

Original Research Article

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Growth Rates in Area, Production and Productivity of Mungbean in Nagaur District of Rajasthan, India

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ABSTRACT

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The present investigation was undertaken with a view to study the growth rates in area, production and productivity of mungbean in Nagaur district of Rajasthan. The area under mungbean in the Rajasthan fluctuated during last forty-one years, ranging from as low as 1.71 lakh hectares in 1987-88 to as high as 12.72 lakh hectares in 2011-12. This affects the employment and income distribution and hampers the economic growth of the state. Compound growth rates were estimated by using the exponential function of the form $Y = ab^t U_t$. The results of compound growth rates in indicated that area, production and productivity of mungbean positively increased at significant growth rates of 4.45, 6.81 and 2.26 percent per annum in Nagaur district and 7.3, 10.03 and 2.53 percent per annum in Rajasthan during 1974-75 to 2014-15, respectively.

Introduction

United Nations declared 2016 as “International Year of Pulses” (IYP) to make the public awareness of the nutritional benefits of pulses as part of sustainable food production aimed at food security and nutrition. India is the largest producer (25%), consumer (27%) and importer (14%) of

pulses in the world (Mohanty and Satyasai, 2015). In order to reduce India's dependence on imports to meet domestic demand of pulses, the Centre has drawn up a five-year roadmap to increase pulse production from nearly 17.06 million tonnes in 2015-16 to 24 million tonnes in 2020-21 through a dedicated action plan. Productivity of pulses in India has been very low at 764 kg per hectare,

compared to best-in-class yields of around 1,900 kg per hectare in Canada and USA. The area under mungbean in the state fluctuated during last forty one years, ranging from as low as 1.71 lakh hectares in 1987-88 to as high as 12.72 lakh hectares in 2011-12.

Similarly, there were also year to year wide fluctuations in the production of mungbean due to variation in weather conditions, area grown under and yield of the crop. This affects the employment and income distribution and hampers the economic growth of the state. Thus, there is a need to have a clear cut information about the growth in area, production and productivity of mungbean so that appropriate policy measures may be designed and executed for enhancing the production of mungbean in the study area.

In Rajasthan, total area under mungbean was 17.19 lakh hectares with the production of 7.42 lakh tonnes and productivity of 515 kg/ha during 2017-18 (Anonymous, 2017-18). In Nagaur, total area under mungbean was 2.56 lakh hectares with the production of 1.80 lakh tonnes and productivity of 509 kg/ha during the year 2017-18 (Anonymous, 2017-18). Mungbean is cultivated mainly under rainfed condition in Nagaur district.

Thus, there is a need to have a clear cut information about the growth in area, production and productivity of mungbean so that appropriate policy measures may be designed and executed for enhancing the production of mungbean in the study area.

Materials and Methods

To examine the growth rates in area, production and productivity of mungbean in the district as well as in the state, secondary data were collected from various publications and records of Agriculture Statistics Cell, Nagaur district, Directorates of Economics

and Statistics, Directorate of Agriculture, Krishi Pant Bhawan, Govt. of Rajasthan, Jaipur and its websites (www.rajsthan.krishi.gov.in) for 41 years (1974-75 to 2014-15).

Compound growth rate

To study growth in area, production and productivity of mungbean in Nagaur district and Rajasthan state, compound growth rates were worked out by using the following formula:

Exponential equation:

$$Y_t = ab^t U_t \dots\dots\dots(i)$$

Where, Y_t is area/production/productivity of mungbean in time period t

t is time element which takes the values 1, 2,3.....n

a and b are parameters to be estimated

Where $b = (1 + g)$; g is the rate at which Y grows every year in relation to its value in preceding years.

U_t is the error term

On logarithmic transformation of Equation (i) we get :

$$\text{Log } y_t = \text{Log } a + t \text{ Log } b + \text{Log } U_t \dots\dots\dots(ii)$$

Equation (ii) can be rewritten as :

$$Y^*_t = a^* + b^*_t + U^*_t$$

Where, $Y^*_t = \log Y_t$, $a^* = \log a$; $b^* = \log b$ and $U^*_t = \log U_t$

The compound growth rate was obtained as $g = (\text{Antilog } b^* - 1) * 100$

The Student 't' test was used for the significance of compound growth rates.

Results and Discussion

Growth rates in area, production and productivity of mungbean

This section deals with compound growth rates in area, production and productivity of mungbean in the district of Nagaur and the state of Rajasthan. The aggregate production of a crop is the resultant effect of area and productivity of that crop. The growth pattern of area, production and productivity of mungbean in this context is important. The estimates of growth rates pertained to the period from 1974-75 to 2014-15.

The table 1 shows that production of mungbean in Nagaur during the study period 1974-2014 registered a significantly compound growth rate of 6.81 per cent per annum which was significant at 1 per cent level of significance. Area under the crop in Nagaur increased at a compound growth rate of 4.45 per cent per annum, significant at 1 per cent level of significance. Like production, productivity of the crop too, registered significant compound growth rate of 2.26 per cent per annum at 5 per cent level of significant. The coefficient of determination (R^2) was estimated to be 0.81, 0.50 and 0.14 indicating that 81%, 50% and 14% of variation in area, production and

productivity was explained by the time variable. The study results revealed that the increase in production of mungbean was mind due to the increase in productivity, through area under the crop significant helped in the district of Nagaur.

The table 2 reveals that mungbean crop registered a significant growth rate of 7.3 percent per annum in area at 1 per cent level of significance. On the other hand, production increased significant compound growth rate of 10.03 per cent per annum also significant at 1 per cent level of significance. The growth rate of productivity for mungbean was registered to be significantly positive (2.53 per cent per annum) at 5 per cent level of significance.

The coefficient of determination (R^2) was 0.75, 0.61 and 0.17 indicating that 75%, 61% and 17% of variation in area, production and productivity was due to time. The returns indicate that the increased area under the crop could increase the production of mungbean crop in Rajasthan. The role of productivity in increasing the production, through significant was much than the area. These results were in conformation with that reported by Devraj (2002), Mathur and Henry (2005), Devraj (2014) and Pichad *et al.*, (2014).

Table.1 Compound growth rates in area, production and productivity of mungbean in Nagaur district during 1974-75 – 2014-15 (Per cent per annum)

Particular	Growth rates	Standard error	R^2
Area	4.45***	0.35	0.81
Production	6.81***	1.13	0.50
Productivity	2.26**	0.90	0.14

*** Significant at 1 per cent level of significance

** Significant at 5 per cent level of significance

Table.2 Compound growth rates in area, production and productivity of mungbean in Rajasthan during 1974-75 – 2014-2015 (Per cent per annum)

Particular	Growth rates	Standard error	R ²
Area	7.3***	0.70	0.75
Production	10.03***	1.33	0.61
Productivity	2.53**	0.91	0.17

*** Significant at 1 per cent level of significance

** Significant at 5 per cent level of significance

The area, production and productivity of mungbean positively increased at significant growth rates of 7.3, 10.03 and 2.53 percent per annum in Rajasthan during 1974-75 to 2014-15, respectively. The area, production and productivity of mungbean positively increased at significant growth rates of 4.45, 6.81 and 2.26 percent per annum in Nagaur district during 1974-75 to 2014-15, respectively. The study results revealed that the increase in production of mungbean was mind due to the increase in productivity, through area under the crop significant helped in the district of Nagaur.

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