheme and its usefulness, inadequate finance to meet the cost of production are some of the problems faced by the growers during cultivation. Unless adequate steps are taken to minimize these problems, the production of Mango may be severely affected.

According to trade sources, during the months of March to May, supply exceeds demand in market which leads to decline in prices. Because of the excess supply, traders and farmers search for new markets for Mango. Kerala is the nearest market, compared to Maharastra. This action led to higher price in 2008-09 compared to the previous year prices. Similarly natural calamities like wind with high velocity' lead to drop in supply of Mango during June to September and hence upward trend in price of Mango is witnessed.

The fluctuation in price creates havoc among the Mango growers in Tamil Nadu, The Domestic and Export market intelligence cell functioning in the Centre for Agricultural and Rural Development Studies of Tamil Nadu Agricultural University analyzed the scenario of Mango prices.

Absence of a large number of organized markets, dependence on pre-harvest contractors for marketing their bunches, inadequate transport facilities at reasonable cost, increased dependence on internal demand etc., are some of the marketing problems faced by the growers that necessitated this study.

The problem of growers in marketing the product is very high. They have to cultivate, harvest, transport and market. The intermediaries have to make payments before or after harvest, transport and market the products. There may be many problems in these different stages. The problems may relate to production or transportation, preservation, price, area, transportation and other related aspects.

Mango is a perishable product. The product might need some tweaking by the person who grows the product to respond to customer complaints. The person who handles human resource issues might be asked to develop compensation plans that reward sales people who build significant relationships that have tremendous potential but are slow to close.

The present study covering the problems of both production and marketing provides a purposeful area for useful analysis. The natural calamities like flood, cyclone, etc., may affect the production of Mango. With all these limitations, the growers have to cultivate and earn profit. Moreover financial constraints and lack of adequate infrastructure for marketing of Mango are the problem areas, which are to be studied at length.

1.4 Objectives of the Study

The following are the prime objectives of this study

1. To analyze the different types of growers of Mangos and their strategies and problems in marketing their products.
2. To study the different types of marketing practices existing in Mango marketing in relation of growers of Mango crop;
3. To examine the role of intermediaries in Mango marketing process;
4. To identify and analyze the problems and perception of intermediaries in marketing of Mangos; and
5. To offer suggestion the measures to improve the marketing efficiency of growers and intermediaries.

1.5 Research Methodology

The study requires both primary and secondary data. Secondary data were collected from publications of agricultural departments, websites, libraries, educational institutions, agent manuals etc. Primary data were collected from growers and intermediaries with the help of a well structured questionnaire. First, a pilot study was conducted. Data were collected from 20 growers and 20 intermediaries. The changes and modifications suggested were helpful in revising and restructuring a comprehensive questionnaire to collect reliable and adequate data.

1.5.1 Sampling Method

This study concentrates on marketing of Mango and the role of intermediaries in marketing aspects. The area of study selected for this research is Salem District. Mango is grown only in all areas of Salem District. There are 4 taluks which are prominently engaged in cultivating Mango crop. The sample taluks are valapady, Attur, Mettur and Sankagiri. A sample of 400 growers and 260 intermediaries are considered from the sample taluks. Multistage Stratified random sampling method is followed for this study.

1.5.2 Frame Work Analysis

The collected data have been processed both manually and with the help of computers. Suitable statistical tools have been used to draw inferences using Statistical Package for Social Sciences (SPSS). The statistical tools like Percentage analysis, correlation, Regression, chi-square test, ANOVA, Factor analysis, discriminat analysis test were used for analyzing the data.

1.5.3 Area of Study

The study area for the research study is Salem District of Tamil Nadu.

1.5.4 Period of Study

The secondary and Primary data relating to various production aspects were collected for a period of 3 years i.e. from 2012-2014.

1.6 Mango in World Scenario

Mango covers an area of 4946 thousand ha with a production of 37.12 million tons in the world during the year of 2010. India occupies top position among mango growing countries of the world and produces 40.48% of the total world mango production. China and Thailand stood at second and third position among mango producing countries in the world with 4,366 and 2,551 thousand tons respectively. The other major mango producing countries in the world during 2010 were Thailand (2550 thousand tons), Pakistan (1784 thousand tones), Maxico (1633 thousand tones) and Indonesia (1314 thousand tones) respectively.

India exports mango to more than 33 countries in the world. The export of mango in 2000-01 was 37,109 M.T. and it increased to 58, 863M.T. in 2010-11. The value of exported mango was Rs. 16481 lakhs in 2010-11. Though India is having world's more than 40 per cent mango production, our share in international market is comparatively very less.

It was 5.97 per cent in volume and 3.96 per cent in value in the year 2000. In the year 2010, India's share was 4.36 per cent in terms of volume and 3.11 per cent in terms of value. Thus there is very vast scope for increasing export of mango from India.

Table 1.4.1, Principal Mango Producing Countries in 2010 (Mt)

Country	Production
India	16,337,400
China	4,351,593
Thailand	2,550,600
Pakistan	1,784,300
Mexico	1,632,650
Indonesia	1,313,540
Brazil	1,188,910
Bangladesh	1,047,850
Philippines	823,576
Nigeria	790,200

Source : FAOSTAT, February 2012

Global production of the mango has doubled in thirty years to around 35 million tonnes (Mt) en 2009. Asia, where the mango is native, is the largest mango producer, representing 77% of global production, followed by the Americas with 13% and Africa with 10%. On the Asian continent, India, where the mango is considered the king of fruits, is the main global producer with 13 to 17 Mt, followed by China (>4 Mt), Thailand (2.5 Mt), and Pakistan (1.7 Mt). In America, Mexico (1.5 Mt) and Brazil (1.2Mt) are placed 5th and 7th respectively in the world rankings. The main African mango producing country is Nigeria followed by Egypt (450 000 tones).

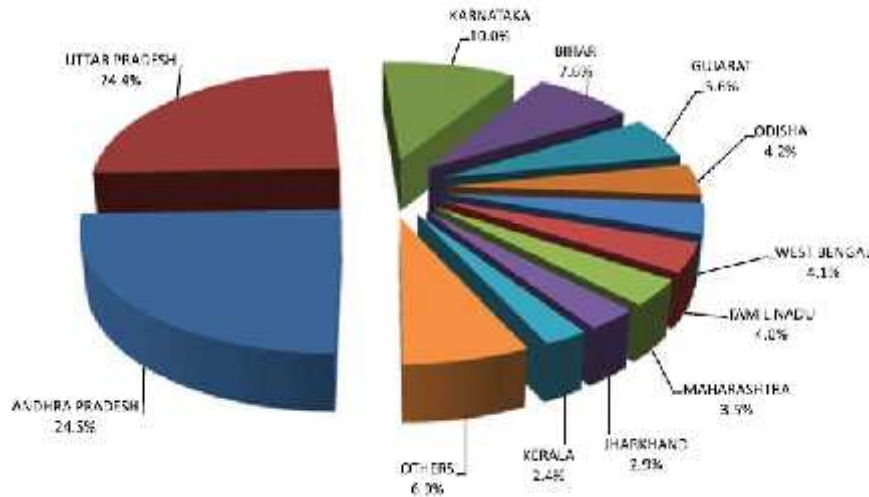
First and foremost it is a fruit that is consumed locally. Although it is constantly increasing, international trade in mangoes only represents 3% of the volumes produced. Being delicate and easily perishable makes selling mangoes difficult, while attacks of mango fly larvae are becoming a major problem.

Major Mango Producing States in India

Mango is grown in India in tropical and subtropical regions from sea to an altitude of 1500 meters. It is grown almost in all states of India. However, it is mainly cultivated in, Andhra Pradesh, Bihar, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. Tamil Nadu is followed by Andra Pradesh, Uttra Pradesh and Orissa in case of harvesting but in case of production it doesn't yield to match the area compared to other states.

Mango varieties such as Alponso, Banganapalli, Neelum, Totapuri, Mulgova Mallika, Amrapalli, Pusa Arunima, Pusa Surya, Arka aruna, Arka Anmol are cultivated in Tamil Nadu. Major mango producing belts in Tamil Nadu are Coimbatore, Dharmapuri, Salem, Krishnagiri, Dindigul, Madurai, Theni, Thiruvallur, Thirunelveli and Vellore. Agri export zones for Mangoes in Tamil Nadu are Madurai, Theni, Dindigul, Virudhunagar and Tirunelveli.

LEADING MANGO PRODUCING STATES (2012-2013)



Source: Indian Horticulture Database 2013

The Andhra Pradesh (24.5%) and Uttar Pradesh (24.4%) contributes 50% to the overall production and other is shared by all other states in the year 2012-13. It is followed by Karnataka (10.0%), Bihar (7.6%), Gujarat (5.6%), Odisha (4.2%), West Bengal (4.1%), Tamil Nadu (4.0%), Maharashtra (3.5%), Jharkhand (2.9%), Kerala (2.4%) and others (6.9%).

AREA, PRODUCTION AND PRODUCTIVITY OF MANGOES STATE WISE

Area in '000 HA, Production in '000 MT and Productivity – MT/HA

STATE	2010-11			2011-12			2012-13		
	AREA	PRODUCTION	PDY.	AREA	PRODUCTION	PDY.	AREA	PRODUCTION	PDY.
ANDHRA PRADESH	381.1	3363.4	8.8	400.7	3514.0	8.8	489.66	4406.97	9.0
UTTAR PRADESH	267.2	3623.2	13.6	298.5	3840.8	12.9	274.05	4386.99	16.0
KARNATAKA	161.6	1770.0	11.0	177.4	1850.3	10.4	178.00	1795.00	10.1
BIHAR	147.0	1331.0	9.1	147.5	1241.8	8.4	147.71	1363.80	9.2
GUJARAT	130.1	911.3	7.0	136.2	968.0	7.1	141.26	1003.71	7.1
ODISHA	180.1	642.0	3.6	197.2	716.2	3.6	187.40	763.79	4.0
WEST BENGAL	98.5	620.2	6.3	80.8	561.6	7.0	82.50	705.00	8.5
TAMIL NADU	148.0	873.7	5.9	151.0	889.6	5.9	157.45	714.08	4.5
MAHARASHTRA	477.0	331.0	0.7	482.0	503.0	1.0	482.00	593.00	1.2
JHARKHAND	36.8	427.8	11.6	50.3	516.6	10.3	51.33	517.82	10.1
KERALA	52.2	300.8	5.8	53.0	373.2	7.0	74.44	441.03	5.9
OTHERS	184.0	851.1	4.6	218.9	1106.6	5.1	218.37	1261.03	5.8
TOTAL	2298.8	16188.4	6.8	2378.1	16188.4	6.8	2630.0	19002.4	7.2

Source : Director of Horticulture / Agriculture of respective State / UT's

Andhra Pradesh is the highest cultivating area (489.66 '000 HA) of mangoes when compared to the other states of India and the least cultivating area is Jharkhand (51.33 '000 HA) but the productivity

is more in Jharkhand than of Andhra Pradesh at the same time the Productivity is decreasing in Jharkhand.

Maharashtra is the second largest grower with contributing (482 HA) but it has the least rate of productivity (1.3) in spite of increasing year by year in a very low rate.

In Uttar Pradesh the Area, Production and Productivity shows a positive shift for all the three years and it also stands first in case of productivity first with (16.0) even though the utilization of land (274.03 HA) is half when compared to Andhra Pradesh the Production is near to it (4386.99 MT) in 2012-13 but in the year 2010-11, 2011-12 the production was higher than of all other states (3623.2, 3840.8) which shows the positive difference in production and the optimum utilization of resource in significant way.

Production trend of Mango in India



Source : Director of Horticulture / Agriculture of respective State / IIT's

The production in 2011-12 is 16196 '000 MT which took 10 years to double its production from 1991-92 (8716 '000 MT). All these years it shows both the increase and decrease trend in the production. 2003-04 depicts the decreased production again consecutively shows increase for another four years and again it shows a decrease in 2008-09 and increase for consecutive years. It looks like a repeated pattern. This constant increase between years may be of measures taken by the Government to improve this sector. Inadequate was it being the evidence on nature the contribution trend to increase.

Problems Faced by the Farmers

Indian farmers depend heavily on middlemen particularly in the marketing of fruits and low efficiency in the marketing channels accompanied with poor marketing infrastructure would not only lead to high and fluctuating consumer prices, but also only a small fraction of the consumer rupee reaching the producer farmer. It may also leads to deterioration in quality, frequent mismatch between demand and supply both spatially and over time resulting to highly fluctuating prices (Vasant P. Gandhi & N. V. Namboodiri). Cost of Marketing, Lack of Knowledge, Long Marketing channels, Less participation of farmers in selling, Inadequate Natural resource, Lack of proper of warehouse and preservation during transportation. Lead time from production still consumption, climatic conditions, policies of importing countries, imbalance between demand and supply, price rise, the other most problems faced are pest and diseases on input side which reflects in quality of the product, etc.

Suggestions & Conclusion

India ranks the first position in world for mangoes production it doesn't sound high in case of productivity and quality. It may be due to adoptability low technology and lack of knowledge among the producers and distributors. As many reports, studies and works depicts. Educate the mango growers in case of pest control, diseases, and necessities of water drip irrigation, marketing knowledge, the updates and information of Government policies, Regulations and financial remedies and subsidies should be enhanced to the farmers. Reduce the intervention of intermediaries in the marketing channels.

Mango farmers should be trained in Hi-tech mango cultivation, which includes adoption of high-density planting, use of fertigation etc. Alternate bearing of fruits in mango trees is serious problem, which has to be solved through proper application of suitable hormones. ICAR institutes and KVK should take initiative to motivate the orchard owners through the visit to orchards, which adopted hi-tech mango in their areas. Therefore large-scale demonstrations of the techniques have to be laid out in different parts of the country. Farmers should be trained with proper methods of harvesting. Government agencies are to take initiatives to develop the sufficient number of cold storages in the country to store the mango fruit and sell the same in the off-season to get higher price.

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