



Performance and Determinants of Mango Export from India

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ABSTRACT

The study has examined the growth performance and identified determinants of Mango exports from India during 2006-07 to 2014-2015. The compound growth rate, instability index were applied to estimate trend and instability and the project export to different countries. The time series data were used for estimating the determinants of Indian Mango export. The study observed that the Mango contributed substantially to the total horticultural export during study period. The higher growth observed in the value of mango export (8.77%) than the quantity of export (-6.54%) due to phytosanitary barriers in European and American countries during 2006-07 to 2014-15. The growth of unit value of mango export is higher (16.39 %). The instability index has been found higher for unit value (21.38%) than the quantity export (15.94 %) and value of export (10.16 %). The estimated regression model has shown that export price, lagged production, exchange rate and domestic consumption are major determinants for mango export from India. In order to sustain in the international market improvement in the quality and sanitary standards is essential.

Key words: Mango, export, performance, instability index and export determinants

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INTRODUCTION

India is largest producer and prominent exporter of mango with annual production of about 18.68 million tonnes and a share of more than one third of world's mango production [1]. About 17 per cent is exported to countries to the European Union and 75 per cent in Gulf. Review of literature highlighted the problems in mango production, marketing, post-harvest handling etc. have been responsible for lower export and rejection of Indian consignments [2]. Over the year export have been adversely affected due to unavailability of required infrastructural facilities in the production zones [3]. At International level the use of non-tariff barriers like sanitary and phytosanitary measures (SPS) and technical barrier to trade (TBT) by importing countries have affected the mango export from India. The US banned import of Indian mango in 1989 on account of excessive usage of pesticides and for a of invasion of fruit flies and stone weevil and India had to affair reduced pesticide level and Hot water treatment as a viable measure of pest control [4]. But after prolong negotiation, US permitted import of Indian mangoes with nuclear irradiation and strict inspection.

The inspection norms were prohibitively strict as inspection in India by US inspectors increases the cost of mango manifold and render it uncompetitive [5]. However, after further negotiations, US agreed for nuclear irradiation and routine inspection only. The EU also ban on import of mango including Alphonso along with four vegetables after observation of fruit flies in 207 consignments of produce. Indian system of export controls failed to meet the international standard for the year. Henceforth, Indian business and government need to address the concerns of EU by putting in place elaborate examination and certification procedure. The implementation of provision of WTO among member countries has enabled integration of global agricultural food markets. The increasing integration of global agricultural food market has been accompanied by stringent food safety measures viz. SPS and NTBs, especially in developed countries [6]. This has poses new challenges before developing countries in modifying their food regulations and standards with the emerging global trends so as to sustain their share of global trade in food commodities and cash crops.

The SPS requirements of importing countries (as per their act) are increasingly being applied to the production and trade of agricultural products. There are ample opportunities for developed countries to tweak the standards stronger than necessary to achieve the optimal level of social protection and to twist the related testing and certification procedure to make their imports more competitive. There are number of forces which directly and indirectly affects the compliances of SPS measures in fresh mango exports. In this backdrop, it becomes essential to analyse the performance and determinants of Indian fresh mango exports. The main objective of present study to evaluate the performance and determinants of mango export from India

MATERIAL AND METHODS

The study is based on the time series data on export quantity and value which were compiled from the various sources for a period of 2006-07. To present the trend, instability in growth and determinants of Indian mango export the data were collected from National Horticultural Board and FAO for the time series spanning from 2006 -07 to 2014-15.

To analyse compound growth rates for export of mango in term of quantity and value is workout. The instability Index was computed using Cuddy Della Valle Index,

$$I = Cv*(1-R^2)^{0.5}$$

Where,

CV is the coefficient of variation

R² is the corrected coefficient of determination of log linear function.

Determinants of Mango exports

The factor affecting the mango export were identified using log-log linear type of function.

$$\ln QT = b_0 + b_1 \ln EXP + b_2 \ln TP + b_3 \ln LGP + b_4 DMC + b_5 \ln EXC + u$$

Where,

QT= Total mango export from India

EXP= Export price (Rs. /t)

TP= Total production (MT)

LPG= Lagged production of mango (MT)

DMC= Domestic consumption of mango (MT)

EXC= Exchange rate with dollar (Rs. /\$)

U= error term

b₁....b₅ are the regression coefficients and b₀ is a constant

The export price for mango have been represented by their respective unit values.

Due to non-availability of data on domestic consumption it was computed as per

$$\text{Domestic consumption} = \text{Production} + \text{Import} - \text{Export}$$

RESULTS AND DISCUSSION

Mango is the commodity grown in more than 80 countries in the world. Major producers are India, China, Mexico, Pakistan, Indonesia, Thailand, Nigeria, Brazil, Philippines and Haiti. World mango production increased from 17.2 MT in 1990 to 42 MT in 2013 registering an increase of nearly two and half times. India enjoy top slot followed by China, Kenya, Thailand and Indonesia. However, the share of Indian mango production in total world production has been consistently falling from 50 per cent in 1990 to 36 per cent in 2013 (Table 1).

Contrary to two time share of China, Kenya, Thailand, Indonesia and Bangladesh in total world mango production has been consistently surging up. Notable increase in Mango production in china is about 3.34 MT in a span of over a quarter century. The result infer that mango production globally is diversifying over the year. To sustain in overseas mango trade. India needed to develop a strategy to enhance yield as well as quality of fresh mango.

Mango accumulates 1/3rd (36 %) of total area under fruit crops and about 22 per cent of total fruit production in the country in 2013-14 (Table 2). The mango production increased from 1.1 MT to 2.6 MT along with 4.19 per cent annual growth rate. The area increase is more than a proportionate increase in production (2.97 per cent). This is also evident from a continuous fall in mango productivity from 8.10 t/ha. to 7.3 t/ha. This inform that, mango production in the country is driven by expansion of area only. Therefore, to sustain the production to meet growing domestic and overseas demand, appropriate technology, policy and institutions are needed to arrest the productivity fall.

Indian fresh mango is the most sought fresh agricultural commodity in overseas market. From 1991 mango export volume of total world increased from 0.22 MT to 1.43 MT. Measure exporting countries India, Thailand, Brazil, Peru, Netherland and Pakistan have consistently enhances their production and correspondingly increased their share and export in world mango market.

Mexico is the leading global exporter with 0.24 MT where it ranks eight in mango production in the world with production between 0.1 to 0.29 MT. Almost 20 per cent of Mexico mango productions is exported. With fact that it has lost almost 50 per cent its share in the world mango market since 1991. It can infer that, from (Table 3) global trade in fresh mango diversifying over the year.

It is observed from the Table 4. That, in the year 2006-07 the mango export reported 79060.88 MT which can decrease to 42998.31 MT in 2014-15. But due to increase in unit price export in value term is shown to increase from 14193.95 thousands crores to 30253.65 thousand crores from 2006-07 to 2014-15. It is also seen from table 4, that the percent share of mango export in horticulture export is declining from 9.91 per cent to 4.46 per cent during this period.

Market structure for fresh mangoes is presented in Table 5. Premium mango market of the European Union and other developed countries have exacted and enforced plant health control and certification system. It revealed that the Major importing countries of Indian mango are gulf countries like Bahrain, Qatar, United Arab Emirates, and Saudi Arab, and Kuwait, European countries like United Kingdom, Netherlands, and United State of America, Singapore and Bangladesh. In 1990 -91.

The total export of fresh mango on constant price was estimated to Rs. 1050 million, which increased to Rs. 14907 million in 2013-2014. However it was Rs. 1012.70 million in 1999-2000 and Rs. 1412.50 million. Growth and instability of mango export from India is presented in Table 6. During the period from 2006-07 to 2014-15 the total mango export from India reported negative growth rate -6.54 percent with instability index of 15.94 indicated export of mango from India is not stable over a period of study in quantity term. However, in term of value the compound growth over a study period exhibit increasing rate of 8.77 percent with 10.16 instability index showing instability in mango export with respect to value term also. This is evident that the unit value and exported mango for various countries registering positive growth rate of 16.39 percent reflecting positive impact on mango export in value term. This is indicated from the table that the Indian mango fetches higher prices over a study period, but that is not stable with instability index of 21.38.

The factors determining mango export for India were studied by employing multiple regression of log-log form where quantity exported was regressed against the export prices, domestic consumption, lag and present production of mango and exchange rate are presented in Table 7.

The data used for regression analysis were for 2005-06 to 2014-2015 and regressive coefficient were estimated. The Table 7 shows that mango production are significant at 5 percent level of significance. However, others variables like domestic consumption are negatively significant at 1 per cent level of significance indicated that domestic consumption has indirect major role in export of mango. Whereas others variables like export prices and exchange rate are non-significant.

Table 1. Major mango producing countries

Country	Production (million tonnes)						Total world production (%)			
Country	1990	1995	2000	2005	2010	2012	1995	2000	2010	2012
India	8.6	11.0	10.5	11.8	15.0	15.3	48.8	42.5	40.4	36.2
China	0.9	2.0	3.2	4.2	4.1	4.6	8.9	13.0	11.1	10.8
Kenya	0.1	0.1	0.1	0.3	0.6	2.8	0.4	0.5	1.6	6.6
Thailand	0.9	1.1	1.6	1.8	2.6	2.7	4.7	6.6	6.9	6.3
Indonesia	0.5	0.9	0.9	1.4	1.3	2.4	3.9	3.5	3.5	5.6
Pakistan	0.8	0.9	0.9	1.7	1.8	2.0	3.9	3.8	5.0	4.6
Mexico	1.1	1.3	1.6	1.7	1.6	1.8	6.0	6.3	4.4	4.2
Brazil	0.5	0.6	0.5	1.0	1.2	1.2	2.8	2.2	3.2	2.8
Bangladesh	0.2	0.2	0.2	0.6	1.0	0.9	0.8	0.8	2.8	2.2
Total World	17.2	22.6	24.7	31.6	37.2	42.1	100	100	100	100

Source: FAOSTAT (2014).

Table 2. Area Production and Productivity of mango in India

Year	Area (M ha)	% of total fruit area	Production (MT)	% of total fruit production	Productivity (MT)
1991-92	1.08	37.5	8.72	30.4	8.1
1994-95	1.23	28.5	10.99	28.5	9.0
1999-00	1.49	37.3	10.50	23.0	7.1
2004-05	1.97	39.7	11.83	24.0	6.0
2009-10	2.31	36.5	15.03	21.0	6.5
2013-14	2.55	35.7	18.68	22.1	7.3
CAGR	4.19	--	2.97	--	-1.17

Source: Indian Horticulture Database.

Table 3. Major mango exporting countries in the world (Quantity in million tonnes)

Country	Years			% share		
	1991	2001	2011	1991	2001	2011
Mexico	0.10	0.19	0.29	44.5	29.8	20.1
India	0.02	0.05	0.23	10.3	7.1	16.0
Thailand	0.00	0.01	0.15	1.4	1.7	10.7
Brazil	0.01	0.09	0.13	3.4	14.4	8.9
Peru	0.00	0.03	0.12	0.0	4.1	8.7
Netherlands	0.00	0.04	0.11	0.0	6.5	7.7
Pakistan	0.01	0.05	0.11	4.7	8.0	7.4
Ecuador	0.00	0.03	0.05	0.0	5.2	3.4
Yemen	0.00	0.01	0.04	0.0	1.0	2.5
EU	0.00	0.01	0.03	0.0	1.2	2.3
Other	0.07	0.14	0.18	32.2	21.1	12.3
World Total	0.22	0.65	1.43	100	100	100

Table-4. Share of Indian Mango export to total Horticultural Export

Year	Total Mango export (MT)	Total Mango export value (Cr)	Unit value (Rs./tonne)	Horticultural Export (in Cr)	Per cent share of Mango export in Horticultural export
2006-07	79060.88	14193.95	179531.93	143216.03	9.91
2007-08	54350.80	12741.76	234435.51	139988.07	9.10
2008-09	83703.18	17071.25	203949.79	268937.75	6.35
2009-10	74460.60	20053.96	269323.11	314948.90	6.37
2010-11	58863.00	16484.00	280040.09	263577.00	6.25
2011-12	63441.00	20974.00	330606.39	306623.82	6.84
2012-13	55585.00	26472.00	476243.59	355727.71	7.44
2013-14	41280.01	28542.84	691444.60	527064.23	5.42
2014-15	42998.31	30253.65	703600.91	468680.22	6.46

Table 5: Market structure of fresh mango export from India (2004-05=100) Values in Million Rs.

Country	Year			
	1990-91	1999-00	2009-10	2013-14
UAE	454.2	361.4	731.3	899.9
Saudi Arab	265.2	125.0	94.8	63.7
Kuwait	95.6	53.2	36.6	43.0
UK	89.4	106.8	123.0	237.4
Baharin	68.3	32.3	28.3	21.1
Bangladesh	1.2	134.9	132.1	21.5
Qatar	42.7	22.0	36.1	34.2
Singapore	3.3	23.0	13.4	26.3
Netherlands	4.7	49.4	4.2	7.8
USA	2.8	20.8	18.1	29.3
Other	23.3	83.9	94.4	106.5
Total World	1050.7	1012.7	1412.5	14907.0

Table 6. Growth rate and Instability Index of Mango Export form India: 2006-07 to 2014-15

Sr. No.	Particular	Simple Growth Rate (%)	Compound Growth Rate (%)	CV	Instability Index
1	Mango Export (Qty)	5.06	-6.54	24.50	15.94
2	Mango export (Value)	12.57	8.77	30.62	10.16
3	Unit value (Rs/tonne)	32.43	16.39	54.07	21.38

Table 7. Estimates of determinants of Mango export from India.

Sr. No.	Variables	Coefficient	Std. error
1	Constant	1.2618	3.1264
2	Production of mango	2.8867**	0.5654
3	lag production of mango	-1.0257	0.6091
4	Export prices	-0.0959	0.2859
5	Domestic consumption	-0.8827*	0.1291
6	ER with Dollar	-0.7496	0.5306
	R Square	0.987959487	
	Adjusted R Square	0.967891965	
	Standard Error	0.019522634	
	f stat	49.23176323	
	*	Significant at 1%	
	**	Significant at 5%	

CONCLUSION

The study has observed that the mango contributed substantially to the total horticultural export during study period. The higher growth observed in the value of mango export than the quantity of export due to phytosanitary barriers in European Union and American countries. The growth of unit value of mango export is higher as well as instability index higher for unit value than the quantity of export and value of export. Therefore, by the estimated regression model it can conclude that export price, lagged production, exchange rate and domestic consumption are major determinants for mango export from India. In order to sustain in the international market improvement in the quality and sanitary standards is essential.

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