TRENDS OF BHARATPUR DISTRICT OF RAJASTHAN: IN CASE OF RAPESEED-MUSTARD

Richa Sharma[*]
Dr. Manju Yadav[**]

ABSTRACT

This study examines growth trends of mustard in respect of area, production and productivity at Bharatpur district. Study is based entirely upon secondary data for the period of 27 years (1990-91 to 2016-17). To estimate compound growth rate of area, production and productivity exponential function has been applied. Instead of that coefficient of variation is computed to get variation around the mean and instability index is also computed to get variation around the trend. The contribution of area and productivity in production of mustard is expressed through decomposition analysis. The result indicated that growth rates of mustard in case of area, production and productivity were positive for the overall period. Growth rates were statistically significant and positive in case of production and productivity in mentioned period. Instability index shows highest variation around trend in production of mustard. Coefficient of variation was also found to be highest in case of production in mustard followed by productivity. Production increases because of increase in productivity under mustard in the corresponding period.

KEYWORDS: *Productivity, Secondary Data, Growth Rate, Instability Index, Decomposition Analysis.*
_____

Introduction

Mustard is primarily produced in Rajasthan, Hariyana and M.P., Gujrat in India. Mustard crop occupies second position under edible oils in India after groundnut. This crop is main oilseed crop in India. It covers more than 80% of area in oilseeds. Area under this crop for 2016-17 was 6652000 hectares and production for the same year was 7109000 tonnes in India. In 2016-17 its average yield was 1069 kg/hectare as per govt. estimates. Mustard occupies second place in edible oils in India. Rajasthan occupies 40.82% share in mustard in India followed by Hariyana (13.33%) and Madhya Pradesh (11.76%). Mustard is mainly produced in Alwar, Tonk, Bharatpur and Shri Ganganagar district of Rajasthan. Bharatpur is a highest mustard cultivating divison occupying about 48% of total production in Rajasthan. This crop is grown in dry region. Mustard is used not only as oil, but its seeds are used in cooking as well. Its oil cakes are utilized in food for cattle and as organic fertilizer.

This study is an attempt to examine the trends of area, production and productivity under mustard at Bharatpur district. Objectives of this study are:

- To compute the growth rates in respect of area, production and productivity of mustard at Bharatpur district.

- To examine the variability in area, production and productivity of mustard at Bharatpur district in Rajasthan.

[*]   Research Scholar, Department of Economics, B.S.R. Government Arts College, Alwar, Rajasthan, India.
[**]   Associate Professor, Department of Economics, B.S.R. Government Arts College, Alwar, Rajasthan, India.

Methodology

To evaluate the growth scenario, instability and decomposition analysis in respect of area, production and productivity of mustard various statistical measures have used as mean, standard deviation, coefficient of variation etc.

This study is based in secondary data entirely. Data of area, production and productivity of mustard has been taken from yearly glance of Rajasthan govt. The time period of the study is of 27 years from 1990-91 to 2016-17. This time period is divided into three period as first period (1990-91 to 1999-00), and second period (2000-01 to 2009-10) and third period (2010-11 to 2016-17). To examine the compound growth trends regarding area, production and productivity of mustard exponential functional form has been used.

Exponential equation: $Y = a.b^x$

Where, Y= area, production and productivity of mustard crop, X= time variable and b is the regression coefficient y upon x.

The compound growth rate: [antilog (b)-1]*100

The reason for applying the exponential model was that the coefficient of determination (R^2) of this function was highest.

Instability Analysis

This analysis applies coefficient of variation to measure instability in area, production and productivity. Coefficient of variation is estimated by applying the formula as-

Coefficient of variation (CV) = [(standard deviation / mean)*100]

When trend series is proved to be significant, in that case variation throughout the trend instead of variation throughout the mean is used as instability index. This index is computed by this formula:

Instability Index= CV $\sqrt{(1-R^2)}$

R^2 refers to adjusted coefficient of multiple determination.

Decomposition Analysis

The decomposition method of growth trend was first presented by Minhas and Vaidyanathan (1965)[1]. They calculated the difference in agricultural output by setting apart the difference in three factors: area, productivity and interactions. The contribution of area, productivity and their interaction on production of mustard crop has been estimated by the formula as

$\triangle P = Y0 \triangle A + A0 \triangle Y + \triangle A \triangle Y$

Where,

$\triangle A = A_n - A_0$

$\triangle Y = Y_n - Y_0$

$\triangle P = A_n - A_0$

A_0, Y_0 and P_0 presents the area, production and productivity of mustard in the base year and An, Y_n and P_n the mentioned area, production and productivity in the current year. This equation refers change in production of mustard crop by area effect, yield effect and interaction effect respectively.

Results and Discussions

- **Trends in Area, Production and Productivity**

To compute the results in area, production and productivity of rapeseed-mustard in the country the area, production and productivity indices are presented in Fig. 1. It is clear from the figure that, increasing trends of area were observed only for three years 1991-92, 1995-96 and 1999-00 under the R&M for the first time period. Maximum increase in area was observed in 2001-02 in period second. This period showed mix trend, while third period also showed mix trend. Maximum decrease was observed in the first period regarding area. In period first maximum production was recorded in 1990-01. In case of yield maximum decline was observed in 1997-98.

- **Compound Annual Growth Rates of Area, Production and Productivity of Mustard**

The CAGR of area, production and productivity of mustard divide into three periods are presented in Table 1. The table depicts that, the overall compound growth rate of Production and

productivity of mustard were found to be positive and significant at the 5 per cent level of significance, while area was observed positive but not significant during 1990-91 to 2016-17. Second period (2000-01 to 2009-10) shows positive growth in area, production and productivity in case of mustard. Growth rate have been negative for area and production but for area it was negatively significant during the period first (1990-91 to 1999-00), productivity showed positive growth rate of 1.33 percent in the same period.

Mustard shows positive growth rate for all area, production and productivity in period second and growth rate of production (7.98 percent) was found significant at 1 percent, and productivity growth rate (4.36) was also found significant at 5 percent. Third period shows declining growth rates for all area and production and productivity were found negative -.82 percent, -1.41 percent and -.58 percent respectively. Area is showing negative growth rate in period first and third which shows decrease in area in mustard crop in Bharatpur district due to shift of area to other remunerative crops. Production has also been negative in the same period (first and third time period) due to decline in area as well high yielding varieties were not adopted that time.

Table 1: Compound Growth Rate of Area, Production and Productivity of R&M at Bharatpur District

Time period	Area (CAGR %)	Production (CAGR%)	Productivity (CAGR%)
1990-91 to 1999-00	-4.58*	-3.33	1.33
2000-01 to 2009-10	3.33	7.98**	4.36*
2010-11 to 2016-17	-.82	-1.41	-.58
1990-91 to 2016-17	.081	3.075*	2.98*

*denotes 5 percent level of significance and **denotes 1 percent level of significance.

Instability Analysis

The coefficient of variation and instability index is showed in table 2 in case of area, production and productivity of R&M crop of Bharatpur district during all time period. Table 2 shows low coefficient of variation in area of mustard during whole time period in comparison with production and productivity. Low coefficient of variation showed that crop holds substantial position. In case of production instability was highest in all three periods. In the second period (2000-01 to 2009-10), it was 26.62 percent in production. In the first period instability was found to be 15.68 percent, 20.15 percent and 20.6 percent respectively for area production and productivity. It was 15.12 percent (area), 26.62 percent (production) and 18.39 percent (productivity) respectively in second period. In the third period it was 5.48, 12.95 and 12.28 percent regarding area, production and productivity of mustard crop at Bharatpur district of Rajasthan. For overall period coefficient of variation of production followed by productivity was found highest in case of mustard. Instability index of all area, production and productivity for mustard at Bharatpur district has been positive which shows lower risk for cultivating of mustard crop in future also.

Table 2: Coefficient of Variation (CV) in Percent and Instability Index for Area, Production and Productivity of Mustard Crop During 1990-91 to 2016-17

Time Period	Aspects	Coefficient of Variation (CV%)	Instability Index (%)
1990-91 to 1999-00	Area	15.68	10.04
	Production	20.15	19.55
	Productivity	20.60	21.49
2000-01 to 2009-10	Area	15.12	13.06
	Production	26.62	15.83
	Productivity	18.39	13.14
2010-11 to 2016-17	Area	05.48	05.66
	Production	12.95	13.81
	Productivity	12.28	13.38
1990-91 to 2016-17	Area	13.20	13.45
	Production	30.82	21.56
	Productivity	27.14	16.16

Source: Author's calculations

Decomposition Analysis

- **Area Effect**

It is expressed in table 3 that area effect has been negative for overall period (1990-91 to 2016-17) under mustard production at Bharatpur district. Area effect was found to be positive for period first and second, while for third period it was negative (-160.91%). It was highest (2252.62%) in period first (1990-91 to 1999-00). In period second it was 441.5 percent after that it became negative.

- **Productivity Effect**

In decomposition analysis productivity of mustard at Bharatpur district has played main role in mustard growth, because its effect was 1202.94 percent during the whole period. Productivity effect was positive for all periods except first period. In first period yield effect was found to be negative -1625.08 percent because of unfavourable weather conditions and other factors in that period. Yield effect was positive in second and third period 236.6 percent and 1171.17 percent respectively.

- **Interaction Effect**

Interaction effect is the effect of change in area and productivity together in direction of increase in mustard production. It is clear from the table that this effect is affecting the production of mustard crop at Bharatpur district by -94.26 percent for the whole period of time (1990-91 to 2016-17). Highest interaction effect was 375.44 percent in period first followed by 143.27 percent in period second. In period third it was found to be negative -8.11 percent. This decomposition analysis suggests that productivity was an important factor in overall growth of mustard production followed by interaction effect.

Table 3: Decomposition of Productivity Development of Mustard at Bharatpur District

Time period	Area effect (%)	Productivity effect (%)	Interaction effect (%)
1990-91 to 1999-00	2252.62	-1625.08	375.44
2000-01 to 2009-10	441.50	236.30	143.27
2010-11 to 2016-17	-160.91	1171.70	-8.11
1990-91 to 2016-17	-108.60	1202.94	-94.26

Source: Author's calculation

Conclusion

The study concludes that the performance of growth in respect of area, production and productivity was positive and it was statistically significant also in case of production and productivity for the whole period (1990-91 to 2016-17).

The contribution of productivity on growth rate of mustard was substantial in comparison of area. The interaction of area and productivity has shown negative effect (-94.26%) on the development of mustard production during the corresponding period.

Highest fluctuation has been seen in mustard production followed by productivity and area during the mentioned period.
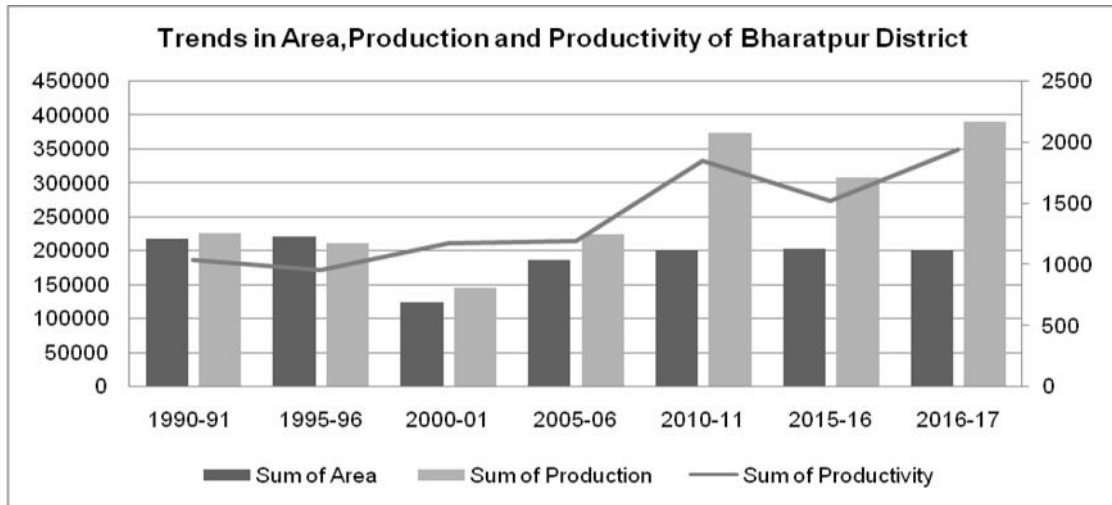
References

- Kumar, Singh, Rathi, Nahatkar, Choudhary and Parey (2019), " Growth and Instability in Area, Production and Productivity of Soybean in India", International Journal of Science, Environment and Technology, vol. 8, No.2, pp 278-288, 2019.
- Madhusudhana (2013), " A survey of Area, Production and Productivity of Groundnut Crop in India", IOSR Journal of Economics and Finance, vol. 1, issue 3, pp 1-07, 2013.
- Reddy and Immanuelraj (2017), "Area, Production and Yield Trends and Patterns of Oilseed Growth in India", Economic Affairs, vol. 62, No.2, pp327-334, 2017.
- Sharma Amod (2018), "Current Trends in Oilsedd Crops Production: An Overview", International Journal of Agriculture Science, vol.10, Issue 3, pp 5104-5114, 2018.
- Shruti, Rao, Devi and Masih, "Analysis of Area, Production and Productivity of Groundnut Crop in Telangana", Agric. Sci. Digest., 37 (2), 151-153, 2017.
- Rajasthan Agricultural Statistics at a Glance for various Years (1990-91 to 2016-17).
- Trends in area, production and productivity under mustard of Bharatpur district for the period 1990-91 to 2016 17.

Time Period	Area	Production	Productivity
1990-91	218399	226704	1038
1995-96	221332	211527	956
2000-01	124648	145965	1171
2005-06	187334	225185	1197
2010-11	202688	374189	1846
2015-16	203222	309039	1521
2016-17	201285	390284	1939

Source: Trends in Rajasthan Agricultural at a Glance for various years.

**Fig. 1 Trends in area, production and productivity under mustard of
Bharatpur district for the period 1990-91 to 2016 -17**

Source: Trends in Rajasthan Agricultural at a Glance for various years..

♦□♦