

Research Paper

Export Performance of Fresh Mangoes from India

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Received: 17-03-2021

Revised: 29-5-2021

Accepted: 12-06-2021

ABSTRACT

The status of fresh mangoes in respect of its export from India was studied for the period from the year 2008-09 to 2019-20 concerning significant export destinations. Status was examined by estimating mean, compound growth rate (CGR), instability, and diversification. Ray method was used to estimate the instability and diversification status was examined with the help of the Simpson Index of Diversification. Compound Growth Rate (CGR) was estimated by employing the best fit, functional form to the export data. United Arab Emirates, Bangladesh Pr, United Kingdom, Nepal, and Saudi Arab were the major export destinations of fresh mangoes from India in terms of quantity and value during the study period. Average growth in this export sector was 0.97 and 1.79 percent *w.r.t.* quantity and value, respectively. High growth coupled with moderate instability was observed. A moderate level of instability was observed at an overall level. During the year 2008-09 to 2019-20, lots of variation was observed in the level of diversification.

Highlights

- ① UAE ranks first in average quantities of Fresh Mangoes exported to these countries while Saudi Arab ranks fifth in the top five export destinations from India.
- ② The maximum growth rate for export with respect to Fresh Mangoes was observed for Maldives followed by Hong Kong, Italy, Canada, etc.
- ③ The export destinations in respect of Fresh Mangoes were increased over the year.

Keywords: Export, fresh Mangoes, Simpson Index, diversification, growth, and instability

Mango (*Mangifera indica*) is India's leading fruit crop and is considered the king of fruits. Besides the delicious taste, excellent flavor, and attractive fragrance, it is rich in vitamin A&C. The tree is hardy, can be grown in a variety of soil, and requires comparatively low maintenance costs. Mango fruit is utilized at all stages of its development, both in its immature and mature state. Raw fruits are used for making chutney, pickles, and juices. Besides being used for desert, the ripe fruits are also utilized for preparing several products like squashes, syrups, nectars, jams, and jellies. The mango kernel also contains 8-10 percent good quality fat which can be used for soap and as a substitute for cocoa butter in confectionery.

Fresh mangoes and mango pulp are the essential items of agri-exports from India. India's main export destinations for mango are UAE, Bangladesh, U.K., Saudi Arabia, Nepal, Kuwait, USA, and other Middle East countries, with a limited quantity being shipped to the European market. Although India is the largest mango producing country, accounting for about 45 % of world production. Fresh fruit export is limited to Alphonso and Dashehari varieties. India's

How to cite this article: Kuthe Surendra, B.,* Daya, S. and Tushar, P. (2021). Export Performance of Fresh Mangoes from India. *Economic Affairs*, 66(2): 201-205.

Source of Support: None; **Conflict of Interest:** None



share in the world mango market is about 15 %. Mango accounts for 40 % of the total fruit exports from the country. There is good scope for increasing the area and productivity of mango in the country.

The major mango-growing states are Andhra Pradesh, Uttar Pradesh, Karnataka, Bihar, Gujarat, and Tamil Nadu. Uttar Pradesh ranks first in mango production with a share of 23.47 % and the highest productivity.

India is also a prominent exporter of fresh mangoes to the world. The country has exported 49,658.68 MT of Fresh Mangoes to the world for the worth of ₹ 400.21 crores/ 56.11 USD Millions during the year 2019-20 (apeda.gov.in).

MATERIALS AND METHODS

The study is based on the secondary time series data from 2008-09 to 2019-20 of quantity and value of export of Fresh Mangoes from India. The required data were collected from the Directorate General of Commercial Intelligence and Statistics (DGCIS Annual Export), APEDA, and agriXchange. For the analysis of the composition of agricultural exports, appropriate statistical tools like percentage, share index, average values, Compound Annual Growth Rate (CAGR), Instability, and Diversification were used.

Compound Growth Rate

The Export performance of Fresh Mangoes in India was examined by estimating compound growth rates for Quantity and Values as follows:

$$Y_t = ab^t$$

Where,

Y_t = Quantity and Values of Export in i^{th} period,

$$b = 1 + r$$

r = Compound growth rate of Y , a =Initial year Quantity and Values of Export (Constant) and

t = Time variable in years (1,2,.....25)

After log transformation and estimation of the above function as:

$\ln Y_t = \ln A + t \ln b$, compound growth rate has been estimated as;

$$\text{CAGR (\%)} = \{\text{Antilog } b_1 - 1\} * 100$$

Instability

Ray (1983) developed a straightforward measure of instability given by the standard deviation in annual growth rates. This method satisfies the properties like instability based on de-trended data and comparability. Moreover, the methodology does not involve actual estimation of the trend, computation of residuals, and de-trending. However, all these are taken care of in the standard deviation of annual growth rates. In short, this method is as follows;

Instability index = Standard deviation of natural logarithm of $(Y_t + 1/Y_t)$

Y_t is the Quantity and Value in the current year and, Y^{t+1} is the same for the following year. This index is unit-free and very robust, and it measures deviations from the underlying trend (log-linear in this case). When there are no deviations from the trend, the ratio of $Y_t + 1/Y_t$ is constant, and thus standard deviation is zero. As the series fluctuates more, the ratio of $Y_t + 1$ and Y_t also fluctuates widely, and the standard deviation increases.

Simpson Index of Diversification

The Simpson Index (SID) was calculated to find the extent of diversification of Fresh Mangoes among various export destinations. This was worked out using following equation:

$$\text{Simpson Index of Diversification} = \left[1 - \left(\sum_{k=0}^n w_i^2 \right) \right]$$

$$W_i = \frac{X_i}{\sum X_i}$$

Where,

X_i = Quantity and Values of Export in i^{th} period

W_i = Proportionate Quantity and Values of Export in i^{th} period in the total

RESULTS AND DISCUSSION

The average exports of Fresh Mangoes were estimated for the last twelve years and are presented in Table 3. It was seen that, in quantity UAE, Bangladesh Pr, Nepal, U.K., and Saudi Arab were the top five export destinations from India. The average quantities of Fresh Mangoes exported to these countries were 24375.84, 12379.43, 5550.63,

Table 1: Concentrated pockets of fresh Mangoes in fresh Mangoes growing states

Sl. No.	State	Districts
1	Andhra Pradesh	Krishna, Vizianagaram, West Godavari, Visakahapatnam, East Godavari, Srikakam Khammam, Nalgonda, Karimnagar, Warangal, Mahaboobnagar, Chittoor, Cuddapah, Nellore, Prakasam
2	Karnataka	Kolar, Bangalore, Tumkur, Chitradurga, Mysore, Hassan, Mandya, Chickmagalur
3	Gujarat	Valsad, Navsari, Surat, Vadodara, Bharuch, Junagadh, Amreli, Bhavnagar,
4	Uttar Pradesh	Lucknow, Sultanpur, Sitapur, Unnao, Hardoi, Barabanki, Faizabad, Saharanpur, Bulandshahar, Meerut, Muzaffarnagar, Bijnaur, Moradabad, Deoria, Basti, Arajganj, Kabir Nagar, Gorakhpur, Kushi Nagar
5	Maharashtra	Ratnagiri, Sindhudurg, Raigarh, Satara, Sangli, Kolhapur, Latur, Nasik, Beed, Akola, Jalna, Ahmednagar, Buldhana, Osmanabad
6	Tamil Nadu	Teni, Dharmapuri, Salem, Tirunelveli.

Table 2: Arrival pattern of fresh Mangoes in top five states

Sl. No.	State	Season of availability	Important cultivars
1	Andhra Pradesh	Mid Feb. - Mid July	Banganpalli, Totapuri, Suvarnrekha, Neelum
2	Gujarat	April - July	Alphonso, Kesar, Rajapuri
3	Karnataka	April - July	Banganpalli, Totapuri, Neelum, Alphonso, Pairi
4	Maharashtra	March - July	Alphonso, Kesar, Pairi
5	Uttar Pradesh	May-August	Bombay Green, Langra, Chausa, Amrapali, Dashehri

2865.13 and 2034.71 MT. Average values of Fresh Mangoes exported to UAE, U.K., Bangladesh Pr, Saudi Arab, and Qatar were 15,524.76, 3,380.55, 1,512.74, 1,403.66, and 1,186.86 MT, respectively, during the study period.

Table 3: Average export of fresh Mangoes from India to major countries (2008-09 to 2019-20)

Sl. No.	Name of Countries	Quantity (M.T.)	Values (₹ Lakh)
1	U A E	24375.84	15,524.76
2	U K	2865.13	3,380.55
3	U S A	443.08	1,026.27
4	Oman	1089.64	866.36
5	Qatar	1385.30	1,186.86
6	Nepal	5550.63	993.06
7	Kuwait	1187.67	1,063.42
8	Saudi Arab	2034.71	1,403.66
9	Bangladesh Pr	12379.43	1,512.74
10	Singapore	626.36	544.92
11	Baharain	864.78	542.93
12	Canada	448.70	333.40
13	Malaysia	263.62	183.64
14	France	151.29	127.82
15	Germany	112.91	104.91
16	Hong Kong	151.42	136.72
17	Italy	53.41	62.62
18	Switzerland	103.02	113.19
19	Maldives	45.92	40.23
20	Japan	54.31	75.17

Country wise Growth and Instability

Growth and instability e important decision parameters in development dynamics and more so in the context of export. Growth and instability in the export of fresh Mangoes have been discussed for India.

The country-wise export growth rate of fresh Mangoes in India in terms of quantity and values were collected from the best fitted functional form for the year 2008-09 to 2019-20 and are presented in Table 4. So far as export to quantity to all the countries was concerned maximum growth rate was observed concerning fresh Mangoes for the Maldives (8.50%) followed by Hong Kong (6.33%), Italy (4.05%), Canada (2.30%), Germany (1.60%), Singapore (1.32%), U S A (0.94%), Qatar (0.35%), Japan (0.31%), Oman (0.22%), respectively. The overall growth rate of quantity was observed to be 0.97%.

Maximum instability in the export of quantity of fresh Mangoes countries was observed in Italy (131.10%) followed by Bangladesh Pr (126.18%), Oman (120.36%), Kuwait (92.63%), Japan (87.02%), USA (75.72%), Maldives (75.07%), Qatar (67.13%), Nepal (61.07%), Germany (47.79), respectively. Overall instability of quantity was observed to be 60.76 %.

In the case of value, the maximum growth rate was found in respect of fresh Mangoes countries in the Maldives (8.25%) followed by Hong Kong (5.05%), Italy (3.45%), Germany (3.24%), France (2.78%), Malaysia (2.53%), Japan (2.08%), Canada (1.73%), Singapore (1.18%), Baharain (1.18%), respectively. The overall growth rate of value was found at 1.75%.

Country-wise highest instability of export-related fresh Mangoes from India was recorded in Italy (138.08%) followed by Oman (118.34%), Bangladesh Pr (101.25%), Maldives (97.50%), USA (93.35%), Qatar (82.50%), Germany (78.22%), Japan (75.70%), Nepal (71.90%), France (64.85%), respectively. Overall instability of value was observed 69.30%.

It is revealed from Table 4 that the fluctuation was found in country-wise growth and instability of export of fresh Mangoes from India in quantity and values. The fact is that the fresh mangos are a seasonal fruit crops and have seen the problem of alternate bearing. The fresh Mangos export was also depended on the demand of that country and supply from India.

Table 4: Country wise growth and instability of export of fresh Mangoes from India (2008-09 to 2019-20)

Sl. No.	Name of Countries	Quantity		Values	
		Growth	Instability	Growth	Instability
1	U A E	-0.03	23.80	0.05	32.71
2	U K	0.12	38.42	0.15	60.66
3	U S A	0.94	75.72	0.34	93.35
4	Oman	0.22	120.36	0.29	118.34
5	Qatar	0.35	67.13	0.34	82.50
6	Nepal	0.08	61.07	0.44	71.90
7	Kuwait	0.05	92.63	0.62	51.05
8	Saudi Arab	-0.21	26.41	0.43	36.43
9	Bangladesh Pr	-0.02	126.18	-0.16	101.25
10	Singapore	1.32	36.71	1.18	53.17
11	Baharain	-0.25	31.28	1.18	45.52
12	Canada	2.30	24.32	1.73	60.15
13	Malaysia	-2.98	33.32	2.53	36.88
14	France	0.07	42.94	2.78	64.85
15	Germany	1.60	47.79	3.24	78.22
16	Hong Kong	6.33	26.55	5.05	50.90
17	Italy	4.05	131.10	3.45	138.08
18	Switzerland	-3.34	47.42	1.08	36.79
19	Maldives	8.50	75.07	8.25	97.50
20	Japan	0.31	87.02	2.08	75.70
	All	0.97	60.76	1.75	69.30

Diversification Status

Diversification offers a broader choice of export of fresh Mangos from India to the other countries. The shift of export from one country to other countries depends on several factors like government policies, foreign policies, trade policies, market availability, etc.

The horizontal diversification increases the export of different countries from India. The extent of horizontal diversification can be gauged empirically through Simpson’s index of diversification (SID). The Simpson index of diversification was computed to evaluate the extent of diversification of Fresh Mangoes across the major countries from India, beginning and end of 2008-09 to 2019-20, and has been presented in Table 5 in the form of quantities and values.

Table 5: Diversification status of fresh Mangoes across the major countries from India

Sl. No.	Years	No. of Export Destinations	Quantity	Values
1	2008-09	46	0.62	0.71
2	2009-10	56	0.67	0.69
3	2010-11	44	0.65	0.58
4	2011-12	41	0.68	0.68
5	2012-13	51	0.52	0.59
6	2013-14	53	0.65	0.59
7	2014-15	47	0.52	0.48
8	2015-16	48	0.64	0.62
9	2016-17	41	0.67	0.66
10	2017-18	53	0.72	0.73
11	2018-19	56	0.82	0.81
12	2019-20	51	0.80	0.81

The diversification values (SID) in respect of quantities of fresh Mangoes across the major countries from India were ranged from 0.82 in 2018-19 to 0.52 in both years 2012-13 and 2014-15. In the case of values, diversification values of fresh Mangos across the major countries were ranged in between 0.81 in both years 2018-2019 and 2019-20 to 0.58 in 2010-2011.

The study concludes that the export destinations in respect of fresh Mangoes were increased over the year. The number of export destinations was 46 in 2008-09, which was related to 51 in 2019-20. But in between 2008-09 to 2019-20 the number of export destinations from India fluctuated over the

year while it is recorded that the number of export destinations was increasing year-wise. It means exports of fresh Mangoes from India to other countries were increased from year to year.

CONCLUSION

UAE, Bangladesh Pr, U.K., Nepal, and Saudi Arab were the major export destinations of Fresh Mangoes from India in terms of quantity and value during the study period. Average growth in this export sector was 0.97 and 1.75 percent *w.r.t.* quantity and value, respectively. High growth was coupled with high instability was observed. A moderate level of instability was observed at an overall level. Except during initial levels, a high level of diversification was observed.

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