

## Economic Analysis of Chickpea in Bhandara District

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### ABSTRACT

*Chickpea (Cicer arietinum L.) is an ancient crop first taken into cultivation by Neolithic farmers. Today, chickpea continues to play an important role in agricultural systems in the world, ranking third behind dry bean (Phaseolus vulgaris L.) and field pea (Pisum sativum L.) Chickpea is a valued crop and provides nutritious food for an expanding world population and will become increasingly important with climate change. Production ranks third after beans with a mean annual production of over 11.5 million tons with most of the production centered in India. Over 2.3 million tons of chickpea enter world markets annually to supplement the needs of countries unable to meet demand through domestic production. Australia, Canada, and Argentina are leading exporters. Chickpea is a good source of energy, protein, minerals, vitamins, fiber, and also contains potentially health-beneficial phytochemicals. Chickpea is playing a leading role in food safety in the world by covering the deficit in proteins of daily food ration of Indian and African Sub Sahara populations.*

*The present study was conducted on "Economic analysis of chickpea in Bhandara District" was undertaken to study the growth rates and instability of area, production and productivity of Chickpea in Bhandara district. The time series data on area, production and productivity were obtained for 30 years from the 1989-99 to 2018-19. The data was collected from krishi.mahagov.in website. Compound growth rate (CGR) was computed based on its fit using non-linear model, and Coppock's Instability Index were used to estimate the instability in area, production and productivity of Chickpea. Results shows that, Compound growth rate for area and Production under chickpea was recorded high during period I and II and Productivity was highest in period III in Bhandara district.*

*Keywords: Chickpea, Growth, Instability, Coppock's Instability Index, Coefficient of Variation*

### INTRODUCTION

India is the largest producer and consumer of Chickpea in the world, accounting for 33 per cent of the world area and 22 per cent of world production (Anonymous 2013). The domestic demand and consumption however, are much higher than production mainly because chickpea is a major source of protein for a large section of the vegetarian population in the country. Chickpea being the richest, cheapest and easiest source of best quality proteins and fats has a vast multiplicity of uses as food and industrial products. Chickpea is also known as gram and the botanical name is *Cicer arietinum*. L. It is the world's first important pulse crop. It is major pulse crop of the semi-arid tropics

and has been used for centuries in inter cropping system. Chickpea belongs to the family legumenaceae, genus *cicer* species *arietinum*. Chickpea evolved in Asia and appeared about 2000 B.C. in West Africa, which is considers a second major center of origin.

In 2017-18 area, production of Chickpea in Maharashtra (20 Mha), (17.6 M. T) and Productivity was (800 Kg/Ha.) respectively. In India the Area, Production and Productivity of chickpea was (10.56 Mha) (11.23 M.T.) (1063 Kg/Ha) respectively. (FAO 2018). Overall, the last several years, India has been the top producer of Chickpeas, also known as garbanzo beans, The production volume of Chickpeas in India amounted to over 11 metric

million metric tonnes. Australia came in second at two million metric tonnes of Chickpeas. In that year around 17 million metric tonnes of Chickpeas were produced worldwide.

**Objectives**

To work out the growth and instability in area, production and productivity of chickpea.

**MATERIALS AND METHOD**

The study area pertains to Bhandara district of Maharashtra State. Based on the objective of the study, for the analysis of the growth rate and instability in area, production and productivity were studied the time series data on area, production and productivity were obtained for 30 years from Bhandara district for the year 1989-90 to 2018-19. Data was collected from various Government published sources. Time series secondary data on area, production and productivity and farm harvest price of Chickpea, rainfall and other data were obtained from various published sources. The study was conducted on the following aspects.

1. Growth rate analysis: The compound growth rate of area, production and productivity for Chickpea was estimated for three sub periods and overall period. It was estimated with the following exponential model.

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

$$\log Y = \log a + t \log b$$

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

Where,

CGR = Compound growth rate

Y = Area/ production/ productivity

a = intercept

b = regression coefficient

t = time variable

2. Instability Analysis: To measure the instability in area, production and productivity, an index of instability was used as a measure of variability. The coefficient of variation (CV) was calculated by the formula,

Standard deviation

$$CV (\%) = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

The simple coefficient of variation (CV) often contains the trend component and thus overestimated the level of instability in time series data. To overcome these problems, we used the instability index (II) given by Coppock's instability index of variation. The algebraic form of equation is

$$V \log = \sum \frac{(\log \frac{x_{t+1}}{x_t} - m)^2}{N - 1}$$

$$CII = [ (\text{Antilog} \sqrt{V \log} - 1) \times 100 ]$$

Where,

Xt = Area/ production/ productivity of crop in year t

N = Number of years - 1

m = Arithmetic mean of the difference between the log X1 and Xt-1

**RESULTS AND DISCUSSION**

*Table 1*  
Compound growth rate for Chickpea in Bhandara district

Particulars		Bhandara
Period I	Area	20.16 ***
	Production	19.97 ***
	Yield	0.11
Period II	Area	10.22 **
	Production	14.62 **
	Yield	3.85
Period III	Area	1.95
	Production	6.35
	Yield	4.28
Over all Period	Area	6.23***
	Production	9.17 ***
	Yield	2.78 ***

(Note: \*\*\*, \*\* and \* denotes significances at 1%, 5% and 10% level of significance)

### Growth performance of Chickpea

The growth performance of Chickpea pertaining to three periods and overall was presented in the Table 1. In period I, the area and production of chickpea increased by 20.16 per cent and 19.97 per cent per annum respectively, while the yield shows non-significant positive growth (viz. 0.11 per cent). In period II, the area and production were increased by 10.22 per cent and 14.62 per cent per annum respectively. While the yield shows significant positive growth i.e., 3.85 per cent per annum. In period III, area, production and productivity shows significant positive growth i.e., 1.95 per cent, 6.35 per cent, and 4.28 per cent per annum respectively. At overall period area, production and productivity was significantly increased by 6.23 per cent, 9.17 per cent, and 2.78 per cent per annum respectively. At overall level, the area, production and productivity under Chickpea was significantly increased over a period of time.

### 2. Instability in Chickpea

The table 2 revealed that during period I,

coefficient of variation under for area was more than compared to production and yield. The highest coefficient of variation for area, was found in period I i.e., 48.16 per cent per annum, and highest coefficient of variation for production was found in period II i.e., 67.99 per cent per annum and highest coefficient of variation of yield was found in period III i.e., 32.66 per cent per annum, respectively.

It was revealed from table 2 that the Coppock's Instability Index(CII) was found highest for area, in period II i.e., 33.74 per cent per annum. While for production and yield, CII was found highest in period III i.e., 53.16 per cent and 30.38 per cent per annum respectively. The instability for area, was found more in period II as compared to period I and III, whereas for production and yield was found more in Period III. In overall period recorded highest degree of variation i.e., coefficient of variation in area, production and productivity. i.e., 59.56 per cent, 93.17 per cent, and 39.66 per cent per annum respectively. While instability in area, production and productivity was 32.62 per cent, 46.47 per cent and 26.93 per cent per annum respectively.

Table 2  
Instability for Chickpea in Bhandara district

Particulars	Period I		Period II		Period II		Overall Period	
	CV	CII	CV	CII	CV	CII	CV	CII
Area	48.61	9.58	47.00	33.74	33.87	33.33	59.56	32.62
Production	47.91	12.15	67.99	51.30	56.51	53.16	93.17	46.47
Yield	6.68	6.67	22.97	20.18	32.66	30.38	39.66	26.93

### CONCLUSIONS

Compound Growth rate for production under chickpea was recorded high during period I and II and productivity was highest in period III in Bhandara district. The instability in area production

and productivity of Chickpea was observed in all study period in Bhandara district it may be because the crop largely depends on vagaries of nature which causes heavy losses.

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