



E-ISSN: 2278-4136

P-ISSN: 2349-8234

JPP 2018; 7(4): 2784-2787

Received: 11-05-2018

Accepted: 15-06-2018

**Bondar US**

Senior Research Assistant,  
Department of Agril. Economics,  
MPKV, Rahuri, Maharashtra,  
India

**Mohalkar SS**

Junior Research Assistant,  
Department of Agril. Economics,  
MPKV, Rahuri, Maharashtra,  
India

**Shrote RV**

Junior Research Assistant,  
Department of Agril. Economics,  
MPKV, Rahuri, Maharashtra,  
India

## Production performance of chickpea in Maharashtra

**Bondar US, Mohalkar SS and Shrote RV**

**Abstract**

Pulses are the second most important food crops after cereals. Maharashtra is major producer of chickpea and in top five pulses producing states in India. This study covers the changes in area, production and productivity of chickpea during pre and post Technology Mission on Pulses. District and region wise as well as state level secondary data were used. The study period was divided into period-I (Pre TMOP) from 1969-70 to 1990-91, period-II (post TMOP) from 1991-92 to 2012-13 and period-III from 1969-70 to 2012-13 (entire period). The result showed that, the area and production of chickpea has been tripled in Maharashtra during the period 44 year and showed increasing trend, As regards the production of chickpea, it had increased by 874.03 per cent during the period of 44 years since 1969. The productivity of chickpea has shown increasing trend in Maharashtra. The area, production and productivity of chickpea at state level had statically significant and increased at the rate of 3.32, 6.01 and 2.61 per cent per annum, respectively for the entire period of 44 years. The production increase was brought about by both area expansion and productivity improvement. The significant increase in growth rate of the acreage, production and productivity of chickpea was noticed in all regions and at the state level during the period from 1969 to 2013.

During pre-TMOP period, the area, production and productivity of chickpea were significant and increased at the rate of 2.84, 5.62 and 2.71 per cent per annum, respectively in the state and significantly highest increase in growth rate of production of chickpea was noticed in Western Maharashtra region (7.21) followed by Vidarbha (6.00) and Marathwada (3.67) regions, while in post-TMOP period the area, production and productivity of chickpea was significant and increased at the rate of 4.09, 6.44 and 2.26 per cent per annum respectively at state level.

**Keywords:** production performance, TMOP, ACGR, chickpea

**Introduction**

The potential of pulses to help address future global security, nutrition and environmental sustainability needs has been acknowledged through the UN declaration of the 2016 International Year of Pulses. Pulses are a Smart Food as these are critical for food basket (dal-roti, dal-chawal), important source of plant protein and help address obesity, diabetes etc. In addition pulses are highly water efficient, can grow in drought prone areas and improve soil fertility by fixing soil nitrogen.

In the world, pulses are grown by 171 countries. At triennium ending 2012-13, the total area under pulses was 72.3 million hectare. This area provided about 64.40 million tonnes of pulses with a productivity 890 kg ha<sup>-1</sup>, and major exporting countries is Canda, China, Austrila, USA, and importing countries are India, China, USA, Egypt, Pakistan.(FAO, STAT- 2014)

India is largest produce and consumer of pulses in the world, for the triennium ending 2012-13, the total area under pulses was 23.90 million hectare. This area provided about 16.58 million tonnes of pulses with productivity 694 kg ha<sup>-1</sup>, the production of pulses has fluctuated between 11.82 million tonnes in 1970-71 and 14.26 million tonnes in 1990-91. It was 18.34 million tons in 2012-13 with average productivity is 789 kgha<sup>-1</sup>, in area with 23.26 million hectare. The domestic consumption of pulses in India was 21.74 million tonnes. Against this, India produces an average of 18.34 million tonnes during this period, there was a gap of 3.40 million tonnes of pulses in demand and supply, but over the years, the productivity has remained quite at low web as compared to other countries. (Directorate of Economics and Statistics, Govt. of India). The major producer of chickpea in the country are Madhya Pradesh which account 43.16% of India's production followed by Rajasthan (14.46), Maharashtra (9.67), Andhra Pradesh (8.63) and Karnataka (7.05). These five states together accounting more than 80 per cent of total chickpea production in the country.

Maharashtra ranks third position in area and production of chickpea in India with 13.14 per cent of area and 9.67 per cent production contribution.

**Correspondence****Bondar US**

Senior Research Assistant,  
Department of Agril. Economics,  
MPKV, Rahuri, Maharashtra,  
India

The area under chickpea in Maharashtra for the year 2012-13 was 1.12 million hectare and production was 0.85 million tonnes with average productivity 759 kg ha<sup>-1</sup> (Agricultural Statistics at a Glance 2014).

Keeping in view the implementation of TMOP in the state, the present paper analyses the production performances of chickpea production in Maharashtra with the specific objectives to study the changes and growth in area, production and productivity of chickpea in Maharashtra during pre and post Technology Mission on pulses.

### Material and Methods

The study is based on district wise as well as state level secondary data of area, production and productivity of chickpea.

### Selection of period

To facilitate proper understanding of percentage increase in area, production and productivity of chickpea in the state, the entire period of 44 years from 1969-70 to 2012-13 will be divided as below because, pulses were brought under the ambit of Technology Mission on Pulses (TMP) of the Ministry of Agriculture & Co-operation, Govt. of India in August 1990.

1. Period-I: 1969-70 to 1990-91 (Pre –TMP period)
2. Period-II: 1991-92 to 2012-13 (Post –TMP period)
3. Overall: 1969-70 to 2012-13 (Entire period)

### Sources of data

The present study is based on secondary data. The required data will be collected for different regions (Barring of Konkan region because very little area of chickpea in that region and time series data was not available than Konkan region was excluded from analysis) and Maharashtra as a whole from different Govt. Publications.

### Analytical tools

In order to analyze the growth rates in area, production and productivity of chickpea in different regions and the state as a whole, compound growth rates will be computed by using the following form of the relationship.

$$Y = ab^t$$

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

$$\text{CGR (\%)} = (\text{Antilog } b-1) \times 100$$

Where,

$$Y = \text{Area (ha.)} / \text{Production (qt.)} / \text{Productivity (Kg.)}$$

$$a = \text{Constant/Intercept}$$

$$b = \text{Trend value/Regression coefficient}$$

$$t = \text{Time period in years}$$

The significance of the estimated compound growth rates will be tested with the help of Student “t” Test.

### Result and Discussion

The findings obtained from the present study are presented below.

### Changes in area, production and productivity of chickpea in Maharashtra

The information on triennial average of area, production and productivity of chickpea in Maharashtra is depicted in Table 1. The reason of taking triennial average was to even out the effect of abnormal years.

The area under chickpea in Maharashtra was 3,62,967 hectares during TE 1969-72 which has increased up to

12,02,500 hectares (231.30 per cent) during TE 2010-13, it is evident that Maharashtra has experienced spectacular progress in respect of area of chickpea. The performance of chickpea among the region showed that the area under chickpea in Marathwada region shared the maximum area in the state during TE 1969-72 while the maximum area of chickpea was shared by Western Maharashtra during TE 1991-94 period.

The production of chickpea in Maharashtra, had increased by 874.03 per cent during the period of 44 years since 1969. The chickpea production was 1,04,200 tonnes during TE 1969-72 which increased continuously and reached to 10,15,320 tonnes during TE 2010-13. The Vidarbha region had highest production of chickpea as compared to other regions in the state during TE 2010-13. Rapid progress has experienced in respect of productivity improvement of chickpea in state as a whole, the productivity of chickpea has been increased by 193.06 per cent from 285.69 to 837.25 kg ha<sup>-1</sup> hectare during the period of 44 year under consideration. The maximum productivity of chickpea was found in Western Maharashtra region (805 kg ha<sup>-1</sup>) during TE 2010–13.

### Growth in area, production and productivity of chickpea in Maharashtra

The estimated compound growth rates in area, production and productivity of chickpea are presented in Table 2.

The information in respect of annual compound growth rates in area, production and productivity for different time periods viz., Period-I 1969-70 to 1990-91 (pre-TMOP period), Period-II 1991-92 to 2012-13 (post -TMOP period) and entire period 1969-70 to 2012-13 (overall period) and for different region of Maharashtra is presented in Table 2.

For the state as whole, the area, production and productivity of chickpea have been significantly increased at the rate of 3.32, 6.01 and 2.61 per cent per annum, respectively during the period of 44 years. Thus, the production increase of chickpea has been contributed both by productivity improvement and area expansion as well. These results are in consonance with the findings of Bhosale (1999), Gajbhiye *et al.* (2010) [12] and Pichad *et al.* (2015). The growth rates in area, production and productivity of chickpea were positive and significant in all the region with the state. Thus, the performance of chickpea seems to have been satisfactory in all the regions and state as a whole during the entire period.

The area under chickpea declined significantly only in Gadchiroli district whereas it remained positive but non-significant in Osmanabad and Beed district while remaining all district in the state are positive and significant growth rates of acreages under chickpea. The negative output growth may be attributed mainly to significant decline in area under the crop in Gadchiroli district. The growth rates of productivity were highly significant in all district of state.

During pre-TMOP period, the area, production and productivity of chickpea had highly significant and increased at the rate of 2.84, 5.62 and 2.71 per cent per annum, respectively in the state. The maximum annual compound growth rate in productivity was observed in Marathwada region (2.99) followed by Western Maharashtra (2.47) and Vidarbha (1.96) region. The significant increase in growth rate of the acreage and production of chickpea was noticed in Western Maharashtra and Vidarbha regions. In case of Marathwada region the positive but non-significant growth in respect of area and significantly positive growth in production of chickpea was observed during this periods.

For the period I, area under chickpea showed significant increase in all district of Western Maharashtra barring of

Solapur district while in Vidarbha region Chandarpur district was negatively significant growth rate in area were observed. In the second period highly significant increase in the area, production and productivity of chickpea was notice at the rate of 4.09, 6.44 and 2.26 per cent per annum, respectively in the state. The maximum annual compound growth rate in productivity was observed in Marathwada region (2.71) followed by Vidarbha (2.60) and Western Maharashtra (1.66) region. The performance of chickpea was quite satisfactory during the period-II as compared to period-I in the state this

may be perhaps due to the impact of Technology Mission on Pulses.

In period II, positive output growth of chickpea was registered in all district of State barring of Nasik and Gadchiroli district. Positive trends in the productivity of crops was observed in all district. The area under chickpea showed significant increase in all district of Vidarbha region except Bhandara and Gadchiroli with respect to Marathwada region except Aurangabad district. The highly significant growth rate of area were observed in Dhule, Ahmednagar and Satara district in Western Maharashtra.

**Table 1:** Area, production and productivity of chickpea in Maharashtra (Triennium average)

| Sr. No.                                     | Region              | Period              |                  |                   |
|---|---------------------|---------------------|------------------|-------------------|
|   |                     | 1969-72 (Base Year) | 1991-94          | 2010-13           |
| <b>A) Area ('00' ha.)</b>                   |                     |                     |                  |                   |
| 1   | Western Maharashtra | 1148.00             | 2438.00 (112.37) | 3396.33 (195.85)  |
| 2   | Marathwada          | 1832.67             | 1703.33 (-7.06)  | 4031.67 (119.99)  |
| 3   | Vidarbha            | 636.67              | 1424.00 (123.66) | 4548.67 (614.45)  |
|   | Maharashtra         | 3629.67             | 5621.00 (54.86)  | 12025.00 (231.30) |
| <b>B) Production ('00' tonnes)</b>          |                     |                     |                  |                   |
| 1   | Western Maharashtra | 379.33              | 1449.33 (282.07) | 2787.15 (634.75)  |
| 2   | Marathwada          | 462.33              | 891.33 (92.79)   | 3011.65 (551.40)  |
| 3   | Vidarbha            | 198.00              | 911.67 (360.44)  | 4314.50 (2079.04) |
|   | Maharashtra         | 1042.40             | 3284.00 (215.04) | 10153.20 (874.03) |
| <b>C) Productivity (Kg ha<sup>-1</sup>)</b> |                     |                     |                  |                   |
| 1   | Western Maharashtra | 329.77              | 589.07 (78.63)   | 805.00 (144.11)   |
| 2   | Marathwada          | 247.17              | 498.15 (101.54)  | 743.12 (200.65)   |
| 3   | Vidarbha            | 309.41              | 611.34 (97.58)   | 939.30 (203.58)   |
|   | Maharashtra         | 285.69              | 569.30 (99.27)   | 837.25 (193.06)   |

Figures in the parentheses indicate per cent change over the base year)

Source: Commissionerate of Agriculture, Govt. of Maharashtra (2014)

**Table 2:** District, Region and period wise annual compound growth rates in area, production and productivity of chickpea in Maharashtra (Per cent)

| Sr. No | District/Region | Period- I (1969-70 to 1990-91) |           |          | Period- II (1991-92 to 2012-13) |           |          | Entire period (1969-70 to 2012-13) |           |          |
|--------|-----------------|--------------------------------|-----------|----------|---------------------------------|-----------|----------|------------------------------------|-----------|----------|
|        |                 | A                              | P         | Y        | A                               | P         | Y        | A                                  | P         | Y        |
| 1      | Nasik           | 4.48 ***                       | 6.67 ***  | 2.10 **  | -1.88 **                        | -0.46     | 1.45 *** | 2.20 ***                           | 4.18 ***  | 1.94 *** |
| 2      | Dhule           | 5.92 ***                       | 8.18 ***  | 2.14 *** | 3.69 ***                        | 6.42 ***  | 2.63 *** | 4.49 ***                           | 6.95 ***  | 2.36 *** |
| 3      | Jalgaon         | 9.62 ***                       | 11.31 *** | 1.54 *   | -0.36                           | 1.82      | 2.19 *** | 6.18 ***                           | 8.64 ***  | 2.31 *** |
| 4      | Ahmednagar      | 3.85 ***                       | 6.08 ***  | 2.14 *** | 5.25 ***                        | 5.92 ***  | 0.64     | 4.20 ***                           | 5.91 ***  | 1.64 *** |
| 5      | Pune            | 5.34 ***                       | 8.43 ***  | 2.94 *** | 1.16 *                          | 2.96 ***  | 1.78 *** | 2.95 ***                           | 5.15 ***  | 2.14 *** |
| 6      | Solapur         | 1.14                           | 3.61 *    | 2.44 *   | 1.65 *                          | 3.41 *    | 1.74     | 0.93 ***                           | 3.39 ***  | 2.43 *** |
| 7      | Satara          | 2.57 ***                       | 4.95 ***  | 2.32 *** | 3.13 ***                        | 5.05 ***  | 1.86 **  | 2.87 ***                           | 4.76 ***  | 1.84 *** |
| 8      | Sangli          | 5.02 ***                       | 6.86 ***  | 1.76     | 1.00                            | 1.69      | 0.68     | 2.82 ***                           | 5.79 ***  | 2.89 *** |
| 9      | Kolhapur        | 12.46 ***                      | 15.91 *** | 3.06 *** | -0.65                           | 0.66      | 1.31 **  | 4.93 ***                           | 7.36 ***  | 2.31 *** |
| 10     | W. Maharashtra  | 4.63 ***                       | 7.21 ***  | 2.47 *** | 1.59 ***                        | 3.28 ***  | 1.66 *** | 3.19 ***                           | 5.60 ***  | 2.33 *** |
| 11     | Aurangabad      | 0.43                           | 2.77      | 2.33 *   | 1.10                            | 3.32 **   | 2.20 **  | 0.97 ***                           | 3.71 ***  | 2.71 *** |
| 12     | Jalna           | -----                          | -----     | -----    | 3.52 ***                        | 4.28 **   | 0.74     | 1.98 ***                           | 4.06 ***  | 2.04 **  |
| 13     | Beed            | -1.15                          | 2.18      | 3.37 **  | 6.07 ***                        | 8.45 ***  | 2.24 **  | 0.50                               | 2.83 ***  | 2.31 *** |
| 14     | Latur           | -----                          | -----     | -----    | 7.17 ***                        | 10.56 *** | 3.16 *** | 4.35 ***                           | 7.45 ***  | 2.97 *** |
| 15     | Osmanabad       | -2.69 ***                      | 0.02      | 2.79 **  | 3.76 ***                        | 6.57 ***  | 2.71 *   | 0.45                               | 2.48 ***  | 2.02 *** |
| 16     | Nanded          | -1.93 ***                      | 1.24      | 3.23 *** | 6.83 ***                        | 10.39 *** | 3.34 *** | 2.97 ***                           | 6.27 ***  | 3.21 *** |
| 17     | Parbhani        | 1.36 ***                       | 5.00 ***  | 3.59 *** | 5.45 ***                        | 7.99 ***  | 2.41 *** | 2.99 ***                           | 6.04 ***  | 2.96 *** |
| 18     | Marthwada       | 0.65                           | 3.67 **   | 2.99 *** | 4.83 ***                        | 7.68 ***  | 2.71 *** | 2.16 ***                           | 4.82 ***  | 2.61 *** |
| 19     | Buldhana        | 7.43 ***                       | 10.87 *** | 3.20 *** | 5.59 ***                        | 7.22 ***  | 1.54     | 6.51 ***                           | 9.61 ***  | 2.92 *** |
| 20     | Akola           | 4.53 ***                       | 7.67 ***  | 2.86 *** | 9.91 ***                        | 12.45 *** | 2.30 *   | 6.66 ***                           | 10.29 *** | 3.32 *** |
| 21     | Amravati        | 7.24 ***                       | 9.93 ***  | 2.51 **  | 5.58 ***                        | 8.21 ***  | 2.49 *** | 6.47 ***                           | 9.92 ***  | 3.24 *** |
| 22     | Yavatmal        | 0.68                           | 3.77 *    | 3.08 *** | 7.74 ***                        | 12.1 ***  | 4.05 *** | 5.38 ***                           | 8.68 ***  | 3.13 *** |
| 23     | Wardha          | 4.89 ***                       | 9.59 ***  | 4.49 *** | 3.23 ***                        | 5.46 ***  | 2.16 **  | 5.92 ***                           | 9.05 ***  | 2.96 *** |
| 24     | Nagpur          | 5.28 ***                       | 7.94 ***  | 2.53 *** | 5.72 ***                        | 8.80 ***  | 2.92 *** | 5.24 ***                           | 7.86 ***  | 2.49 *** |
| 25     | Bhandara        | 0.51                           | 0.80      | 0.29     | 0.53                            | 3.14 *    | 2.60 *** | -0.45                              | 0.64      | 1.09 *** |
| 26     | Chandarpur      | -1.68 ***                      | -2.47 **  | -0.81    | 6.90 ***                        | 8.85 ***  | 1.82 **  | 2.08 ***                           | 3.25 ***  | 1.14 *** |
| 27     | Gadchiroli      | -----                          | -----     | -----    | -3.10 **                        | -1.67     | 1.47     | -1.69 ***                          | -0.05     | 1.66 *** |
| 28     | Vidarbha        | 3.96 ***                       | 6.00 ***  | 1.96 *** | 6.26 ***                        | 9.02 ***  | 2.60 *** | 5.13 ***                           | 7.97 ***  | 2.70 *** |
| 29     | Maharashtra     | 2.84 ***                       | 5.62 ***  | 2.71 *** | 4.09 ***                        | 6.44 ***  | 2.26 *** | 3.32 ***                           | 6.01 ***  | 2.61 *** |

Note - \*, \*\*, and \*\*\* indicates significance at 10, 5 and 1 per cent level of significance

### Conclusions

The Maharashtra state has experienced spectacular progress in respect of area under chickpea. The production of chickpea almost tripled during the period. The productivity of chickpea has witnessed improvement over the period of time. The performance of chickpea was satisfactory in regard to the area expansion, production increase and productivity improvement in all region and state as a whole during the period 44 years. The growth rate of area, production and productivity of chickpea were highly significant and increased at the rate of 3.22, 6.01 and 2.61 per cent per annum respectively, for entire period in the state. The production increase was brought about by both area expansion and productivity improvement.

### References

1. Asewar BV, Bainade SS. Impact of improved technology on productivity of pulses. *Indian Journal of Pulses Research*. 2005; 18(1):57-59.
2. Ashturkar BW, Kohal AN. Performance of tur in regions of Maharashtra. *Indian Journal of Agricultural Economics*. 1993; 48(3):434-435.
3. Asmatoddin Mohd, Jawale SV, Perke DS. Economic analysis of pulses on medium farms in Marathwada region of Maharashtra. *Agriculture Update*. 2009; 49(1):262-265.
4. Bhatia MS. Trends and Pattern of Growth of food grain production in India. *Indian Journal of Agricultural Economics*. 1980; 35(4):28.
5. Gawade BB, Bhosale SS. A study on state-wise production performance of principal crops. *Agroesco Report submitted to Research Review Committee, Department of Agricultural Economics, Mahatma Phule Krishi Vidyapeeth, Rahuri*, 1998, 397-427.
6. Gaikwad DN, Yadav DB, Kulkarani AR. Compound growth rates in area, production and productivity in major pulses in Maharashtra. Paper presented in 2nd International Conference of Maharashtra Society of Agricultural Economics held at Dept. of Agril. Economics, MPKV, Rahuri, Maharashtra State on 10 to 11 February 2017, *Conference Souvenir*. 2017, 210-211.
7. Goswami SN, Choudhary AN, Sharma BK. Growth trend of oilseeds and pulses in India. *Agricultural Situation in India*. 1995; 52(4):191-193.
8. Joshi PK, RakaSaxena. A Profile of Pulses Production in India: Fact, Trends and Opportunities. *Indian Journal of Agricultural Economics*. 2002; 57(3):326-339.
9. Kamble BH, Gavali AV, Deokate TB. Regional Variations in Pulse Cultivation in Maharashtra. *Agricultural Economics Research Review*. 2015; 28(23):337.
10. Naik G, Thimmappa K. Trends in agricultural output growth and prices of agricultural commodities. *Agricultural Situation in India*. 2001; 55(3):205-212.
11. Sharma DK, Brahm Prakash. Analysis of growth and instability in area production and productivity of pulses in India. *Indian Journal of Agricultural Economics*. 2002; 57(3):397.
12. Gajbhiye RN, Wankhade SJ, Kakde. Growth and instability of chickpea production in Vidarbha region of Maharashtra. *International Journal of Commerce and Business Management*. 2010; 3(2):172-174.
13. Sonnad JS, Raveendaran N, Ajjan N, Selvaraj KN. Growth analysis of oilseed crops in India during pre and post WTO periods. *Karnataka Journal of Agricultural Sciences*. 2011; 24(2):184-187.

14. Tiwari AK, Dr. Shivhare AK. Pulses in India: peterospect and prospects DPD/Pub.1/2016 Published by Director, Govt. of India, Ministry of Agri. & Farmer Welfare (DAC & FW), Directorate of Pulses Development, Vindhyachal Bhavan, Bhopal, M.P- 462004, 2016, 2.
15. Tyagi BN, Avasthi KW. A study of growth rates in agricultural production in Madras State. *Agricultural Situation in India*. 1972; 32(5):537.