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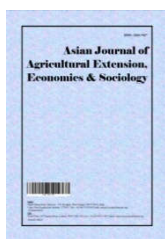
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The Trend and Growth Rate of Brinjal in Dhamtari Block and Chhattisgarh State, India

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Authors' contributions

This work was carried out in collaboration among all authors. Author RS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author NKR managed the analyses of the study. Author GP managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The research work was carried out with objectives to estimate the trend and growth rate in area, production & productivity of brinjal in Dhamtari block of Chhattisgarh state. The study was conducted in Dhamtari district which comprises of 4 blocks and among which Dhamtari block occupies maximum area and production of Brinjal. The secondary data was collected from Directorate of Horticulture, Directorate of Land record, Directorate of Economics and Statistics, and annual horticultural statistics, Raipur Chhattisgarh. The annual area, production and productivity of Brinjal in Dhamtari district is collected from Directorate of Horticulture Dhamtari, Chhattisgarh. The secondary data were collected for the last 10 years (2006-07 to 2015-16). Compound growth rate and simple growth rate were used to analyse the collected data. To reveal the behavior of selected variables in the district over time, regression analysis was carried out. The following form of linear production function was fitted by least square technique to estimate the trend and growth rate of the selected variable for the study period. Area, production and productivity of Brinjal in Chhattisgarh state was found to be increased at highly significant rate, whereas, in Dhamtari district, it was found that only area of Brinjal increased at highly significant rate.

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Keywords: Production; productivity; trend; compound growth rate; simple growth rate.

1. INTRODUCTION

The world's largest vegetable crop and known as protective food, both because of its special nutrient value and also because of its wide spread production [1-3]. Brinjal is one of the important vegetable crops cultivated for fleshy fruit. Brinjal is also known as Eggplant. Brinjal has been a stable vegetable in our diet since ancient times, it is considered as important commercial and dietary vegetable crop [4-6]. Brinjal is good source of vitamins-B, minerals, organic acid, essential amino acid, dietary fibers and it also contains Anthocynin pigment [7-9].

Brinjal is cultivated all over countries having wider diversity of soil, climate, biodiversity and management practices [10,11]. In India, it is cultivated in area of 664 thousand hectares with total production of 12552 thousand MT of fruits for consumption as well as for export purpose (National horticulture board 2015-16) [1]. The major brinjal producing states in India are Orissa, Bihar, Karnataka, WestBengal, Andhra Pradesh, Maharashtra, & Uttar Pradesh. In Chhattisgarh State, it is grown in 35.38 thousand hectares area with the production of 633.34 thousand million tones and productivity of 17.90 tones ha⁻¹ (Horticulture at a glance, 2015) [2] and in Dhamtari district brinjal is grown in 1278 ha with the production of 19486 million tones approx and productivity is 15.24 tones ha⁻¹ (Director Horticulture, C.G., dis. Dhamtari 2015-16). This study will help us to provide scientific information on the trends and growth rate of brinjal production in the study area.

2. MATERIALS AND METHODS

This deals with the materials and research methodology adopted for the present study with respect to the selection of study area, collection of data and analytical techniques. The research methodology adopted has been described into following subheads: The study area, Collection of data and Analytical procedure.

2.1 Study Area

The present study was confined to Dhamtari block of Chhattisgarh, which was selected purposively due to highest area for Brinjal cultivation in Chhattisgarh to get more accurate information. From the Dhamtari block, five villages namely, Gagra, Sarangpuri, Kharenga,

Bhothipar and Darri were selected randomly for the study.

2.2 Collection of Data

The secondary data was collected from Directorate of Horticulture, Directorate of Land record, Directorate of Economics and Statistics, and annual horticultural statistics, Raipur Chhattisgarh. The annual area, production and productivity of Brinjal in Dhamtari district is collected from Directorate of Horticulture Dhamtari, Chhattisgarh.

2.3 Period of the Study

The primary data were collected in the references related to the agriculture year 2015-16 Rabi season.

3. ANALYTICAL PROCEDURE

3.1 Analysis of Growth

To reveal the behavior of selected variables in the district over time, regression analysis was carried out. The following form of linear production function was fitted by least square technique to estimate the trend and growth rate of the selected variable for the study period.

3.2 Growth Rate

For compute the trend and simple growth rate following formulae will be used.

$$Y = a + b_1 x_1$$

Where,

Y = Area/ production/ productivity

a = Constant/Intercept

b₁ = Regression coefficient

x₁ = independent variable (year)

$$\text{Simple growth rate (SGR)} = b/Y \times 100$$

$$\text{Compound Growth Rate} = Y = ab_1^{x_1} \quad (b \text{ from exponential function}) = \text{CGR} = (\text{Antilog } b-1) \times 100$$

4. RESULTS AND DISCUSSION

This deals with the results of the cross section data collected from the sample holding and analyzed in the light of the objective stated in chapter first.

Table1. Absolute change, relative change, coefficient of variance, trend, simple growth rate, compound growth rate of Dhamtari block (Dhamtari district) for the period 2006-2007 to 2015-16

Particulars	Area (in ha)	Production (in mt)	Productivity (t/ha)
Absolute Change	605.33	10282.63	1.28
Relative Change %	87.72	105.08	9.00
Coefficient of Variance %	25.89	31.09	9.67
Trend	82.78**	1358**	0.12
Simple growth rate	8.38	9.56	0.89
Compound growth rate	9.039	10.07	0.95

Note: ** Significant at 1%

* Significant at 5%

Table2. Absolute Change, Relative Change, Coefficient of variance, Trend, Simple growth rate, Compound growth rate of Chhattisgarh State for the period 2006-2007 to 2015-16

Particulars	Area (In ha)	Production (In mt)	Productivity (t/ha)
Absolute Change	10613.33	297135.78	4.40
Relative Change %	45.15	92.00	32.00
Coefficient of Variance %	16.47	28.00	13.04
Trend	1508**	43147**	0.65**
Simple growth rate	5.30	9.19	4.00
Compound growth rate	5.42	9.90	4.23

Note: ** Significant at 1%

* Significant at 5%

4.1 Growth Rates in Area, Production and Productivity of Brinjal

To examine the growth rates in area, production and productivity of brinjal crop of Dhamtari block (Dhamtari district) and Chhattisgarh state for the period of 2006- 2007 to 2015-2016, exponential form was estimated.

Area, Production and Productivity of brinjal in Dhamtari block (Dhamtari district) was increased by 87.72%, 105.08% and 9% from its base year to current year which showed increasing and highly significant SGR trend as well as CGR trend with compound growth rate of 9.03%, 10.07% and 0.95% per year.

Area, Production and Productivity of brinjal in Chhattisgarh state was increased by 45.15%, 92.00% and 32% from its base year to current year which showed increasing and highly significant SGR trend as well as CGR trend with compound growth rate of 5.42%, 9.9% and 4.23% per year.

5. CONCLUSIONS

Demonstrations are required to be conducted on the farmer's field for penetration of the improved technologies. The socio-economic backwardness

of farmers of study area is a higher obstacle in terms of acceptance of the improved technology. It is suggested that frequency of extension visits should be increased to encourage more, wider spread and adoption of farm technologies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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