

# Growth Rate and Instability Estimation of Flowers' Production in India

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**ABSTRACT:** The world floriculture trade is depends on quality and demand of the flowers. Developed countries in Europe, America, and Asia account for more than 90% of demand. The major flowers producing countries are Netherlands, USA, Japan, Germany and Canada. The demand for flowers is increasing globally at approximately 10 percent per annum. Indian floriculture industry is growing at higher rate. Karnataka, Tamil Nadu, Andhra Pradesh are major states in the country. India shares 0.61 percent in world floriculture industry. Out of total cut roses production, Karnataka alone accounts for about 75% followed by Maharashtra, Tamil Nadu, Bihar, West Bengal, Uttar Pradesh, Haryana, Punjab, Jammu and Kashmir, Andhra Pradesh and Madhya Pradesh. Considering the need of the hour, the present topic entitled as 'Temporal Performance of Flowers' Production in India' is taken to review the growth rate and instability indices in area, production and productivity as well as impact of the area and productivity on production. The data is collected from the Indian Agricultural Statistic Research Institute on the Area, Productivity and Production of the Flowers from the year 1991-92 to 2011-12 on the Area, Productivity and Production of the Flowers in India. From the results it is found that the good Flowers production achieved in India in last 20 years. The growth in area (13.94 %) and production(11.91 %) of the Flowers in India is positive, while significant in area and production, while negative(-1.78) and significant in productivity. Instability Index shows that the Production of Flowers in India was more unstable as compared to Area and Productivity of Flowers during the period from 1995-96 to 2011-12. The previous years' area made positive effect on next years' production of Flowers in overall period.

**KEYOWRDS:** Flowers, Growth Rate, Instability, Production, Productivity

## I. INTRODUCTION

Now days, flowers has been essential part of life and it is inevitable in people's celebrations like Weddings, graduations, funerals, Mother's Day, St. Valentine's Day, Easter and Christmas. In few decades, flower production is converted from hobby to business. Commercial floriculture has emerged as hi-tech activity-taking place under controlled climatic conditions inside greenhouse. Floriculture in India, is being viewed as a high growth Industry. Commercial floriculture is becoming important from the export angle. The liberalization of industrial and trade policies paved the way for development of export-oriented production of cut flowers.

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## OBJECTIVES

The objectives of the study are designed as follows

1. To study the production status of Flowers in India
2. To estimate the growth rates of the Area, Productivity and Production for Flowers in India;
3. To study the instability in the Area, Productivity and Production of Flowers in India;
4. To find the effect of Area and Productivity on Production of the Flowers in India;

## II. METHODOLOGY

### 1.1 Source of data

The data is collected from the Indian Agricultural Statistic Research Institute on the Area, Productivity and Production of the Flowers.

### 1.2 Period of the data

The annual data is collected from the year 1991-92 to 2011-12 on the Area, Productivity and Production of the Flowers.

### 1.3 Analytical Tools:

The tools are used to estimate the growth; instability and effect of area and productivity on production are as follows;

#### 1.3.1 Estimation of Production status

The status of the Flowers production in last 20 years in simply presented in over decades. The triennial averages are estimated.

#### 1.3.2 Estimation of Growth

In the present study, the Compound Growth Rates in Area, Productivity and Production of Flowers are estimated as follows  
The exponential equation of the following type was used.

$$Y=ab^t$$

Where

Y = Area, Productivity and Production

(Area in "00" ha, Production in "00" bales, Productivity in lint kg /ha.)

t = time period in years

b = trend value (coefficient)

a = intercept.

Compound Growth Rate= (Antilog b-1) x 100. (Chand and et al.)

The significance of the estimated compound growth rates was tested with the help of ‘t’ test.

For getting normal base year, the triennial averages are taken as base year.

**1.3.3 Estimation of Instability**

To estimate the instability of Area, Productivity and Production of Flowers, the Coefficient of variation and Cuddy Della Index is used. The formula is as follows

a) Coefficient of Variation(CV) : Standard Deviation/Mean

To avoid the over estimation of CV, the following Cuddy Della Index (Ix) is used in comparison with CV.

b) Cuddy Della Index (Ix) was calculated as follows:

$$I_x = CV\sqrt{(1 - \bar{R}^2)}$$

Where, CV = Coefficient of Variation ( $\sigma/\bar{X}$ )

$\bar{R}^2$  = Adjusted coefficient of multiple determination

**1.3.4 Method for effect of Area and Productivity on Production**

To estimate the effect of Area and Productivity on Production of Flowers in India, the Crop Acreage Response Model is used. In this model, the effect of lagged years' area and productivity on the present production of the Flowers is estimated.

$$Y = a + b_1A_{t-1} + b_2P_{t-1} + u$$

Y = Production of selected crop (000 tons)

a = Intercept

$A_{t-1}$  = Area under selected crop (000 ha)

$P_{t-1}$  = Productivity of selected crop (ton/ha)

$b_i$  (1 to 2)= Coefficients of respective variables

**III. RESULTS AND DISCUSSION**

Results regarding the trend and stability of the Flowers in India are presented and discussed in this section on the line of objectives mentioned.

**3.1 Production status of Flowers in India**

The table no 1 represents the area, production and productivity status of the Flowers in India. The table shows the area, production and productivity of Flowers in India over the decade since 1991-92 and the current year 2011-12.

The area of the Flowers in the country has increased from 57 thousand hectares to 580 thousand hectares i.e. net area increased by 1027 per cent. The production also increased from 247 thousand tons to 1965 thousand tons i.e. net increased by 796 per cent. The productivity of Flowers in India is increased from 4.37 tons per hectare to 3.89 tons per hectare. i.e. net decreased by 89 per cent. It may be due to increased in demand for cut flowers over loose flowers. The more increase in area and production in seen between year 2001-02 to 2011-12 which is increased by 1027 and 796 per cent

Overall, the good Flowers production achieved in India in last 20 years

<b>Table no. 1 . Production Status of Flowers in India</b>				
Area: Area 000 ha, Production 000 tons, Productivity tons / ha				
S.N.	Particulars/Year	1991-92	2001-02	2011-12
1	Area	57	91	580
	%	100	162	1027
2	Production	247	609	1965
	%	100	246	796
3	Productivity	4.37	7.07	3.89
	%	100	162	89

Note : The figures area triennial averages.

### 3.2 Growth in Flowers in India

The table no 2 represents the compound growth rates of area, production and productivity of Flowers in India. The table shows the compound growth rates of area, production and productivity of Flowers in India for the decades 1995-96 to 2004-05 and for the decade 2005-06 to 2011-12 as well as for whole period of said two decades.

The growth rate of the Flowers’ area was 4.56 per cent significantly for first decade. While, it was 26.97 per cent significantly for second decade. For whole period it was 13.94 percent significantly. Which shows the growth in area of Flowers was smother and positive for whole period.

The Flowers’ productivity was increased by 3.50 percent in first decade and declined by 5.77 percent per annum in second decade, significantly. For whole period, growth rate of productivity in Flowers was negative but significant and it was 1.78 percent per annum.

The production growth in Flowers of India was 8.26 percent, 19.65 percent and 11.91 percent for first decade, second decade and for whole period respectively. It was positive and significant at 1 per cent.

Overall, the growth in area(13.95 %) and production(11.91 %) of the Flowers in India is positive, while significant in area and production, while negative(-1.79) and significant in productivity.

<b>Table no. 2: Compound Growth Rate of Area, Productivity and Production of Flowers in India</b>				
S.N.	Particulars	1995-96 to 2004-05 (first decade)	2005-06 to 2011-12 (second decade)	1995-96 to 2011-12 (whole period)
1	Area	4.56**	26.97***	13.94***
2	Productivity	3.50	-5.77**	-1.78*
3	Production	8.26***	19.65***	11.91***

Note: \* = Significant at 10 percent (table T value is 1.833 for decades and 1.729 for whole period)

\*\* = Significant at 5 percent (table T value is 2.262 for decades and 2.093 for whole period)

\*\*\* = Significant at 1 percent (table T value is 3.250 for decades and 2.861 for whole period)

### 3.3 Instability in Flowers of India.

The table no.3 displayed the Instability in Area, Productivity and Production of Flowers in India for the decades 1995-96 to 2004-05, for the decade 2005-06 to 2011-12 and for whole period of said two decades. Coefficient of Variation and Cuddy- Della Index are showing instability in Area, Productivity and Production.

The instability indicates the variation in the selected indicator over the period of the study. The Cuddy Della Index indicates instability at controlled level.

The Coefficient of Variation in area of Flowers was 19.57, 77.10 and 110.54 per cent in first decade, second decade and for whole period respectively, while the CD index for area in Flowers was 13.53, 36.95 and 69.19 per cent in first decade, second decade and for whole period respectively.

In case of Productivity of Flowers in India, the Coefficient of Variation was 28.36, 23.11 and 27.84 per cent in first decade, second decade and for whole period respectively, while the CD index for productivity in Flowers was 25.80, 15.50 and 26.18 per cent in first decade, second decade and for whole period respectively.

The Flowers production was also varying over the selected period. The Coefficient of Variation was 25.76, 60.33 and 85.58 per cent in first decade, second decade and for whole period respectively, while the CD index for productivity in Flowers was 10.82, 24.58 and 47.23 per cent in first decade, second decade and for whole period respectively.

The Coefficient of Variation shows that variation of the almost all parameters is higher than the variation showed by Cuddy Della Index.

Overall, Instability Index shows that the Area of Flowers in India was more unstable as compared to Production and Productivity of Flowers during the selected period.

**Table no. 3: Instability in Area, Productivity and Production of Flowers in India**

S.N.	Indices	Area			Productivity			Production		
		1995-2004	2005-12	1995-2012	1995-2004	2005-12	1995-2012	1995-2004	2005-12	1995-2012
		I	II	Whole	I	II	Whole	I	II	Whole
1	CV	19.57	77.10	110.54	28.36	23.11	27.84	25.76	60.33	85.58
2	Cuddy-Della index	13.53	36.95	69.19	25.80	15.50	26.18	10.82	24.58	47.23

**3.4 Effect of Area and Productivity on Production of Flowers in India**

The table.4 depicts the effect of previous years’ Area and Productivity of Flowers on next years’ Flowers Production in India for the decades 1995-96 to 2004-05 and for the decade 2005-06 to 2011-12 as well as for whole period of the two decades.

The results show that the lagged value of the area has given positive effect on next years’ production significantly. The regression coefficient of area was 0.63 percent, 0.80 per cent and 0.89 percent non-significantly for first decade, second decade and whole period. While the lagged productivity of Flowers has contributed negatively on production non-significantly in second decade. while positively and significantly in first decade.

The effect of past productivity was not significant. The previous years’ area made positive effect on next years’ production of Flowers in overall period.

**Table no. 4 : Crop Acreage Response Model of Flowers in India**

S.N.	Year	1995-2004	2004-12	1995-2012
	Particulars	Coefficient	Coefficient	Coefficient
1	Productivity	5.82*	-22.94	4.54
2	Area	0.63	0.80	0.89
3	Intercept	1.51	261.88	94.35

Note: \* = Significant at 10 percent (table T value is 1.833 for decades and 1.729 for whole period)  
 \*\* = Significant at 5 percent (table T value is 2.262 for decades and 2.093 for whole period)  
 \*\*\* = Significant at 1 percent (table T value is 3.250 for decades and 2.861 for whole period)

**IV. CONCLUSION**

It is concluded from the results that the good Flowers production achieved in India in last 20 years. The growth in area(13.94 %) and production(11.91 %) of the Flowers in India is positive, while significant in area and production, while negative(-1.78) and significant in productivity. Instability Index shows that the Production of Flowers in India was more unstable as compared to Area and Productivity of Flowers during the period from 1995-96 to 2011-12. The previous years’ area made positive effect on next years’ production of Flowers in overall period.

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