



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., 2,212 thousand Ha and the production is around 19,506 MT, contributing 57.18 % of the total world production of mango. The main mango producing states in India are Uttar Pradesh (21%), Andhra Pradesh (20%), Bihar (11%), Karnataka (8%), Tamilnadu (6%), Gujrat (5%), Telangana (5%), West Bengal (4%), Odisha (4%), Maharashtra (4%), Total export of mangoes from India is 49658.68 MT, valuing Rs. 400.21 crores during 2019-20. India exports mango to over 50 countries worldwide. India’s exports to UAE, UK, Saudi Arabia, Qatar, United States, Kuwait, Oman, Nepal and Bahrain, Singapore together account for 97% of total exports of fresh/dried 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 number 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 Pune.

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 Pune are usually around 28 to 32°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 build-up 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 Pune 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 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, these 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 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 Bullock 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. Junnar and Pune are the main assembling markets in Pune 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. 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 Mumbai. 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. Mumbai is the nearest market, compared to Kerala. This action led to higher price in 2016-17 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 Maharashtra, The Maharashtra State Agricultural Marketing Board and Maharashtra Government and Studies of various Agricultural Universities analysed 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 analyse 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 analyse 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 Pune District. Mango is grown only in small areas of Pune District. There are 4 Tehsils which are prominently engaged in cultivating Mango crop. The sample Tehsils are Junnar Ambegaon, Khed and Bhore. A sample of 400 growers and 260 intermediaries are considered from the sample Tehsils. 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, discriminant analysis test was used for analysing the data.

1.5.3 Area of Study

The study area for the research study is Pune District of Maharashtra.

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 2015-2017.

1.6 Mango in World Scenario

Mango covers an area of 4825 thousand ha with a production of 45.29 million tons in the world during the year of 2018. India occupies top position among mango growing countries of the world and produces 44.25% of the total world mango production. China and Thailand stood at second and third position among mango producing countries in the world with 4,770 and 3,634 thousand tons respectively. The other major mango producing countries in the world during 2018 were Mexico (2266 Thousand tons), Indonesia (2156 Thousand tons) Brazil (1,635 thousand tons), Pakistan (1,480 Thousand tons), Egypt (1345 Thousand tons) Bangladesh (1175 Thousand tons) and Nigeria (926 Thousand tons) respectively.

India exports mango to more than 59 countries in the world. The export of mango in 2019-20 was 49,659 M.T. and it decreased to 21,033 M.T. in 2020-21. The value of exported mango was Rs. 40,021 lakhs in 2019-20. Though India is having world's more than 44 percent mango production, our share in international market is comparatively very less.

It was 6.58 per cent in volume and 4.35 per cent in value in the year 2019. In the year 2020, India's share was 5.36 per cent in terms of volume and 3.09 per cent in terms of value. Thus, there is very vast scope for increasing export of mango from India after post pandemic situation.

Table 1.6.1 Principal Mango Producing Countries in 2018 (MT)

Sr. No.	Country	Production
1	India	18,454,498
2	China	4,770,133
3	Thailand	3,634,367
4	Mexico	2,266,471
5	Indonesia	2,156,817
6	Brazil	1,635,298
7	Pakistan	1,480,155
8	Egypt	1,345,427
9	Bangladesh	1,175,530
10	Nigeria	926,156

Source: FAOSTAT, February 2018

Global production of the mango has doubled in thirty years to around 38 million tonnes (Mt) in 2018. Asia, where the mango is native, is the largest mango producer, representing 79% of global production, followed by the Americas with 12% and Africa with 9%. On the Asian continent, India, where the mango is considered the king of fruits, is the main global producer

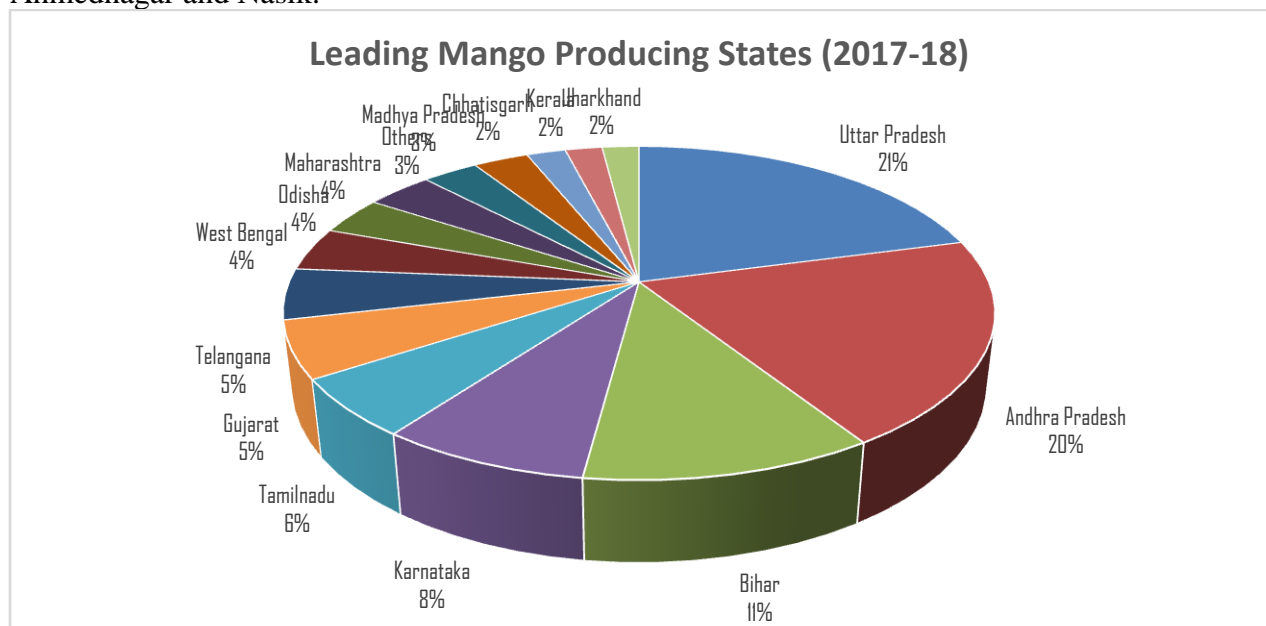
with 15 to 18 Mt, followed by China (4.7 Mt), Thailand (3.6 Mt), and Pakistan (1.4 Mt). In America, Mexico (2.2 Mt) and Brazil (1.6Mt) are placed 4th and 6th respectively in the world rankings. The main African mango producing country is Egypt followed by Nigeria (926,156 tones).

First and foremost, it is a fruit that is consumed locally. Although it is constantly increasing, international trade in mangoes only represents 5% 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, The Uttar Pradesh, Andhra Pradesh, Bihar, Karnataka, Tamilnadu, Gujrat, Telangana, West Bengal, Odisha, Maharashtra, Madhya Pradesh, Chhatisgarh, Kerala, Jharkhand. Maharashtra is followed by Uttar Pradesh, Andhra Pradesh, Bihar, Karnataka, Tamilnadu, Gujrat, Telangana, West Bengal, Odishain case of harvesting but in case of production, it's yield doesn't match to the area compared to other states.

Mango varieties such as Alphonso, Mankurad, Mulgoa, Pairi, Rajapuri, Kesar, Gulabi, Vanra are cultivated in Maharashtra. Major mango producing belts in Maharashtra are Ratnagiri, Sindhudurg, Pune, Raigad, Nanded, Beed and Osmanabad. Agri export zones for Mangoes in Maharashtra are Ratnagiri, Sindhudurg, Raigarh, Thane, Aurangabad, Jalna, Beed, Latur, Ahmednagar and Nasik.



Source: Indian Horticulture Database- 2018

The Uttar Pradesh (21%) and Andhra Pradesh (20%) contributes 41% to the overall production and other is shared by all other states in the year 2017-18. It is followed by Bihar (11%), Karnataka (8%), Tamilnadu (6%), Gujrat (5%), Telangana (5%), West Bengal (4%), Odisha (4%), Maharashtra (4%), Madhya Pradesh (3%), Chhatisgarh (2%), Kerala (2%), Jharkhand (2%) and others (3%).

STATE WISE AREA, PRODUCTION AND PRODUCTIVITY OF MANGOES

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

State	2015-16			2016-17			2017-18		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Andhra Pradesh	327.31	2803.66	8.57	336.96	4043.47	12.00	363.00	4373.61	12.05
Arunachal Pradesh	0.05	0.03	0.50				0.00	0.00	0.00
Assam	4.62	46.15	9.99	4.66	47.15	10.12	4.68	48.44	10.34
Bihar	149.14	1464.93	9.82	149.96	1472.38	9.82	149.28	2443.47	16.37
Chhatisgarh	71.52	420.61	5.88	74.17	434.32	5.86	77.03	461.73	5.99
Gujarat	153.18	1241.59	8.11	161.27	1424.87	8.84	162.77	1207.78	7.42
Haryana	9.26	89.97	9.72	9.34	96.79	10.37	9.35	98.60	10.54
Himachal Pradesh	41.52	37.63	0.91	41.77	48.24	1.16	41.99	31.35	0.75
Jammu & Kashmir	12.67	23.74	1.87	12.74	24.15	1.90	12.96	30.35	2.34
Jharkhand	50.41	393.67	7.81	50.56	438.54	8.67	54.53	435.86	7.99
Karnataka	181.70	1725.67	9.50	180.60	1719.73	9.52	183.23	1760.60	9.61
Kerala	70.12	382.52	5.46	70.41	388.14	5.51	83.12	439.20	5.28
Madhya Pradesh	27.89	371.48	13.32	43.42	586.24	13.50	45.52	654.79	14.38
Maharashtra	162.08	463.17	2.86	156.84	603.83	3.85	166.76	791.36	4.75
Mizoram	0.87	4.18	4.80	0.89	4.18	4.70	0.91	4.19	4.60
Nagaland	0.57	3.74	6.61	0.64	4.23	6.60	0.64	4.24	6.61
Odisha	199.29	778.72	3.91	199.42	817.91	4.10	199.08	805.77	4.05
Punjab	6.74	113.50	16.83	6.75	113.69	16.85	6.90	116.52	16.90
Rajasthan	5.00	82.27	16.45	5.16	154.79	29.97	4.97	87.37	17.58
Tamilnadu	125.98	975.11	7.74	176.42	1282.44	7.27	152.57	1234.00	8.09
Telangana	194.05	1778.32	9.16	111.65	482.46	4.32	115.99	1080.14	9.31
Tripura	11.75	59.06	5.02	10.64	57.03	5.36	10.33	54.93	5.32
Uttar Pradesh	263.28	4512.71	17.14	264.94	4341.00	16.38	265.62	4551.83	17.14
Uttarakhand	35.91	149.73	4.17	36.42	150.14	4.12	36.48	152.71	4.19
West Bengal	96.74	693.39	7.17	99.22	736.90	7.43	103.25	918.35	8.89
Others	6.91	27.00	3.91	7.40	33.58	4.54	33.58	35.14	4.90
Total	2208.56	18642.53	8.44	2212.24	19506.20	8.82	2258.13	21822.32	9.66

Source: Director of Horticulture/ Agriculture of Respective States UT's

Andhra Pradesh is the highest cultivating area (363 '000 HA) of mangoes when compared to the other states of India and the least cultivating area is Nagaland (0.61 '000 HA) but the productivity is less in Nagaland than of Andhra Pradesh at the same time the Productivity is decreasing in Nagaland

Maharashtra is the 14th largest grower with contributing (167 HA) but it has the least rate of productivity (4.75) 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 Second with (17.14) even though the utilization of land (265.62 HA) is half when compared to Andhra Pradesh the Production is near to it (4551.83 MT) in 2017-18 but in the year 2016-17, 2015-16 the production was higher than of all other states (4341.00, 4512.71) which shows the positive difference in production and the optimum utilization of resource in significant way.

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 lead 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 and 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 tress 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.

References

1. Biswas, B C and Kumar, Lalit Fert. Marketing News, (41) 6 3-10(2010).
2. Chengappa, P.G. (2006), Evolution of Food Retail Chains: Evidence from South India, Paper Presented at IFPRI-IEG Workshop on From Plate to Plough: Agricultural Diversification and its Implications for the Smallholders, September 20-21, 2006, New Delhi.
3. Economic Research Report assed by Peyton Ferrier Everett Petersen Maurice Landes (2012), "Specialty Crop Access to U.S. Markets: A Case Study of Indian Mangoes" Number 142, November.
4. Hand Book of Horticulture, published by Director of Information and Publication of Agriculture, ICAR, Krishi Anusandhan Bhavan, Pusa, New Delhi – 110 012 (2002).
5. Sarada Gopalakrishnan "Marketing System of Mangoes in India" (2013), World Applied Sciences Journal 21 (7), pg.1000-1007. ISSN 1818-4952.
6. The New Indian Express, "Rs 10.40 crore given as subsidy to mango growers"Jun 24, 2011, http://www.newindianexpress.com/states/tamil_nadu/article444982.ece?
7. Ugese, F. D., Iyango P. O. and Sweml T. J., (2012) "Mango (Mangifera Indica L.) Fruit Production and Production Constraints in Gboko Local Government Area of Benue State" PAT June, 8 (1): 164 - 174; ISSN: 0794-5213

8. Horticultural Statistics at a Glance- 2018, Government of India Ministry of Agriculture & Farmers' Welfare Department of Agriculture, Cooperation & Farmers' Welfare Horticulture Statistics Division, © Government of India PDES – 256 (E) Controller of Publication 500-2018 – (DSK-III).