

Trends in Area, Production and Productivity in Onion in Tamil Nadu

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Author's contribution

Author RP designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript.

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ABSTRACT

India ranks first in area in onion and second in production next to China, but productivity is low as compared to Netherland, USA, China. Growth rates are widely employed in the field of agriculture as these have important policy implications. To study the trends of growth in area, production and productivity of onion crop compound growth rate were worked out. The study concluded that In India, Even though there was decline in area, increasing trend in production was noticed. It was due to increase in Productivity. In Tamil Nadu, the trend in area, production and productivity of Onion was found to be stable.

Keywords: Onion; area; production; productivity; CGR; percentage change.

1. INTRODUCTION

Onion (*Allium cepa* L) is an important vegetable crop not only for domestic consumption but also as highest foreign exchange earner among the fruits and vegetables. In India production of onion

has increased from 40.4 lakh tonnes (1994-95) to 215.63 lakh tonnes (2016-17), India ranks first in area (12.71 lakh hectare) in onion and second in production (215.63 lakh tonnes) next to China, but productivity is 16.10 tonnes hectare which is low as compared to Netherland, USA, China.

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The major onion producing states in the country are Maharashtra, Karnataka, Gujarat, Bihar, Madhya Pradesh, Andhra Pradesh, Rajasthan, Haryana, Uttar Pradesh and Tamil Nadu. These states together account about 87.93 per cent of the total area and 89.91 per cent of the total production of onion in the country [1].

Onion has significant position in the diet across all income groups and its dominant position in the ingredient of many Indian recipe causes wide ranging effects due to price change. It is equally important for all class of people. Changes in area and production of Onion leads to changes in prices causes stir among farmers and consumers. The fluctuations in production of onion adversely affect the employment and income distribution at farm level. Onion is one of the most market sensitive commodities; high price variability in case of onion affects both producers as well as consumers and it also has spillover effect on the other sectors, thereby leading to high inflation in the economy. Thus, it is major concern for the politicians, policy makers and experts. Hence, The present study was under taken with the objective to analyse the trend in area, production and productivity of Onion in Tamil Nadu and India.

2. MATERIALS AND METHODS

Time series data on area, production and productivity of onion were collected from various sources for the period from 2000-2015 to study the growth rate in area, production and productivity of Tamil Nadu and India. Compound annual growth rates (CAGR), percentage change or annual growth was worked out to study the changes in area, production and yield of Onion over a period of time. The study was based on secondary data collected from various published sources. The compound annual growth rate was calculated by fitting the following equation in the time series data in area, production and yield.

$$\ln Y = a + bt \quad (1)$$

where, Y defines the time series data of production, area and yield of Onion, 't' is the trend term and 'a' is the constant coefficient.

'b' is the slope coefficient, which measures the relative change in Y for a given absolute change in the value of explanatory variable 't'.

Compound growth rate calculated using the following equation:

$$\text{CGR} = [\text{antilog } b - 1] * 100 \quad (2)$$

The equation (1) has been estimated by applying Ordinary Least Square (OLS) method. The t-test was applied to test the significance of 'b'. This equation presumes that a change in agriculture output in a given year would depend upon the output in the proceeding year [2,3].

If y_t denotes the observation (e.g. agricultural production, productivity, or area) at time t and r is the compound growth rate, model employed for estimating r is based on Eq. (1):

$$y_t = y_0 (1 + r)^t \quad (1)$$

The usual practice is to assume a multiplicative error-term $\exp(e)$ in Eq. (1) so that the model may be linearized by means of logarithmic transformation, giving Eq. (2):

$$\ln(y_t) = A + Bt + e \quad (2)$$

where, $A = \ln(y_0)$, and $B = \ln(1 + r)$. Eq. (2) is then fitted to data using "method of least squares" and goodness of fit is assessed by the coefficient of determination R^2 .

Finally, the compound growth rate is estimated by Eq. (3):

$$r^{\wedge} = \exp(B^{\wedge}) - 1 \quad (3)$$

2.1 Sources of Secondary Data

Area, production, productivity collected from season and crop report of Tamil Nadu and National Horticultural Research and Development Foundation (NHRDF).

3. RESULTS AND DISCUSSION

3.1 Compound Annual Growth Rate

Compound annual growth rate was calculated on area, production and productivity of Onion for about for fifteen years in India and Tamil Nadu to know about the growth rate over a period of time. In India, There was negative growth rate of area under Onion from 2000-01 to 2015-16, which was found to be (-13.88 per cent), whereas positive growth rate (11.25 per cent) was found in production during the same period (Table 1), (Fig. 1). Even though there was decline in area, increasing trend in production was noticed. It is evident that increase in production was due to increase in Productivity (3.49 per cent).

Production was increased because of increase in productivity, use of technologies including high yielding varieties, better irrigation and management practices.

Area, production and productivity of Onion in Tamil Nadu was found to be stable shown in (Table 2), (Fig. 2) from 2000-01 to 2015-16, Overall CAGR in area, production and productivity of Onion in Tamil Nadu were found to be 1.27 per cent, 2.22 per cent and 1.01 per cent, respectively. Similarly, Singh and Choudhary [4], Kallo and Singh [5], Malik et al., [6], Swati Sharma., [1] in their studies, they also observed increasing trends in area, production and productivity of onion in various parts of the country including vegetables.

3.2 Percentage Change in Area, Production and Productivity

Percentage change in Area, production and productivity of Onion in India from 2002 to 2015 shown in Table 3.

Percentage change in Area, production and productivity of Onion in Tamil Nadu from 2002 to 2015 shown in Table 4. In India, area under onion cultivation witnessed an increase of 4.43 per cent. Similarly, production of onion witnessed an increase of 10.90 per cent Productivity of onion has increased marginally by 7.38 percent during 2015 over 2014.

Percentage change in Area, production and productivity of Onion in Tamil Nadu from 2002 to 2015 shown in Table 4. In Tamil Nadu, area under onion cultivation witnessed an increase of 15.77 per cent. Similarly, production of onion witnessed an increase of 11.50 per cent. Productivity of onion has declined marginally by -1.62 per cent during 2015 over 2014.

Similarly, Singh and Choudhary [4], Kallo and Singh [5], Malik et al., [6] Swati Sharma., [1] in their studies, they also observed increasing trends in area, production and productivity of onion in various parts of the country including vegetables.

Table 1. CAGR of onion in Tamil Nadu during 2001-02 to 2015-16

Area	Production	Productivity
1.27	2.22	1.01

Table 2. CAGR of Onion in India during 2001-02 to 2015-16

Area	Production	Productivity
-13.88	11.25	3.49

Table 3. Percentage change in Onion in India

Year	Area	Production	Productivity
2002	-14.34	-19.85	-6.60
2003	30.40	48.89	14.14
2004	10.83	23.82	11.50
2005	14.63	21.54	6.35
2006	9.15	15.00	5.22
2007	6.90	28.15	19.86
2008	1.58	-2.41	-3.55
2009	-9.33	-10.37	-1.23
2010	-85.93	24.34	-11.80
2011	2.16	15.83	13.38
2012	-3.27	-3.99	-0.62
2013	14.47	15.40	0.63
2014	-2.54	-2.44	0.19
2015	4.43	10.90	7.38

Table 4. Percentage change in Onion in Tamil Nadu

Year	Area	Production	Productivity
2002	-17.99	-28.85	-13.25
2003	-0.17	6.27	6.44
2004	12.96	22.34	7.47
2005	10.11	-9.51	-17.17
2006	1.43	10.50	8.93
2007	0.75	11.18	10.35
2008	1.50	-0.41	-1.89
2009	2.54	5.78	3.17
2010	3.01	-1.08	-3.98
2011	9.24	25.94	15.29
2012	-31.17	-47.15	-23.21
2013	56.88	115.69	37.50
2014	-31.72	-39.58	-11.49
2015	15.77	11.50	-1.62

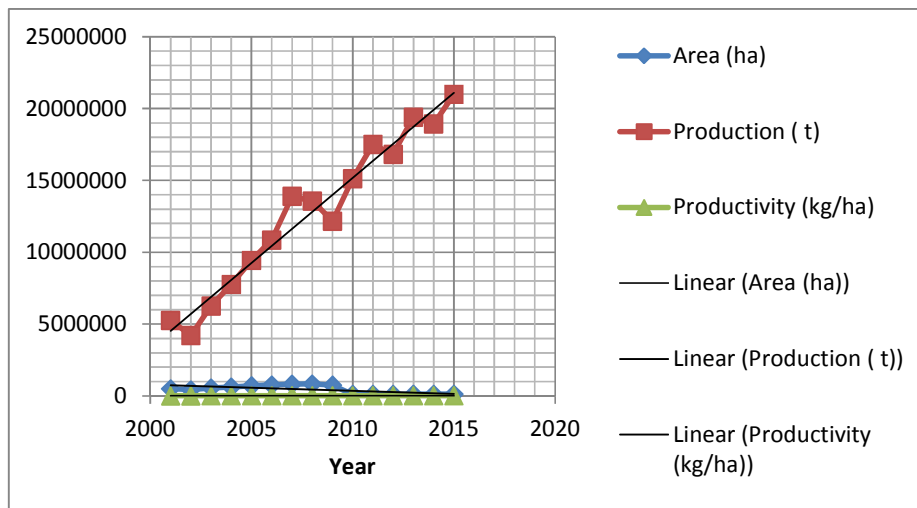


Fig. 1. Trend in area, production and productivity of Onion in India

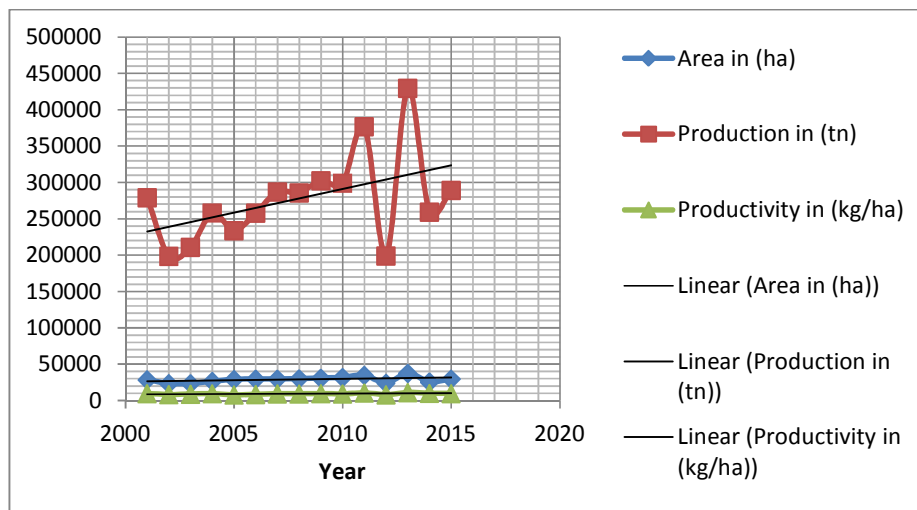


Fig. 2. Trend in area, production and productivity of Onion in Tamil Nadu

4. CONCLUSION

Area, production and yield growth rates revealed that onion showed better performance in Tamil Nadu as well as national level. Area, production and productivity of Onion in Tamil Nadu was found to be stable. In India, Even though there was decline in area, increasing trend in production was noticed. Production was increased because of increase in productivity, use of technologies including high yielding varieties, better irrigation and management practices.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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