Growth in area, production and productivity of chickpea in Amravati district

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ABSTRACT: The research on the performance of chickpea in Amravati district was carried with the objectives, to study growth rates and variability in area, production, and productivity of chickpea. The secondary data on area, production and productivity of chickpea in Amravati district, were collected from various issues of epitome of agriculture and district socio-economic review. The data pertained to the period of 20 years i.e. from 1990-91 to 2009-10. The performance of chickpea was examined by estimating the growth rates and co-efficient of variation of area, production and productivity of chickpea. The results revealed that, compound growth rates for area, production and productivity for period II were found positive and significant. The co-efficient of variation indicated that, instability in chickpea area exhibited less variation than production and productivity, at overall period. Whereas, production witnessed highest instability as compared to area and productivity, at overall period.

KEY WORDS: Chickpea, Growth rate, Co-efficient of variation


INTRODUCTION

Agriculture, being one of the major sectors associated with country's population has attracted much attention, since independence. The first two decades after independence did not show much growth of agricultural sector. It was attributed to expansion of land, area sown under different crops and not by technological changes. Pulses have exhibited wide year-to-year fluctuations in production. The fluctuation may induce inefficiency in production which, in turn, would hamper the pace of growth in production. Pulses are the important crop in India. The different pulses grown in the country are an integral part of subsistence farming. The different pulses play important role in sustainable production system and household nutrition security. Chickpea or chana is very important pulse crop in the world after peas and beans named *Cicer arietinum* in the leguminccea family.

Chickpea has been known in this country for long time. Chickpea ranks third in world production among peas and beans. It accounts 31.77 per cent of the area and 45.70 per cent of production in India. The global scenario of chickpea observed that, the area under gram in India during 2009-10 was 8.56 million hectare producing 7.35 million tones and the productivity of about 859 kg per ha (Anonymous, 2010).

In India, major chickpea growing states are Madhya Pradesh, Rajasthan, Bihar, Maharashtra and Uttar Pradesh, etc. Among these states, Maharashtra ranks third in acreage under chickpea after Madhya Pradesh and Rajasthan. Madhya Pradesh produces the major share of 40 per cent in the Indian production. In Maharashtra, it constitutes 13.08 lakh ha. area, producing 9.24 lakh tones with the productivity of 706 kg/ha in 2007-08. The area under chickpea in Maharashtra contributes about 17.49 per cent of total area under chickpea in India, whereas production of chickpea in Maharashtra state
accounted 14.53 per cent in the total production of chickpea in India (Economic survey of Maharashtra, 2007-08).

The rural economy of Vidarbha is the basically the crop economy. The principal Kharif crops grown are cotton, soybean, jowar, tur, mung, sunflower etc. The principal Rabi crops are wheat and gram. Though, contribution of sub-sector likes horticulture and forestry is increasing over time, the cropping sector remains the major contributor to the domestic product. Thus, chickpea is one of the major crops grown in Vidarbha region. It is usually grown on available soil moisture during winter season after harvesting Kharif crop. Since, the irrigation facility are very limited in this region, the Rabi crop i.e. chickpea acts as a good source of income to the farmers in rainfed area and also helps, in increasing cropping intensity of this region giving economic support to the farmers.

The area under chickpea in Vidarbha region has 6.14 lakh hectares with production of 5.22 lakh tones with productivity of 850.26 kg per hectare during the year 2007-08. In Vidarbha region Akola, Amravati, Yavatmal, Buldhana, Nagpur, and Washim are the major districts growing chickpea on large area. The present study is concentrated in one district of Vidarbha i.e. Amravati district. The area under Amravati district was 909 thousand hectares, with production of 700 thousand tones and productivity is 770 kg per hectare in 2009 – 10.

Chickpea is a major pulse crop grown in Vidarbha region. Release of high – yielding verities of chickpea and development of other improved production technologies have resulted, increasing in area under this crop and production levels are also increasing. With this view, the present study primarily aims at studying the growth rates in area, production, and productivity of the crop in Amravati district. This helps in knowing the trends in the crop production over a period of the study.

Objectives :
– To study the growth rates of area, production and productivity of Chickpea in Amravati district.
– To study the degree of instability in area, production, and productivity of Chickpea in Amravati district.

**MATERIALS AND METHODS**

Amravati district was purposively selected for the present study. The study covered a 20 year period of study predominantly based on secondary data were collected from various issues of epitome of agriculture and district socio-economic review, pertaining to the year 1990-91 to 2009-10. The entire study was split into two sub periods. The growth rates were calculated separately for the overall period (1990-91 to 2009-10) and for two sub periods, Period I (1990 - 1991 to 2000 – 01) and Period II (2001- 2002 to 2009 – 10). In order to study the variability in area, production, and productivity in Chickpea, the co-efficient of variation was estimated for the study period.

**Estimation of growth rates**:
The growth rate was estimated using exponential trend model (Veena, 1996).

\[ Y = a \times b^t \]

where,
\[ Y = \text{Area/production/ productivity} \]
\[ a = \text{Intercept} \]
\[ b = \text{Regression co-efficient} \]
\[ t = \text{Time variable}. \]

The above equation can also be written as,
\[ \log Y = \log a + \log b \]

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

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

where, \( r = \text{compound growth rate}. \)

**Degree of instability in area, production, and productivity of chickpea**:
The degree of instability in area, production, and productivity of chickpea in different periods was measured using co-efficient of variation.

\[ (\text{c.v. %}) = \frac{\sigma}{X} \times 100 \]

where,
\[ \sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}} \]

\[ \bar{x} = \text{Arithmatic mean} \]

**RESULTS AND DATA ANALYSIS**

The findings of the present study as well as relevant discussion have been presented under following heads :

**Compound growth rates**:
The compound growth rates of area, production and productivity of Chickpea in Amravati district is presented in Table 1.

**Area**:
It can be seen from the Table 1 that, the growth rate for area at overall period of chickpea was 3.19 per cent, which was significant at 1 per cent level. The area under chickpea increased in period II as compared to period I. In area, growth
rate of chickpea was increase by 3.89 per cent during period II and in period I, it was 2.19 per cent which is significant at 5 per cent level (Hazell, 1982, 1984 and Rangi et al., 2002).

Production:
With respect to production of chickpea, a significant growth of 19.21 per cent per annum was observed in period II. The production was non – significant but positive in period I and in period II, significant growth of 19.21 per cent was observed at 10 per cent level.

Productivity:
It is most important criteria of measuring the growth of any crop output. The success or failure of any crop in agricultural is measure by the resultant increasing or decrease in the productivity as seen in Table 1.

The productivity of chickpea in Amravati district for overall period, showed a non significant growth rate of 1.43 per cent. The productivity for period I negatively non-significant and at period II, it was significant at 5 per cent level.

Instability in chickpea:
The degree of instability in area, production, and productivity of Chickpea in different periods was measured by using co-efficient of variation, which measures the absolute variation. The higher the co-efficient of variation, the greater is the instability and vice versa.

Table 2 presents the co-efficient of variation in area, production, and productivity of chickpea in Amravati district.

Area:
From the above Table 2, it can be seen that, the co-efficient of variation for chickpea for overall period was 30.22 per cent. During the period II, Amravati district recorded highest variation with the coefficient of variation 26.67 per cent, whereas, during period I, there was less variation as compared to period II. The extent of variation during period I was 21.12 per cent (Kumar and Surabhi, 2000 and Kaur and Singhal, 1998).

Production:
As revealed from the Table 2, Amravati district witness a high instability of production as indicated by high co-efficient of variation value of 61.84 per cent for overall period. The co-efficient of variation for the period II has shown a high instability of 64.83 per cent. Whereas, period I had instability of 37. 62 per cent.

Productivity:
It can be seen from the above table 2 that, the co-efficient of variation was found to be 40.16 per cent for the overall period. The first period showed a variation of 38.19 per cent, whereas, in the second period the instability in productivity of chickpea increased to 43.16 per cent.

From the above discussion, it is clear that the extent of variation was highest during the period II as compared to period I in area, production and productivity. The higher instability in different period as evident from higher co-efficient of variation is a disturbing feature. Marawar et al. (2003) and Tingre et al. (2007) have also studied the production and productivity of different crops in pattern of the present investigation.

Conclusion:

– The compound growth rates of area and production at overall period of 1990-91 to 2009-10 were found to be significant. Which were 3.19 (sig. at 1%) and 4.10 (sig. at 10 % level).
– The co-efficient of variation of area, production, and productivity showed highest variability in period II over the study period.

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