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Original Research Article

Growth and Export Performance of Mango in India

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A B S T R A C T

The present study entitled, growth and export performance of mango in India with objective of estimation of growth and export performance of mango in India. From study, it was revealed that, positive and significant growth of area, production and productivity of mango was observed. Highest variation was observed in case of production i.e. 15.88 per cent. Highest growth rates in case of area and production were found in Odisha state, where as highest variation in case of area and production was observed in Maharashtra. Highest growth i.e. 23.79 per cent of mango exported from India to Kuwait was observed. It was also observed that, Bangladseh was most stable importer of Indian mango followed by UAE, Baharain and other countries respectively. India produces 50 per cent of total mango produced in the world, but have low export share. Therefore, it is need to more emphasize on export of mango from India.

Keywords

Weeds, Herbicides, Weed control efficiency, Cane yield and seasonal sugarcane

Introduction

India is the second largest producer of fruits in the World after China with a production of 81.2 million tonnes of fruits from an area of about 6.9 million hectares, with a per capita consumption of 85 grams per day. On the Asian continent, India, where the mango is considered the king of fruits, ranks first among world's mango producing countries accounting for about 50% of the world's mango production, followed by China, Thailand, and Pakistan. In America, Mexico and Brazil are the largest producers of mangos. The main African mango producing country is Nigeria followed by Egypt.

The leading states in the production of mango in India are Uttar Pradesh, Andhra Pradesh, Karnataka, Bihar, and Gujarat. Indian mango is mainly patronized in UAE, UK, Saudi Arabia, Qatar, and Kuwait. Truly speaking Indian fruits are highly patronized mostly in West Asia Nations Association (WANA) countries. The major mango and guava, producing countries in the World are India (44.1%), China (9.1 %), Kenya (5.8 %) and Nigeria with a distant (1.8 %) (NHB, 2012-2013).

The mango has been known in India since very early times. It has been under cultivation by man for over 4000 years. Mango has occupied an important place in horticulture during the rule of the Mogul emperors in India, and Akbar the Great planted an orchard of 100,000 mango trees. It is considered as king of fruits in the tropical areas of the world. Indian mangoes

come in various shapes, sizes and colours with a wide variety of flavour, aroma and taste. The Indian mango is the special product that substantiates the high standards of quality and bountiful of nutrients packed in it. Mango cultivation is found in many countries of Southeast Asia – the Philippines, Indonesia, Java, Thailand, Burma, Malaysia and Sri Lanka. Introduction of the mango to East and West Africa and subsequently to Brazil is said to have occurred during the sixteenth century. The cultivated mango varieties are the result of constant selection by man from original wild plants for over 4000 years.

The main objectives includes, to study the performance of mango in India. And to study the export performance of mango.

Materials and Methods

The study is based on time series data on area, production, productivity and exports of mango from India obtained from various published issues of APEDA and other government publications for a period of 2004-05 to 2014-15.

Analytical tools

For the present study, following analytical tools were used.

1) Coefficient of Variation (CV)

$$C.V.(\%) = \frac{\sigma}{\bar{x}} \times 100$$

2) Compound Growth Rate (CGR)

The compound growth rate of area, production and productivity of mango crop were worked out by fitting an exponential function as given below

$$Y = ab^t$$

Where,

Y= Area, Production and productivity
a= Intercept
b= Regression coefficient
t = Time period (years)

From the coefficient values, the rates of compound growths will be work out by using the formula

$$CGR(r) = [\text{Antilog}(\log b) - 1] \times 100$$

Where,
r = Compound growth rate in per cent.

3) Coppocks Instability Index (CII)

$$\text{Delta M} = \frac{\sum \log (X_t + 1) - \log (X_t)}{N-1}$$

$$V\log = \frac{\sum[\{\log X_t + 1 - logX_t\} - m]^2}{N-1}$$

$$C.I.I = \left[\text{Antilog}\left(\sqrt{V\log}\right) - 1\right] \times 100$$

Where,
X_t = Value of area, production and productivity
N = No. of years
m = Arithmetic mean of difference between the log of X_t, $X_t + 1$, $X_t + 2$
V log = Logarithmic variance of the series.

Materials and Methods

Transition probability matrix of export of mango

Annual export data for period 2004-05 to 2014-15 were used to analyze the direction of trade and changing pattern of Indian mango export. The major Indian mango importing countries considered were U.A.E, Bangladesh, UK, Nepal and Saudi Arabia. Estimation of the exports was done for the study period using Markov chain analysis.

Growth performance of mango

An attempt was made to estimate the growth

rates of area, production and productivity of mango with the help of growth rates model explained in methodology. The results obtained are shown in Table 1.

i) Area

It could be seen from table 1 that the growth rate of area under the mango crop was 1.67 per cent which is significant at the 1 per cent level. This indicates that the area under mango crop in India has increased.

ii) Production

Table 1 indicates that the growth rate of mango production for India was positive i.e. 4.67 per cent which is significant at 1 per cent level over the entire period. The mango production is significant in India has been brought about by the increased yield in which the returns were made possible due to adoption of new varieties.

iii) Productivity

Productivity is the most important criteria in measuring the growth of any crop output. The success or failure of any improvement in the art of agriculture is measured by resultant increase or decrease in the productivity.

As seen from the table 1 that mango productivity in India for a period registered growth of 2.92 per cent which was significant at 1 per cent level. It shows that, the productivity of mango over a period of time increases.

Instability in area, production and productivity

The growth rates of area, production and productivity of mango is significant over the entire period. It was considered necessary to study the instability in area, production and productivity of mango. Coefficient of variation and instability were estimated for this purpose. The result obtained is presented in table 1.

i) Area

As seen from the table 1 that the coefficient of variation for mango crop for entire period was 7.44 per cent. From this, it is seen that the India exhibited low variation in area under mango crop.

ii) Production

As revealed from Table 1 that, the India witnessed low instability of production but greater than area & productivity as indicated by co-efficient of variation of 15.88 per cent over the entire period.

iii) Productivity

Table 1 revealed that, the productivity of mango over the entire period showed low co-efficient of variation of 12.30 per cent.

From this it is cleared that the instability in mango productivity was less and area were increased over the entire period. It means mango crop was maintain their stability in case of area, production and productivity.

Coefficient of instability

The coefficient of variation measures the absolute variations while coefficient of instability index measures the variation around the trend. The instability index computed using Coppocks Instability Index presented in Table 1.

i) Area

It was observed from table 1 that the

instability index of area under mango for entire period was 5.96 per cent. It shows low actual variation in area of mango crop.

ii) Production

It was observed from table 1 that the instability index of production under guava for entire period was 8.28 per cent. It shows low actual variation in production of mango crop.

iii) Productivity

It was observed from table 1 that the instability index of productivity under mango crop for entire period was 9.65 per cent. It shows low actual variation in productivity of mango crop.

State wise performance of mango

From table 2, it was revealed that the highest growth in case of area of mango crop was observed in Odisha state i.e. 5.65 per cent which is significant at 1 per cent level, whereas least growth was observed in Bihar state i.e. 0. 68 per cent. The highest growth in case of production of mango crop was observed in Odisha state i.e. 8. 92 per cent which is significant at 1% level, where as lowest growth was observed in Tamil Nadu state i.e. 4.66 per cent, which is significant at 1 per cent level. The highest growth rate in case of productivity of mango crop was observed in Uttar Pradesh state i.e. 5.44 per cent which is significant at 1% level where as the least growth was observed in Tamil Nadu state i.e. 2.16 per cent which is significant at 10 per cent level.

From table it was also seen that, the highest variation in case of area under mango crop was observed in Maharashtra state i.e. 21.54 per cent where as lowest variation was found in Bihar state i.e. 2.35 per cent. The highest variation in case of production of mango crop was observed in Maharashtra state i.e. 31. 90 per cent where as lowest variation was observed in Bihar state i.e. 16.08 per cent. The highest variation in case of productivity of mango crop was observed in Maharashtra state i.e. 63.83 per cent where as lowest was found in Tamil Nadu state i.e. 12.42 per cent.

The highest actual variation in case of area under mango crop was observed in Maharashtra state i.e. 19.09 per cent where as lowest was found in Bihar state i.e. 0.73 per cent. The highest actual variation in case of production of mango crop was observed in Odisha state i.e. 29.91per cent where as lowestactual variation was observed in Uttar Pradesh state that is 6 point 20% the highest actual variation in case of productivity of mango crop was observed in Maharashtra state i.e. 47.26 percent lowest was found in Uttar Pradesh state that is 7.09%.

Country wise export performance of mango

From table 3, it was revealed that, highest growth rate of quantity of mango exported to Kuwait from India was 23.79 per cent which is significant at 1 per cent level where as lowest was found in U.A.E. i.e. 5.82 per cent which is significant at 1 per cent level. The highest growth rate in case of total value of mango exported was found in Kuwait i.e. 23.80 per cent & lowest was found in Behrain i.e. 8.19 per cent which is significant at 1 per cent level.

The highest variation in case of quantity of mango exported was found in Kuwait i.e. 134. 78 per cent where as lowest was found in U.A.E. i.e. 26.48 per cent. Highest variation in case of total value of mango exported was observed in UK i.e. 69.48 per cent where as lowest was found in Behrain

i.e. 34.62 per cent.

Transition probability matrix of export of mango

The transitional probability matrix presented in table 4, depict a broad idea of change in the direction of trade of Indian mango during 2004-05 to 2014-15 period. The six major countries which imported mango were, Bangladesh, UAE, Saudi Arabia, UK, Nepal and Baharin. The export to remaining countries was pooled under the category of other countries.

From the above table it can observed that Bangladesh was most stable importer of Indian mango as it retained 73.33 per cent of its share from previous year by losing 21.03 per cent share to UAE, 1.12 per cent to Saudi and 4.52 per cent to Nepal even though it gained considerable share from Nepal (i.e. 97.45 per cent).

UAE is another stable importer of Indian mango because it retained 51.73 percent of its share from the previous year by losing 6.78 per cent to Saudi Arabia, 12.11 per cent to UK, 10.12 per cent to Nepal, 1.62 per cent to Baharin and 17.59 per cent to other countries. But it gained 21.03 per cent share from Bangladesh, 100 per cent from Saudi Arabia 97.59 per cent from UK 59.65 per cent from Bharin and 96.20 per cent to other countries.

Saudi Arabia could not retain its previous year share over a period of time. By losing 100 per cent share to UAE and gain 1.12 per cent share from Bangladesh, 6.78 per cent from UAE and 16.11 per cent from Baharin. UK is another country which could not retain its previous year share over a period of time by losing 97.59 per cent area to UAE and 2.41 per cent to Baharin and it gains 12.11 per cent previous year share from UAE.

Nepal retains only 0.46 per cent previous year share by losing 97.45 per cent area to Bangladesh and 2.09 per cent area to Baharin and it gained 4.52 per cent share from Bangladesh, 10.17 per cent share from UAE. Baharin is another stable importer of Indian mango because it retains 24.24 per cent previous year share over a period of time by losing 59.65 per cent share to UAE and 16.11 percent share to Saudi Arabia while it gained 1.62 per cent share from UAE, 2.41 per cent from UK and 2.09 per cent from Nepal. Other countries retained only 3.80 per cent of its share from previous year by losing 96.20 per cent share to UAE while it gained 17.59 per cent previous share from UAE.

From above table it was concluded that Bangladesh was major importer of Indian mango followed by UAE, Baharin and other countries respectively.

From study, it was concluded that, positive and significant growth of area, production and productivity of mango was observed. Highest variation was observed in case of production i.e. 15.88 per cent. Highest growth rates in case of area and production were found in Odisha state, where as highest variation in case of area and production was observed in Maharashtra. Highest growth i.e. 23.79 per cent of mango exported from India to Kuwait was observed. It was also observed that, Bangladseh was most stable importer of Indian mango followed by UAE, Baharain and other countries respectively. India produces 50 per cent of total mango produced in the world, but have low export share. Therefore, it is need to more emphasize on export of mango.

Table.1 Growth performance of mango in India during 2004-05 to 2014-15

Sr. No	Particulars	Compound growth rate	Coefficient of Variation	Coppocks Instability Index
1.	Area	1.67***	7.44	5.96
2.	Production	4.67***	15.88	8.28
3.	Productivity	2.92***	12.30	9.65

Table.3 Country wise export performance of mango during 2004-05 to 2014-15

Sr. No.	Country	Quantity		Value	
		CGR	CV	CGR	CV
1	Bangladesh	-23.13***	64.24	-3.81**	60.11
2	U.A.E.	5.82***	26.48	17.24***	51.96
3	Saudi Arabia	1.30	27.34	11.51***	42.79
4	U.K.	0.44	45.46	9.81	69.48
5	Nepal	-9.54	52.48	3.53	40.33
6	Bahrain	-0.67	36.09	8.19***	34.62
7	Netherlands	-13.08	75.67	-6.98	61.35
8	Kuwait	23.79***	134.78	23.80***	67.60
9	Japan	-18.18***	74.22	-6.96	51.14
10	Singapore	13.60***	41.46	21.88***	66.15
11	Others	7.62***	30.30	18.11***	59.72
Total		-3.81***	22.67	11.64***	36.91

Table.4 Transition probability matrix of export of mango during 2004-05 to 2014-15

Country	Bangladesh	U.A.E.	Saudi Arabia	U.K.	Nepal	Bahrain	OTHERS
Bangladesh	**0.7333**	0.2103	0.0112	0.0000	0.0452	0.0000	0.0000
U.A.E.	0.0000	**0.5173**	0.0678	0.1211	0.1017	0.0162	0.1759
Saudi Arabia	0.0000	1.0000	**0.0000**	0.0000	0.0000	0.0000	0.0000
U.K.	0.0000	0.9759	0.0000	**0.0000**	0.0000	0.0241	0.0000
Nepal	0.9745	0.0000	0.0000	0.0000	**0.0046**	0.0209	0.0000
Bahrain	0.0000	0.5965	0.1611	0.0000	0.0000	**0.2424**	0.0000
OTHERS	0.0000	0.9620	0.0000	0.0000	0.0000	0.0000	**0.0380**
Total	1.7078	4.2621	0.2401	0.1211	0.1516	0.3036	0.2138
Remark	**70.78 %**	**326.21 %**	**75.99 %**	**87.89 %**	**84.84 %**	**69.64 %**	**78.62 %**
	Increase	**Increase**	**Reduction**	**Reduction**	**Reduction**	**Reduction**	**Reduction**

Table.2 State wise performance of mango during period 2004-05 to 2014-15

Sr. No.	State	Particulars	CGR	CV	CII
1	Andhra Pradesh	Area	-2.86**	16.30	15.22
		Production	-0.84	18.02	13.79
		Productivity	2.04	13.94	12.56
2	MS	Area	-3.85	21.54	19.09
		Production	1.77	31.90	29.60
		Productivity	5.74	63.83	47.26
3	UP	Area	0.28	3.72	3.70
		Production	5.76***	18.51	6.20
		Productivity	5.44***	17.72	7.09
4	Bihar	Area	0.68***	2.35	0.73
		Production	2.96**	16.08	28.84
		Productivity	2.25	15.23	29.32
5	Karnataka	Area	5.15***	18.31	8.44
		Production	2.24	29.96	24.68
		Productivity	-2.3	32.74	32.03
6	Odisha	Area	5.65***	18.10	5.73
		Production	8.92***	31.30	29.91
		Productivity	4.00	28.85	26.82
7	T.N	Area	2.47***	9.22	7.36
		Production	4.66***	18.41	17.85
		Productivity	2.16*	12.42	11.65
8	GJ	Area	5.30***	16.81	4.61
		Production	5.43	27.34	23.26
		Productivity	0.13	22.57	18.18

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