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Stability Analysis of Indian Mango Exports

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ABSTRACT: Major mango-growing states in India include Andhra Pradesh, Uttar Pradesh, Karnataka, Bihar, Gujarat and Tamil Nadu. Andhra Pradesh ranks first in mango production with a share of 24.48 per cent with highest productivity. The study was based on the time series, secondary data collected from different reliable resources and data were collected for the period of 2007-08 to 2019-20. India's major Export Destinations during the year 2019-20 included United Arab Emirates, Saudi Arabia, Kuwait, Qatar and Nepal and it has exported fresh mangoes of 49,658.67 MT of fresh mangoes worth of Rs. 40,021.34 lakhs during the same period. In the year 2007-08 production of mango was 13,997 thousand MT which rise to 20,444 thousand MT in the year 2019-20. This is mainly due to the new highly yielding varieties developed by research institutes. There was a positive growth rate in increase in Indian imports of mango with maximum growth by Oman, Qatar, United States of America and United Kingdom. Maximum retention of the market share for India mango was by United Kingdom which was followed by Other minor importing countries, United Arab Emirates, Oman and Qatar, United States of America was the most unstable country for Indian imports as the country has started importing the mangoes from China and Pakistan which has drastically hit on the business of Indian mangoes. Export of fruits in the region is through traders and not by farmers themselves. Thus, farmers may be motivated to undertake fruits exports through action for getting premium price for the quality produce grown in our country. The final quality products fetch high remunerative prices which gives the way to increase in the production of fruit crops.

Keywords: Trend, Markov Chain analysis, Export, Structural Composition

INTRODUCTION

Horticulture is the foundation for other supplementary industries like canning and processing industries. Banana, grape, mango and pineapples are some of the industrial attribute crops and cultural intensive crops. India is the second largest producer of fruits in the World after China with a production of 81.2 million tons of fruits from an area of about 6.9 million hectares, with its projected value touching 40 million tonnes by the year 2020-21. A large variety of fruits are grown in India, of which mango, banana, citrus, guava, grape, pineapple and apple are the major fruit crops Atteri (2011).

Mango is a very important crop grown in India, scientifically known as *Mangifera indica.* India ranks first in the world in the production of mangoes popularly known as the king of all fruits. It contributes nearly 45 per cent of the total mango production of the world. Hence, production and exports of fresh exported mangoes 6, 55,221.44 quantities per metric tonnes and value of Rs.3, 55,186.23 lakhs USD and processed mango products is an important industry in India. Indian mangoes are varies in shapes, sizes and colours with a wide variety of flavour, aroma and taste. The Indian mango substantiates the high standards of quality and is a source of bountiful nutrients and area 29,942 thousand hectare and production 2, 29,911 thousand metric tonnes in the year 2019-20 (Anonymous, 2021). In India, mangoes are mainly grown in tropical and sub-tropical regions from sea level to an altitude of 1,500 m. Mangoes grow best in temperatures around 27°C. About 1000 varieties of mangoes are grown in India. Prominent varieties of mangoes which are exported from India comprises of Alphonso, Payari, Totapuri, Langra, Kesar, Dashehari, Neelum etc. Also processed mango products include jams, pickles, pulp, chutneys, slices in brine, squash, jellies etc.

Mango-growing states in India include Andhra Pradesh, Uttar Pradesh, Karnataka, Bihar, Gujarat and Tamil Nadu. Andhra Pradesh ranks first in mango production with a share of 24.48 per cent with highest productivity and total area in different states 25390.53 thousand hectare and production 188,184.05 thousand metric tonnes in the year 2019-20. India's major Export Destinations during the year 2019-20 included United

Arab Emirates, Saudi Arabia, Kuwait, Qatar and Nepal and it has exported fresh mangoes of 4,49,658.67 MT of fresh mangoes worth of Rs. 40,021.34 lakhs during the same period. Thus, it can be seen that mangoes provide a huge opportunity to Indian mango producers and exporters to exploit the world market and hence we have emphasized on export of Indian mangoes and processed mango products with special highlights on export of fresh mangoes. The major mango producing countries in the World are India (44.1%), China (9.1 %), Kenya (5.8 %) and Nigeria with a distant (1.8 %) during 2018-19. Most of the world's mango production from Asia Pacific region *i.e.* India and China. In 2018, India's mango, mangosteen and guava production volume amounted to over 21 million tons. The volume of mangos produced in China in 2018 reached nearly 5 million tons. The total production of mango, mangosteen and guava in the world in the 2019 is 55.85 million metric tons (Yeledhalli, 2012).

The Indian mango is the special product that substantiates the high standards of quality and bountiful of nutrients packed in it. A single mango can provide up to 40 per cent of the daily dietary fibre needs – a potent protector against heart disease, cancer and cholesterol build–up. In addition, this luscious fruit is a warehouse of potassium, beta- carotene and antioxidants. For maintaining highest quality standards, State-of-the-art pack houses have been set up in major production zones. Keeping in view the different country requirements, internationally recognized treatment facilities like hot water treatment, vapour heat treatment and irradiation facilities have also been set up at various locations across the production belt. Unique product identification system, compliant to the traceability networking and residue monitoring plan has been developed for the consumer safety and readiness to product recall in case of any emergency. India is the home of about 1,000 varieties of mangoes. Most of the Indian mango varieties have specific eco - geographical requirements for optimum growth and yield. The Northern/Eastern Indian varieties are usually late bearing compared to Southern and Western Indian varieties. Some of the local varieties of mango bear fruits throughout the year in extreme southern parts of India.

METHODOLOGY

A. Growth rate analysis

The growth rate of area, production, productivity and export of mango was computed for a period from 2007-08 to 2019-20. The liner, log liner, exponential and power function are some of the important functional form employed to study the growth rate.

Deferent functional form was tried past for working out of growth rates in area, production, productivity and export. Some of the important forms tried were the linear growth model ($y = a + bt$), exponential function ($y = ab^t$) and quardic function ($y = a + bt + ct^2$) howevere, it was found the exponential form of the function $y_t = ab^t$ is better and most frequently used one. In the present study, compound growth rate for study, compound growth rate for area, production, productivity and export of mango were estimated by using exponential growth function (Angles 2001) of the form

$$\boldsymbol{Y_t = ab^t + U_t} \quad \ldots(1)$$

Where,

Y_t = Dependent variable for wich growth rate was estimated (area, production, yield, quantity and unit value cashew export in year "t")

a= Intercept

b= Regression co-efficient

t= year which value from 1,2….n

U_t= disturbance term in year "t"

The equation one is transform into log-linear and written as

$$\boldsymbol{logy_t = loga + tlogb + logU_t} \quad \ldots(2)$$

Equation (2) was estimated by using ordinary least square (OLS) technique. The per cent compound growth rate (g) was derived using the relationship (3)

$$\mathbf{g = (anti\log - 1) \times 100} \quad \ldots(3)$$

Where,

g= estimate compound growth rate per annum in percentage.

b= antilog of log b

Tabular presentation technique. Tabular analysis was adopted to study the structural composition of exports of fruits from India. For this analysis, the country wise export data of quantity and value mango, were selected and arranged in a systematic manner to describe the structural composition of exports.

Pattern of foreign trade. Markov chain first order process to study the direction of Indian mango exports. The structural change in exports was examined using the Markov Chain Approach.

Central to Markov Chain Analysis is the estimation of the Transitional Probability Matrix P. The element P_{ij} of this matrix indicates the probability that exports will switch from country i to country j with the passage of time. The diagonal P_{ij} measures the probability that the export share of a country will be retained. Hence, an examination of the diagonal elements indicates the loyalty of an importing country to a particular country's exports.

$$E_{jt} = \sum_{r=1}^{r} \mathrm{E_{ij}} - \mathrm{P_{ij}} + \mathrm{e_{jt}}$$

Where,

E_{jt} = Exports from India during the year t to j^{th} country.

E_{it-1} = exports to i^{th} country during the year t-1.

P_{ij} = The probability that exports will shift from i^{th} country to jth country.

e_{jt} = The error term this is statistically independent of E_{it-1}

r = the number of importing countries

The Transitional Probability P_{ij}, which can be arranged in a (c x r) matrix, have the following properties.

$$0 \leq P_{ij} \leq 1$$

$$\sum_{i=1}^{r} \mathrm{P_{ij}} = 1 \text{ for all}$$

Thus, the export proportions of each country during period t were obtained by multiplying the exports to these countries in the previous period (t-1) with the Transition Probability Matrix.

The Transitional Probability Matrix is estimated in the Linear Programming (LP) frame work by a method referred to as Minimization of Mean Absolute Deviation (MAD).

The LP formulation is stated as

$$min\ OP* + Ie$$
$$\text{Subject to} -$$
$$XP* + V = Y$$
$$GP* = 1$$
$$P* \geq 0$$

Where,

P* is a vector in which probability P_{ij} are arranged,

0 is a vector of zeros,

I is an appropriately dimensioned vector of area,

e is the vector of absolute errors (IUI)

Y is a block diagonal matrix of lagged values of Y and

V is the vector of errors

G is a grouping matrix to add the row-elements of p arranged in P* to unity.

RESULTS AND DISCUSSION

A. Trend in area, production and productivity of selected fruit crops

The Table 1 presents the trend in area, production and productivity of mango in India for a period form 2007-08 to 2019-20. It is evident from the table, the area under mango which was 2,201 thousand hectares in 2007-08 has raise to 2,291 thousand hectares in 2019-20. The average area during the study period was 2,303 thousand hectares. The growth rate was found to be negative with 0.16 per cent for the study which was supported by the time variable that is R^2 to the tune of 66 per cent. Coefficient of variation was observed to be 4.68 per cent during the study period. In this table also depicts about the production, in the year 2007-08 the production of mango was 13,997 thousand MT which rise to 20,444 thousand MT in the year 2019-20. The average production in the study area was 17,685 thousand MT.

Table 1: Trend in area, production and productivity of mango in India.

Years	Area (000 ha)	Production (000 Mt)	Yield (Mt/ha)
2007-08	2201	13997	6.36
2008-09	2309	12750	5.52
2009-10	2312	15027	6.50
2010-11	2297	15188	6.61
2011-12	2378	16196	6.81
2012-13	2500	18002	7.20
2013-14	2516	18431	7.33
2014-15	2163	18527	8.57
2015-16	2209	18643	8.44
2016-17	2212	19506	8.82
2017-18	2258	21822	9.66
2018-19	2296	21378	9.31
2019-20	2291	20444	8.92
Total	29942	229911	100
Mean	2303	17685	8
Std	107.74	2849.56	1.32
CV	4.68	16.11	17.12
CAGR (%)	-0.16	4.16**	4.32**
R^2	0.66	0.90	0.89

** Significant at 1 percentage

* Significant at 5 percentage

The growth rate was 4.16 per cent during the study period and was found statistically significant at 1 per cent which was supported by the time variable with the tune of 90 per cent. Coefficient of variation of production was 16.11 per cent. The next parameter that is yield, average yield during the study period was 8 MT/ha. Yield which was 6.36 Mt/ha in the year 2007-08 was increased to 8.92 Mt/ha in the year 2019-20. Growth rate for the study period was around 4.32 per cent was found to be statistically significant which was supported by the time variable to the tune of 89 per cent respectively. It can be observed from the table that except area, other parameters such as production and productivity of mango in India has increased as it is reflected with the positive growth rate. Decrease in area is mainly due to shift to other commercial crops which yield high return in major producing states.

It could be observed from the table that even through the area under mango crop has decreased but the production and productivity has increased. This is mainly due to the new highly yielding varieties developed by research institutes. Recently Indian Institute of Horticultural Research, Bengaluru has released the new high yielding variety by name Arka Suprabath. Thus, even though there is a decrease in the area under crop, certainly there is an increase in the production and productivity of the crop which can be signified by the coefficient of variation within 20 per cent for all the parameters (Koujalagi *et al.*, 2014).

The Table 2 presents the trend in production of mango in different states. The states were selected for the study was Andhra Pradesh, Bihar, Gujarat, Karnataka, Kerala, and Maharashtra. Odisha, Tamil Nadu, Uttar Pradesh, West Bengal and other states which was grouped under others. In Andhra Pradesh the production in the year 2007-08 was 4157.90 thousand MT which grew to 4373.61 thousand MT in the year 2017-18. Average production during the period was 3527.56 thousand MT with the growth rate of 0.39 per cent, supported by the

time variable to the extent of 60 per cent. In Bihar state the production was 870.40 thousand MT for the year 2007-08 which raised up to 2443.47 thousand MT in 2017-18. During the study period average production was round 1377.91 thousand MT with the growth rate of 6.31 per cent which was significant at 1 per cent level and R^2 obtained to be 55 per cent. The next state which was listed was Gujarat, production in the year 2007-08 was 930.10 thousand MT grew to 1207.78 thousand MT in a decade. Average production of Mango in the state during the study period was 1017.01 thousand MT having the growth rate of 8.91 per cent which was found to be statistical significant at 5 per cent probability level with the R^2 of 64 per cent. In Karnataka state the area which was 1223.30 thousand MT in the year 2007-08 which grew to 1760.60 thousand MT in the year 2017-18. The average production during the study period was 1659.27 thousand MT. Growth rate found to be 2.60 per cent which was statistical significant with 5 per cent with the R^2 value of 0.97. In the Kerala state the production of mango in the year 2007-08 was 445.40 thousand MT had negligible growth with 439.20 thousand MT in the year 2017-18. Average production was found to be 396.62 thousand MT for the entire study period. Growth rate was found to be negative with 1.08 per cent with the time variable explaining to the tune of 57 per cent. Next state that was listed was Maharashtra, production in the year 2007-08 was 710.90 thousand MT which increased to 791.36 thousand MT in the year 2017-18. Average production during the decade was calculated which indicated 665.21 thousand MT with the growth rate of 1.51 per cent which was explained by the time variable to the tune of 67 per cent. In Odisha state the production of mango was 251.80 thousand MT in the year 2007-08 which grew to 805.77 thousand MT in the year 2017-18. Average production for the study area was around 664.85 thousand MT with the growth rate of 9.04 per cent which was found to be statistical significant at one percentage probability level the same was supported by the time variable at 77 per cent. In the state of Tamil Nadu, it was observed that in the year production of mango registered at 753.60 thousand MT and grew to 1234.00 thousand MT for the year 2017-18 with an average production during the study period happened to be 892.05 thousand MT registering the growth rate at 5.20 per cent with time variable explaining to the tune of 62 per cent. In Uttar Pradesh state mango production was around 3365.00 thousand MT in the year 2007-08 which grew to 4551.83 thousand MT in the year 2017-18. The average production was found to be 4029.45 thousand MT with the growth rate of 3.30 per cent and $R^2$to be 88 per cent. West Bengal production was 623.30 thousand MT in the year 2007-08 had grown to 918.35thousand MT for the year 2017-18. Average production during the study period was around 667.81 thousand MT and had a growth rate of 3.46 per cent with 58 per cent of time variable explaining respectively. The other states which are growing mango were grouped as others, in the year 2007-08 production registered to be 490.50 thousand MT had grew to 663.83 thousand MT in the year 2017-18. There was a negative growth rate with 1.50 per cent which was supported by the time variable to the tune of 96 per cent. The main reason in decline in production of mango in Kerala is due to unseasonal rainfall. It is evidenced that from past four years there were unusual rainfall during the flowering stage of the crop, which has damaged the crop entirely across the major districts of the state that is weather temperature has a dominant influence on the growth cycle, time and frequency of flowering, fruit growth as well as taste and appearance of the mango in almost all production areas of the country. The major factors for good flowering in mango trees is long exposure to light and heat which yields in maximum production (Ahmad *et al.,* 2015).

B. Structural composition of exports

The Table 3 presents the percentage share to total export of mango from India. In the year 2008-09 among the five major countries to which mango exported United Arab Emirates was having the major share with 29.35 per cent. Next country which had the major share in export percentage was United Kingdom with 3.02 per cent which was followed by Oman country with a major share of 0.48 per cent, Qatar 0.32 per cent, United States of America 0.24 per cent. Left over percentage of 66.59 was exported to other minor importing countries. In the year 2019-20 similar level of trend was obtained with United Arab emirates with 33.36 per cent followed by United Kingdom with 8.77 per cent, Oman 7.32 per cent, Qatar 5.53 per cent and United States of America to be 2.21 per cent among the total exported and other minor importing countries with the share of 42.81 per cent. The similar trend was observed for entire study period, the other minor importing countries had a large share indicating the Indian mangoes are having huge demand from other minor importing countries. The major mango varieties that are exported from India are Alphonso Mango (Hapus),Totapuri Mango, Kesar Mango, Badami Mango ,Green mango, Rajapuri Mango and Banganapalli Mango (Gupta, 2014).

C. To examine the direction of trade

Table 4 presents the transitional probability matrix of mango exports (quantity) from 2008-9 to 2019-20. United Arab Emirates, United Kingdom, Oman and other minor importing countries were found to be stable market as the retention of previous trade to the extent of 74 per cent, 80 per cent, 69 per cent and 78 per cent respectively. Qatar was found to be moderately stable with the retention of the share at 45 per cent and United States of America was found to be most unstable market with the zero per cent retention to the previous trade. United Arab Emirates retained a share of 74 per cent of its previous trade of which gained 21 per cent from other minor importing countries and 11 per cent from United Kingdom.

Table 2: Trend in production under mango of different states. **('000 MT)**

Years	Andhra Pradesh	Bihar	Gujarat	Karnataka	Kerala	Maharashtra	Odisha	Tamil Nadu	Uttar Pradesh	West Bengal	Others
2007-08	4157.90	870.40	930.10	1223.30	445.40	710.90	251.80	753.60	3365.00	623.30	490.50
2008-09	2522.00	1329.80	299.80	1284.40	445.40	712.80	449.70	821.40	3465.90	548.90	869.70
2009-10	4058.30	995.90	856.70	1694.00	373.20	597.00	577.50	636.30	3588.00	578.00	1071.80
2010-11	3363.40	1334.90	911.30	1778.80	380.90	331.00	642.00	823.70	3623.20	620.20	951.10
2011-12	3514.80	1241.80	966.00	1868.30	373.20	503.00	715.20	889.60	3840.80	661.50	660.00
2012-13	4406.90	1363.80	1003.70	1795.10	441.00	633.00	753.80	714.10	4387.00	735.00	583.30
2013-14	2737.00	1367.60	1125.60	1755.60	441.00	1212.50	751.00	785.50	4301.00	430.70	580.40
2014-15	2822.10	1272.00	1219.70	1646.50	252.90	758.80	769.90	896.80	4347.50	799.70	633.50
2015-16	2803.66	1464.93	1241.59	1725.67	382.52	463.17	778.72	975.11	4512.71	693.39	636.98
2016-17	4043.47	1472.38	1424.87	1719.73	388.14	603.83	817.91	1282.44	4341.00	736.90	733.97
2017-18	4373.61	2443.47	1207.78	1760.60	439.20	791.36	805.77	1234.00	4551.83	918.35	663.83
Total	38803.14	15156.98	11187.14	18252.00	4362.86	7317.36	7313.30	9812.55	44323.94	7345.94	7875.08
Mean	3527.56	1377.91	1017.01	1659.27	396.62	665.21	664.85	892.05	4029.45	667.81	715.92
SD	715.48	398.70	294.56	208.81	57.26	227.34	176.13	203.35	453.96	131.46	176.51
CAGR	0.39	6.31**	8.91*	2.60*	-1.08	1.51	9.04**	5.20**	3.30**	3.46	-1.50
R^2	0.60	0.55	0.64	0.97	0.57	0.67	0.77	0.62	0.88	0.58	0.96

** Significant at 1 percentage
* Significant at 5 percentage

Table 3: Percentage share to total export of mango from India.

Year	UAE	U K	U S A	Oman	Qatar	Others
2008-09	29.35	3.02	0.24	0.48	0.32	66.59
2009-10	34.39	3.97	0.24	0.36	0.89	60.15
2010-11	43.28	4.62	0.17	0.23	0.64	51.06
2011-12	34.70	3.99	0.56	0.24	1.29	59.22
2012-13	67.64	5.94	0.44	0.64	2.74	22.60
2013-14	55.83	8.19	0.59	0.84	1.87	32.69
2014-15	67.98	0.77	0.63	1.41	2.32	26.89
2015-16	54.31	4.07	0.73	1.16	2.76	36.97
2016-17	53.99	5.74	1.17	1.70	4.27	33.13
2017-18	47.87	7.58	1.63	4.54	4.72	33.66
2018-19	35.26	8.63	2.05	7.78	6.19	40.10
2019-20	33.36	8.77	2.21	7.32	5.53	42.81

It lost 19 per cent of the market share to other minor importing countries, United Kingdom to the extent of 0.05 per cent and to Qatar with 0.01 per cent. 80 per cent of the previous trade was retained by the United Kingdom with gaining of its trade of 0.05 per cent from United Arab Emirates. It lost its market share of 11 per cent to United Arab Emirates, 4 per cent each to United States of America and Oman. United States of America lost its entire share of trade to Qatar with 100 per cent which is reflected with zero percentage. Oman retained the market share of 69 per cent, gained from Qatar to the extent of 24 per cent and United Kingdom at 4 per cent. Oman lost the market share to other minor importing countries to the tune of 31 per cent. Country Qatar retained 45 per cent of its previous market share, gaining 1 per cent from United Arab Emirates, and 100 per cent from United States of America. It lost its market share to 29 per cent to United States of America and 24 per cent to Oman. The other importing countries of mango which was grouped under the category of others retained the share of 78 per cent of market share to its previous share. The gain in the market share was obtained from United Arab Emirates with 19 per cent and 30 per cent from Oman. The other minor importing countries lost its share to United Arab Emirates to the tune of 22 per cent respectively. It is evidenced from the table that other minor importing countries has a good share of retention indicating that Indian mangoes are having the demand in the international market as other countries apart from the listed ones are purchasing the Indian mangoes (Kusuma and Basavaraja 2014).

Transitional probability matrix of Indian mango exports in terms of value from 2008-09 to 2019-20 is depicted in Table 5. United Arab Emirates, United Kingdom and other minor importing countries were found to be stable market for the revenue generation of India mango that was exported during the study period. Oman was found to be moderately stable. United States of America and Qatar were found to be most unstable with zero per cent of retention of market value. United Arab Emirates retained the share of 72 per cent of its previous market value with gaining from 36 per cent from United Kingdom and 37 per cent from other minor importing countries. It lost the share of market value to United Kingdom to the tune of 12 per cent, 1 per cent to Qatar and 13 per cent to other minor importing countries. The next country found to be stable was United Kingdom retained the share of 48 per cent of its market value from its previous market value share. It gained the market value from United Arab Emirates with 12 per cent and 5 per cent from Oman. It lasts its market value share to United Kingdom with 36 per cent, 4 per cent to United States of America, 5 per cent to Oman, 3 per cent to Qatar. United States of America lost its entire share of market value with zero per cent retention. It lost its market share value to Oman with 4 per cent, 96 per cent to other minor importing countries. Next country which was Oman retained a share of 17 per cent of its previous market value share with the gain from United Kingdom 5 per cent, United States of America 3 per cent and Qatar to be 30 per cent. The country Qatar had lost its entire market share in terms of value to United States of America with 69 per cent and 31 per cent to Oman. The other minor importing countries which were grouped under the category as others retained the share of 62 per cent, it lost the left over market share in value terms to United Arab Emirates to the tune of 38 per cent. Retention of the share was from United Arab Emirates with 13 per cent and 55 per cent from Qatar. It is evident from the table that most stable nations in terms of value were United Arab Emirates followed by other minor importing countries and United Kingdom. Even though the Qatar retained the share in terms of quantity has lost in terms of value with the zero per cent of retention. Government need to frame the guidelines or meet the demand of the country Qatar as per the specifications of the country so that India can export the mangoes. United States of America was the most unstable nation as it retained zero per cent of its previous share and was the most unstable market (Hugar, 2002).

Table 4: Transitional probability matrix of Indian mango exports (quantity) from 2008-09 to 2019-20.

Country	UAE	U K	U S A	Oman	Qatar	Others
UAE	**0.7448**	0.0501	0.0000	0.0000	0.0142	0.1910
U K	0.1126	**0.8006**	0.0413	0.0455	0.0000	0.0000
U S A	0.0000	0.0000	**0.0000**	0.0000	1.0000	0.0000
Oman	0.0000	0.0000	0.0000	**0.6988**	0.0000	0.3012
Qatar	0.0000	0.0076	0.2975	0.2408	**0.4541**	0.0000
Others	0.2117	0.0012	0.0003	0.0000	0.0042	**0.7826**

Table 5: Transitional probability matrix of Indian mango exports (value) from 2008-09 to 2019-20.

Country	UAE	U K	U S A	Oman	Qatar	Others
UAE	**0.7251**	0.1255	0.0000	0.0000	0.0131	0.1363
U K	0.3629	**0.4877**	0.0499	0.0562	0.0370	0.0063
U S A	0.0000	0.0000	**0.0000**	0.0359	0.9641	0.0000
Oman	0.0000	0.0555	0.2135	**0.1776**	0.0000	0.5534
Qatar	0.0000	0.0000	0.6937	0.3063	**0.0000**	0.0000
Others	0.3733	0.0000	0.0000	0.0000	0.0000	**0.6267**

CONCLUSION

Horticulture is an inevitable segment playing a major role in the economy of Indian agriculture. Major mango-growing states in India include Andhra Pradesh, Uttar Pradesh, Karnataka, Bihar, Gujarat and Tamil Nadu. Andhra Pradesh ranks first in mango production with a share of 24.48 per cent with highest productivity. India's major Export Destinations during the year 2019-20 included United Arab Emirates, Saudi Arabia, Kuwait, Qatar and Nepal. The increase in mango production is mainly due to the new high yielding varieties developed by research institutes. Maximum retention of the market share for India mango was by United Kingdom which was followed by Other minor importing countries, United Arab Emirates, Oman and Qatar, United States of America was the most unstable country for Indian imports as the country has started importing the mangoes from China and Pakistan which has drastically hit on the business of Indian mangoes. The final quality products fetch high remunerative prices which gives the way to increase in the production of fruit crops.

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