

## Performance of chickpea production in Akola district of Maharashtra

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### ABSTRACT

Chickpea (*Cicer arietinum* L.) is the premier pulse crop of Indian subcontinent. India alone has nearly 75 per cent of the world acreage and production of gram. The present study is an attempt to evaluate the growth and instability of such important crop *i.e.* chickpea. For the present study, Akola district from Maharashtra state was chosen purposively as area under chickpea is reported highest in this district. The study was based on secondary data pertained to the year 1985-86 to 2005-06. The results revealed that chickpea is a most important crop in Akola district, the growth rates for area and production of chickpea were found significant. Instability studied in chickpea indicates that productivity under chickpea exhibited less variation. It means that production of chickpea over the period has been almost constant.

**KEY WORDS :** Flora, Soil properties, Gorewada forest

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### INTRODUCTION

Chickpea (*Cicer arietinum* L.) commonly known as gram or Bengal gram is the most important pulse crop of India which alone has nearly 75 per cent of the world acreage and production of gram. Gram occupies about 37 per cent of area under pulses and contributes about 50 per cent of total pulse production of India. It is used for human consumption as well as feeding to animals.

An agricultural sector being unstable in nature may substantially impede the economic growth of the country. The spectacular performance of agricultural sector primarily is determined by the generation and sustenance of growth in production. The production instability tends to be transmitted to the markets and may cause wide fluctuations in prices of agricultural commodities (Marawar *et al.*, 2003). With this view, it is essential to study the growth and instability of chickpea production in Akola district of Maharashtra.

The present study was planned with the objective are as : to study the growth rates of area, production and productivity of chickpea in Akola district of Maharashtra and to study the degree of instability in area, production and productivity of chickpea in Akola district of

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### MATERIALS AND METHODS

The study covered a 21- year period of study predominantly based on secondary data pertaining to the year 1985-86 to 2005-06. Data on area, production and productivity of chickpea were collected from various issues of epitome of agriculture. The entire study was splited into two sub periods. The growth rates were calculated separately for the overall period (1985-86 to 2005-06) and for two sub periods, periods I (1985-86 to 1995-96) and period II (1996-97 to 2005-06). In order to study the instability in area and productivity which are the major sources of production instability. The Coppock's instability index, coefficient of variation was estimated for the study period.

#### Estimation of growth rates:

The growth rates in area, production and productivity were studied estimating compound growth rates at different periods. Both linear and compound growth rates were estimated. However, finally the compound growth rate was used for the study.

The growth rate was estimated using exponential trend model.

$$Y = a \cdot b^t$$

where,

Y = Area / production / productivity

a = Intercept

b = Regression coefficient

t = Time variable

From the estimated function, the compound growth rate was worked out by,

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

where,

r = Compound growth rate

The degree of instability in area production and productivity of chickpea in different period was measured using coefficient of variation and coefficient of instability

$$\text{coefficient of variation (C.V.)} = \frac{6}{X} \times 100$$

where,

$$6 = \text{Standard deviation} = \sqrt{\frac{\sum(x - \bar{x})^2}{n}}$$

X=Arithmetic mean

Coefficient of instability was worked out using Coppocks Instability Index

$$V \log = \frac{\left[ \frac{\sum \log \frac{X_{t+1}}{X_t} - m}{N} \right]}{N}$$

The instability index = [Antilog ( $\sqrt{v \log}$ ) - 1] x 100

where,

$X_t$  = 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 growth performance in agriculture is measured in three ways-area, production and yield. It could be seen from the Table 1 that the overall growth rate of area under chickpea was 1.07 per cent which was found significant. The growth rate of chickpea production as a whole was significant being 2.65 per cent over the period.

Productivity is the most significant criteria in measuring the growth of any crop output. The success or failure of any improvement in the art of agriculture is measured by the resultant increase or decrease in the productivity as seen in the Table 1. Chickpea productivity for overall period registered a significant positive growth rate of 4.11 per cent. The productivity of chickpea declined by 0.47 per cent in period II.

**Table 1 : Compound growth rates of area, production and productivity of chickpea**

Sr. No.	Particulars	Compound growth rates		
		Period I	Period II	Overall
1.	Area	4.46	-3.76	1.07
2.	Production	11.18	-3.32	2.65
3.	Productivity	13.61**	0.47	4.11**

\* and \*\* indicate significance of values at P=0.05 and 0.01, respectively

In order to examine the extent of instability in area, production and productivity of chickpea, coefficient of variation was worked out. The higher the co-efficient of variation the greater is the instability and *vice versa*.

As seen from the Table 2 that the coefficient of variation for chickpea area for overall period was 39.47 per cent. As revealed from the table, Maharashtra witness a high instability of production as indicated by high coefficient of variation value of 59.90 per cent for overall period. Results of coefficient of variation of productivity for overall period showed consistent variation as coefficient of variation was 36.75 per cent (Table 2).

**Table 2 : Coefficient of variation in area, production and productivity of chickpea**

Sr. No.	Particulars	Coefficient of variation		
		Period I	Period II	Overall
1.	Area	35.04	22.45	39.47
2.	Production	59.11	39.83	59.90
3.	Productivity	41.60	30.80	36.75

The coefficient of variation measures the absolute variation while coefficient of instability which is also called as instability index measures the variation around the trend. It could be seen from the Table 3 that the instability index of area under chickpea for overall period was 15.69 per cent. For production it was 20.01 per cent for entire period, the study thus indicated that instability in production was on higher side during the study period. This indicated the unstable nature of production of chickpea and the instability index of productivity during overall period was 14.34 per cent. This indicates that the farmers were getting higher yield recently than the previous year.

**Table 3 : Coppack's instability index in area, production and productivity of chickpea**

Sr. No.	Particulars	Instability index		
		Period I	Period II	Overall
1.	Area	25.87	12.26	15.69
2.	Production	18.54	15.93	20.01
3.	Productivity	14.78	13.65	14.34

**Conclusion:**

– The growth rates for area and production of chickpea were found significant.

– Instability studied in chickpea indicates that productivity exhibited less variation. It means that production of chickpea over the period has been almost constant.

– Variability in area, productivity of chickpea during period I was lowest compared to period II.

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