

Performance of mango in South Gujarat region

G.S. JAYPATRE, K.S. PATEL, S.B. GAJBHIYE AND P.R. AWAGHAD

See end of the article for authors' affiliations

Correspondence to :

G.S. JAYPATRE

Department of
Agricultural Economics
and Statistics,
Navsari Agricultural
University, NAVSARI
(GUJARAT) INDIA

ABSTRACT

The trends in area, production and productivity of mango crop in South Gujarat Region were estimated in the present study. The district wise time series data on area, production and productivity of mango crop were collected from General Statistical Information of Agricultural Department published by Govt. of Gujarat. The entire study was split into two sub periods, i.e. period I (1990-91 to 1997-98) and period II (1998-99 to 2007-08). Different districts of South Gujarat region were classified into two different periods. Period I included Bharuch, Surat and Valsad districts and period II included Bharuch, Surat, Valsad, Dang, Navsari and Narmada districts. The results revealed that Linear Growth Rate for mango was non-significant in both the periods, but Compound Growth Rate for mango was significant in both the periods. For Valsad district, the production and productivity of mango was highly significant in 2nd period as compared to 1st period of South Gujarat region. The results for the instability index for area, production and productivity were found higher in period II as compare to period I.

INTRODUCTION

The mango (*Mangifera indica* L.) is the most important among the tropical fruits of India. India is the largest producer of mango accounting for about 63 % of world production. Mango is grown in all the parts of Gujarat State. However, it is not considered on commercial proposition except in South Gujarat region. High growth and low instability in production are a pre-requisite for the overall sustainable agricultural performance. However, there is a growing concern that with the technological change in production, variability has also increased. Since the magnitude of growth and instability in production are serious implications for policy makers. Taking into consideration the importance, the present study was undertaken to work out the linear growth rate and compound growth rate of mango for different districts in South Gujarat region and to estimate the instability indices of mango for different districts of South Gujarat region.

METHODOLOGY

The District wise time series data on area, production and productivity of mango were collected from General Statistical Information of Agricultural Department published by Govt. of Gujarat. To study the performance of mango in respect of area, production and productivity, linear and compound growth rates were worked out for the period 1990-91 to 2007-08. The entire study was split into two sub periods

i.e. period I- (1990-9 to 1997-98) and period II- (1998-99 to 2007-08). Different districts of South Gujarat Region were classified into two different periods. Period I included Bharuch, Surat and Valsad districts and period II included Bharuch, Surat, Valsad, Dang, Navsari and Narmada districts. The linear and compound growth rates were worked out by using the following formulae:

Linear equation

$$Y = a + bx \quad \dots \quad (1)$$

where,

Y = Yield

a = Constant

bx = Regression coefficient

Linear growth rate (LGR) = $b/y \times 100$

The compound growth rates were calculated by fitting the exponential function given below:

$$Y = a b^t \quad \dots \quad (2)$$

where,

Y = Area / production / productivity

a = Constant

b = Regression coefficient

t = Time variable

Compound growth rate (CGR) = $(\text{Antilog of } b-1) \times 100$

The significance of L.G.R and C.G.R were tested at 5% level with the table value of

Key words :

Growth rate,
Instability index,
Performance,
Mango

Accepted :
July, 2010

coefficient of correlation (r).

Coefficient of instability was worked out using Coppocks Instability Index.

$$V \log N \frac{\sum \log \frac{X_{t-1}}{X_t} > m}{N}$$

The instability index $N \left| \text{Antilog } \frac{V \log N}{\log 10} \right| > 1.15 \sqrt{100}$

where,

V = Instability index

X_t = Area / production productivity of crop in year t

N = Number of years minus one

M = Arithmetic mean of the differences between the log of X_t and X_{t-1} , X_{t-2} etc.

RESULTS AND DISCUSSION

The district wise results of linear and compound growth rates for area, production and productivity of mango crop in Ist period of South Gujarat region are presented in Table 1. It showed non-significant linear growth of area, production and productivity of mango in all the districts. Annual compound growth rates of area and production were positive and significant for all districts which implied that the area and production of mango raised during the study period. The productivity of mango was found to be negative and significant in Valsad district (-3.46%) whereas it was raised significantly in Surat

district (2.16%).

The district wise results of linear growth rates and compound growth rates for area, production and productivity of mango in II period of South Gujarat region are presented in Table 2. It showed non-significant linear growth of area, production and productivity of mango in all districts. Annual compound growth rates were found positive and significant for all districts which implied that the area and production of mango raised during the study period. As compared to other districts, the highest growth rate of area was observed in Narmada district (18.80 %) whereas Valsad district recorded highest growth in production (19.93 %) and productivity (10.63 %) of mango during the study period. The productivity of mango declined significantly in Surat (-3.14 %) and Narmada district (-5.18 %).

The district wise result of Instability Index for area, production and productivity of mango in I period of South Gujarat region, are presented in Table 3. It revealed that, area variability was found highest in Bhuruch district (11.22) and lowest in Valsad district (11.14). The instability in production was found lowest in Surat district (11.51) and highest in Bhuruch district (11.63). The instability index for productivity ranged from 10.69 (Bharuch) to 10.52 (Valsad) districts.

The district wise results of Instability Index for area, production and productivity of mango in II period of South Gujarat region, are presented in Table 4. It revealed that, the area variability was found lowest in Bhuruch district (11.62) and highest in Narmada district (15.69). The

Table 1: Performance of mango for different districts in South Gujarat region for period I (1990-91 to 1997-98)

District	Linear growth rate (% p.a.) (LGRs)			Compound growth rate (% p.a.) (CGRs)		
	Area	Production	Productivity	Area	Production	Productivity
Bharuch	6.06	5.18	-0.32	6.08*	5.35*	-0.59*
Surat	5.76	7.96	2.13	5.90*	8.19*	2.16*
Valsad	5.59	2.01	-3.40	5.74*	2.06*	-3.46*

* indicates significance of value at P= 0.05

p.a.= per annum

Table 2: Performance of mango for different districts in South Gujarat region for period II (1998-99 to 2007-08)

District	Linear growth rate (% p.a.) (LGRs)			Compound growth rate (% p.a.) (CGRs)		
	Area	Production	Productivity	Area	Production	Productivity
Bharuch	5.67	9.94	4.59	5.92*	11.07*	4.86*
Surat	6.93	7.59	-3.03	7.37*	16.57*	-3.14*
Dang	13.95	-9.31	0.61	16.75*	4.31*	0.14*
Valsad	5.94	14.74	8.28	6.11*	19.93*	10.66*
Narmada	16.41	11.18	-5.10	18.80*	12.65*	-5.18*
Navsari	6.66	13.003	6.85	6.88*	14.79*	7.39*

* indicates significance of value at P=0.05

p.a.= per annum

Table 3 : Coppack's Instability Index in area, production and productivity of mango for different districts in South Gujarat region for period I (1990-91 to 1997-98)

District	Instability Index		
	Area	Production	Productivity
Bharuch	11.22	11.63	10.69
Surat	11.18	11.51	10.54
Valsad	11.14	11.54	10.52

Table 4: Coppack's Instability Index in area, production and productivity of mango for different districts in South Gujarat region for period II (1998-99 to 2007-08)

District	Instability index		
	Area	Production	Productivity
Bharuch	11.62	13.36	11.54
Surat	12.53	25.17	10.98
Dang	15.59	13.06	11.54
Valsad	11.63	18.33	16.21
Narmada	15.69	13.82	11.61
Navsari	11.85	14.64	12.39

instability in production was found lowest in Dang district (13.06) and highest in Surat district (25.17). The instability index for productivity was lowest in Surat district (10.98) and highest in Valsad district (16.21). Similar type of investigations on groundnut and caston have been carried out in Gujarat state by Kalola *et al.* (2008 a and b).

Conclusion:

In I and II period of South Gujarat region LGRs was non-significant for all the districts. Compound growth rate for mango was significant in both the periods. For Valsad

district CGRs of mango the production and productivity were highly significant in II period as compared to I period of South Gujarat region. The instability index for area, production and productivity of mango was found higher in period II as compared to period I.

Authors' affiliations:

K.S. PATEL, Department of Agricultural Economics and Statistics, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

S.B. GAJBHIYE AND P.R. AWAGHAD, Department of Agricultural Economics and Statistics, Dr. Panjabrao Deshmukh Krishi Vidhyapeeth, AKOLA (M.S.) INDIA

REFERENCES

Kalola, A.D., Pandya, H.R., Sakarvadia, G.L., Upadhyay, S.M. and Parikh, R.K. (2008a). Studied on period wise trends in area, production and yield of groundnut crop for different regions of Gujarat state. *Internat. J. Biosci. Report.*, **6**(2):267-271.

Kalola, A.D., Pandya, H.R., Sakarvadia, G.L., Upadhyay, S.M. and Parikh, R.K. (2008b). Studies on period wise trends in area, production and yield of castor crop of Gujarat state. *Internat. J. Biosci. Report.*, **6**(2):351-355.

