



# GROWTH RATE OF RICE CROP OF BARABANKI DISTRICT UTTAR PRADESH

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## Abstract

The present study is based on secondary data collected from Sankhiki Patrika published by Uttar Pradesh Government and available on web-site <http://updes.up.nic.in/spatrika/spatrika.htm>. Data collected during 1994-1995 to 2014-15 of Paddy crop with the causal variable as well as Production, Productivity and Area of Barabanki district Simple Growth Rate. This period of study had many severe and moderate droughts resulting in sharp fall in production. The adverse effect is displayed Graphically Productivity and Area also got affected by Rainfall but less pronounced in comparison to production.

## Introduction

Rice is the most important cereal food crop of India. It occupies about 23.3% of gross cropped area of the country (2009-10). It plays vital role in the national food-grains supply. Rice contributes 43% of total food-grains production and 46% of the total cereal production of the country (2012-13). Rice is the staple food of more than 60% of the world population especially for most of the people of South-East Asia. Among the rice growing countries in the world, India has the largest area under rice crop and ranks second in production next to China.

Uttar Pradesh is one of the major states of rice growing in the country. It accounts about 13.53 and 13.54% towards the total acreage and production of the rice in the country (2011-12). It has first rank in area as well as production among all the states of India. The productivity of rice has increased 2358 Kg/ha in 2011-12 from 519 Kg/ha in 1950-51 *i.e.* four and half times during the last 60 years. However, productivity of rice in Uttar Pradesh has been a little low (2358 Kg/ha, 2011-12) as compared to leading states of rice growing. For example, the maximum productivity of rice has been 3741 Kg/ha in Punjab followed by Tamil Nadu (3423 Kg/ha), Andhra Pradesh (3146 Kg/ha), Haryana (3044 Kg/ha), Karnataka (2897 Kg/ha), West Bengal (2715 Kg/ha) etc. during the year 2011-12. Various research workers in the Growth and instability several crops based on time series data on crop yield and weekly data on weather variables. Notably among them are Awaghad *et al.* (2010), Gaddi *et al.* (1999), Gajja *et al.* (2008), Jha *et al.* (2006), Kumaravardan *et al.* (2009), Naidu *et al.* (1994), Prasad *et al.* (1996), Prasad *et al.* (2009), Rao *et al.* (2005).

## Materials and Methodology

The present study is related to Barabanki district (Eastern Uttar Pradesh, India) which is situated between Latitudes 26° 30' North and 27° 19' North and Longitudes 80° 58' East and

81° 55' East. District Barabanki is surrounded by district Ayodhya in the East, districts Gonda and Bahraich in the North East, district Sitapur in the North West, district Lucknow in the West, district Rae Bareli in the South and district Amethi in the South East. The river Ghaghra forms the North Eastern Boundary separating Barabanki from Bahraich and Gonda. The annual normal rainfall data of Nawabganj, Ramsanehi Ghat, Fatehpur and Haidergarh raingauge station is 1173.4 mm, 1058.4 mm, 982.4 mm and 1011.6 mm, respectively. The annual normal rainfall of the district is 1056 mm. It lies in the Eastern plain zone of Uttar Pradesh. The secondary data collected from Sankhiki Patrika published by Uttar Pradesh Government and available on web-site <http://updes.up.nic.in/spatrika/spatrika.htm>. The investigation was carried out during 1994-1995 to 2014-15 related to Paddy the time series data of 21 years on Production, Productivity and Area of Barabanki district.

## Statistical analysis

Growth rate in area, production and productivity of different rice crops have been worked out by fitting the following two different functions:

### 1. Simple linear function

$$Y_t = a + bt$$

### 2. Compound growth rate function

$$Y_t = a \left( 1 + \frac{r}{100} \right)^t$$

Where,

$Y_t$  - Time series data on area/ production/ productivity of pulse crops at time t, a & b are parameters of the function to be estimated.

t - Time index (t=1, 2, 3,.....n)

r - Average compound growth rate per annum.

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However, before the fitting of above function, the series data on area and production were smoothed by moving-average method.

After fitting the first linear trend function by least-square method, we get the estimate of b denoted by  $\hat{b}$  (say). Then, annual linear growth rate is computed as follows

$$r = \frac{\hat{b}}{\bar{Y}} \cdot 100$$

Where,

$\bar{Y}$  is arithmetic mean of  $Y_t$ .

To obtain annual compound growth rate, second function was first linearized by taking log on both side, i.e.

$$Y_t = a \left( 1 + \frac{r}{100} \right)^t$$

$$\log Y_t = \log a + t \log \left( 1 + \frac{r}{100} \right)$$

or

$$Y_t^* = a + bt$$

$$\text{Where, } b = \log \left( 1 + \frac{r}{100} \right)$$

The above linearized function was fitted by least square method and estimate of b as  $b^*$  was obtained. The annual compound growth rate is then computed as

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

Both growth rates are expressed in percentage. The best fitted function was judged on the basis of  $R^2$  (coefficient of determinations).

## Results and Discussion

To get idea about the growth rate of rice area, production and productivity of Barabanki district of Uttar Pradesh, we have been proposed to calculate Simple growth and compound growth rate. The table 1 show reveals that the Growth Rate for production varies from 2.75 to 2.85 but less than the target of 4% set by Government. Barabanki is one of the best Districts of Eastern Uttar Pradesh and has potential of achieving growth rate of 4 or higher percentage by augmentation of Infrastructure and Technology. The best-fitted function was judged on the basis of  $R^2$  (Coefficient of determination) which was varies from 55.71 to 37.19 in case of both the growth rates of the entire period of Barabanki district of Uttar Pradesh.

## Conclusion

The growth rate of rice crop of Barabanki district of Uttar Pradesh was evaluated and a comparative conclusion is obtained. Simple growth rate was higher in Production. Barabanki is one of the best districts of eastern Uttar Pradesh but its Growth Rate of Production of Paddy is around 2-2.5% which is less than desired target of 4%.

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**Table 1: Growth rate of rice crop of Barabanki district of Uttar Pradesh**

	Simple Growth Rate	Compound Growth Rate
Area	1.035** ( $R^2=44.24$ )	1.057** ( $R^2=43.66$ )
Production	2.832** ( $R^2=55.71$ )	2.71** ( $R^2=51.43$ )
Productivity	1.747** ( $R^2=42.84$ )	1.636** ( $R^2=37.19$ )

\*Significant at, 05.0%r \*\* Significant at 01.0%r