



REGIONAL GROWTH ANALYSIS OF OILSEED PRODUCTION IN UTTAR PRADESH, INDIA

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Abstract

The study is based on the secondary data of area, production and productivity of major oil seeds grown in four regions different agro economic regions of the state. The compound growth rates based on log linear function were worked out to measure the growth in area, production and productivity of oilseeds during Three Phases of thirty years. The study reveals that 1) The oilseed area and production of all major oilseeds have decreased except mustard. 2) The variability is higher in initial phase as compared to later phase showing more stability in the production of oilseeds. 3) The increase in production was majorly due to increase in area rather than increase in productivity.

Key words : Oilseeds, growth rate, variability, decomposition analysis, future projection, demand and supply.

Introduction

Oilseed crops have traditionally been the backbone of agricultural economy of India. Indian vegetable oil economy is the fourth largest in the world, accounting for about 14.5 per cent of the world's oilseeds area and 6.65 per cent of the production next to U.S.A, China and Brazil. The state of Uttar Pradesh occupies a prominent place in the production of oilseeds in India as the area under these crops is 1.16 million hectares in the country. The state contributed around 3.35 per cent to country's oilseeds production in 2015-16 (Directorate of Economics and Statistics, Department Agriculture and cooperation, 2017).

The important oilseed crops of the Uttar Pradesh state are groundnut, rapeseed (mustard), til and linseed. The growth pattern of these crops in the Uttar Pradesh state has been prone to risk because of the rainfall pattern and limited water-resources. The facilities available in the state are neither equally distributed nor fully dependable. As per demand projection (2017), the per capita consumption of vegetable oils is likely to be at least 16 kg/year. For a projected population of 1276 million,

the total vegetable oils need would be 20.4 million tonnes. If one assumes at least 20% of vegetable oils from crops other than annual oilseeds like rice bran, cotton seed, coconut, tree borne oilseeds, oil palm, etc then the country needs to produce about 54.4 million tonnes by the terminal year of XII plan to achieve near self-reliance in vegetable oils.

Keeping in view the importance of oilseeds crops, a critical examination of growth in area production and productivity of oilseeds would be of paramount importance. Thus, the present investigation was undertaken on Groundnut, Til, Linseed and Rapeseed for different agro- economic regions of the state of Uttar Pradesh, India.

Materials and Methods

All the four agro-economic regions of the present state of Uttar Pradesh *viz.* Western Uttar Pradesh, Central Uttar Pradesh, Eastern Uttar Pradesh and Bundelkhand have been taken into account for purpose of drawing conclusions of the study. A period of thirty years (1981-82 to 2011-12) has been taken into account by dividing it into three phases Phase I (1981-82 to 1990-91), Phase II (1991-92 to 2000-2001) and Phase III (2001-

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02 to 2011-12) keeping in view finding out the growth, variation in area and production with consequent suggestions for remedial measures.

For the present study major oilseed crops of Uttar Pradesh *viz.* Til, Groundnut, linseed and rapeseed have been included. The secondary data have been utilized for arriving at various conclusions of the study. The Phase and region wise data on area, production and productivity of major oilseed crops have been primarily collected from different publications of Directorate of Agriculture Statistics.

Compound growth rate

The compound growth rate technique was used for explaining its growth patterns (Saravanadurai and Kalaivani, 2010).

$$Y = a b^t$$

Where, Y = area, production or yield.

t = time

a = intercept term.

b = 1 + r (constant)

r = compound growth rate

Decomposition analysis

An analysis of growth rate of area, production and productivity of crops indicate the general pattern of growth in production, although this does not evaluate the exact contribution of area and yield to production (Paul *et al.*, 2012).

$$\Delta P = A_0 \Delta Y + Y_0 \Delta A + \Delta A \Delta Y$$

Where,

A_0 & Y_0 = Total area and yield under crops in base period

ΔP & ΔY = Average difference in total production and yield during two periods.

ΔA = Average difference in total area during two periods.

Variability of area, production and productivity

The variability in area, production and productivity of pulses crops of the entire state and across different regions in different phases was worked out by using following technique (Paul *et al.*, 2012).

$$\text{Variability} = C. V. \times \mu 1 - R^2$$

Where,

R^2 is coefficient of multiple determinations.

Results and Discussion

The compound growth rate of mustard area (table 1) in U.P. was found to be negative in phase II while positive in I and III. The growth rate in phases I and II were significant at 1 per cent level of significance. The growth rate was highest 8.417 per cent/ annum in phase III and lowest in phase II *i.e.* 3.096 per cent. The compound growth rate of area under Til cultivation shows the growth rate was positive in all the phases but significant only in phase I and III at 5 and 1 per cent level of significance. For the linseed it was found to be negative during all the phases which vary from 0.143 to 5.036 per cent per annum. In groundnut, it was found to be negative in all the phases of production but it was significant in

Table 1 : Compound growth rate of area of oilseeds in different regions of Uttar Pradesh, India.

PHASES		Regions				State
		Western	Central	Bundelkhand	Eastern	
I	Mustard	0.070**	0.029*	-0.023	0.025**	0.151**
	Til	0.040**	0.135**	-0.016	0.052**	0.040*
	Linseed	-0.120**	0.013	0.015	-0.012	-0.001
	Groundnut	-0.118*	-0.087*	0.205**	-0.062**	0.084*
II	Mustard	-0.060**	0.008	-0.019	0.025**	-0.031**
	Til	-0.052	0.053*	0.012	0.024	0.010
	Linseed	-0.191**	-0.116**	-0.071**	-0.020*	-0.051**
	Groundnut	-0.102*	-0.048**	0.116**	-0.006	-0.005
III	Mustard	0.184	0.814	0.098**	0.041	0.080
	Til	0.035**	0.052**	0.289**	0.030	0.153**
	Linseed	0.296*	-0.143**	-0.013	0.093**	-0.031**
	Groundnut	0.008	-0.001	-0.010	0.000	-0.004

Table 2 : Compound growth rate of production of oilseeds in different regions of Uttar Pradesh, India.

PHASES		Regions				State
		Western	Central	Bundelkhand	Eastern	
I	Mustard	0.118**	0.007*	0.000	0.064*	0.101**
	Til	0.043	0.208**	0.049	0.128*	0.0938*
	Linseed	-0.102	0.031	0.030	0.004	0.016
	Groundnut	-0.10	-0.072	0.224**	-0.031	-0.065
II	Mustard	-0.454	0.013	-0.028	0.031	-0.025
	Til	-0.105*	0.036	0.042	0.039*	-0.001
	Linseed	-0.194**	-0.129**	-0.063	-0.036**	-0.054*
	Groundnut	-0.113*	-0.095	0.114**	-0.010	-0.021
III	Mustard	0.233	0.174	0.111*	0.075	0.120
	Til	0.008	0.036	0.318**	0.040	0.144**
	Linseed	-0.296**	-0.148**	-0.019	-0.004	-0.035
	Groundnut	0.024	0.004	0.018	0.015	0.012

Table 3 : Compound growth rate of productivity of oilseeds in different regions of Uttar Pradesh, India.

PHASES		Regions				State
		Western	Central	Bundelkhand	Eastern	
I	Mustard	0.047*	0.046*	0.023	0.039	0.049*
	Til	-0.002	0.072	0.065	0.076	0.053
	Linseed	0.017	0.018	0.015	0.016	0.017
	Groundnut	0.018	0.015	0.018	0.031	0.018
II	Mustard	0.014	0.005	-0.008	0.006	0.005
	Til	-0.052	-0.017	0.030	0.015	-0.012
	Linseed	-0.002	-0.012	0.007	-0.015	-0.002
	Groundnut	-0.011	-0.046	-0.002	-0.004	-0.015
III	Mustard	0.049	0.032	0.013	0.034	0.039
	Til	-0.027	-0.016	0.029	0.010	-0.008
	Linseed	0.000	-0.004	-0.006	-0.004	0.004
	Groundnut	0.015	0.006	0.029	0.015	0.016

phase I only. The maximum compound growth rate was 8.129 per cent per annum in phase I and minimum in phase III *i.e.* 0.431 per cent per annum.

Table 2 reveals the compound growth rate of mustard/rapeseed production in U.P. was observed to be negative in phase II and significant in phase I. Maximum growth rate was 12.82 per cent per annum in phase III and minimum in phase II *i.e.* 2.521 per cent per annum. The compound growth rate of production of Til shows positive and significant growth rate in production during phase I and III but negative in II phase. The growth rate of the state as a whole varies from 0.177 to 15.51 per

cent per annum due to the impact of Technology Mission on Oilseeds (TMO). For linseed, it was observed to be positive in phase I and negative during the second and third phases. growth rate was negative in phase I and II, the growth rate was highest 6.37 per cent per annum in phase I and minimum 1.215 per cent per annum in phase III for groundnut.

The growth rate of productivity (table 3) of mustard in UP as a whole was found to be positive during all the phases of production. Significant growth rate was only during phase I. The compound growth rate of til was positive and non significant in the phase I, while it was

Table 4 : Variability of area, production and productivity of oilseeds in different zones of Uttar Pradesh (Percentage).

Character	Phases	Regions				State
		Western	Central	Bundelkhand	Eastern	
Area	I	12.01	13.19	14.68	4.48	8.80
	II	10.05	5.09	15.19	2.45	7.70
	III	6.89	4.58	20.13	2.04	5.55
Production	I	21.09	23.78	16.54	11.8	18.65
	II	19.45	35.27	23.34	8.39	17.31
	III	8.73	8.48	25.28	8.33	7.91
Productivity	I	12.25	14.84	4.793	10	11.55
	II	15.99	35.83	10.03	8.2	14.41
	III	4.58	6.35	27.56	8.05	7.51

Table 5 : Decomposition Analysis of total oilseed production with respect to area, yield and interaction effect in different zones of Uttar Pradesh. (in percentage).

Regions	Effects	Phase I	Phase II	Phase III
Western	Area	113.1	-358.3	11.43
	Yield	150.7	70.36	58.58
	Interaction	30.31	-69.48	1.473
	Increase (+)/decrease(-)	+	-	+
Central	Area	3.20	-5.37	20.44
	Yield	-6.61	-1.65	-10.80
	Interaction	-0.13	0.05	-1.21
	Increase (+)/decrease(-)	-	-	+
Bundelkhand	Area	24.96	12.81	91.91
	Yield	21.00	11.52	-49.52
	Interaction	8.72	1.84	-30.23
	Increase (+)/decrease(-)	+	+	+
Eastern	Area	2.49	11.23	-8.21
	Yield	8.54	-3.00	18.88
	Interaction	0.31	-0.33	-1.52
	Increase (+)/decrease(-)	+	+	+
Uttar Pradesh	Area	142.00	-236.77	191.13
	Yield	163.56	31.69	-34.31
	Interaction	27.41	-10.56	-7.37
	Increase (+)/decrease(-)	+	-	+

negative during the second and third phases. The maximum compound growth rate was estimated to be 5.445 per cent in Phase I and minimum in Phase III *i.e.* 0.88 per cent per annum. The growth rate of linseed was positive in the phase I only and non significant in all the

phases. The maximum linear growth rate was 1.804 per cent per annum in phase I and minimum in phase II *i.e.* -0.439 per cent per annum. The growth rate of groundnut was negative in phase II and positive in other phases, growth variation was found to be 1.915 per cent in phase

I and minimum in phase II 1.556 per cent per annum.

Variability in area, production and productivity in total oilseeds is given in table 3. It reveals that the variability in area of total oilseeds in the state as a whole was 8.80, 7.70 and 5.55 percent in first, second and third phase of production, respectively. The variability within the region was the highest 8.61 percent in central region while least 2.24 percent in the eastern region. Variability in the production of oilseeds was found to be decreasing in Bundelkhand region eastern region and in the state as a whole. Yield variability trends were found similar as production among the regions. The highest yield variation in the state was observed in second phase of production while lowest in the third phase.

The result of decomposition analysis of total oilseeds production are showed in table 4, shows that in phase first, contribution of area in change of production was found positive in all regions and state as a whole. The contribution of yield and interaction in change of production was found positive in western, Bundelkhand, eastern regions and state as a whole. The interaction effects of area and yield was found to be negative in Western and Eastern region and in the state as a whole,

while it was positive in Central and Bundelkhand region. (45.52%). In Western and Eastern region effect of yield was found positive. Overall effect of yield on production of oilseeds in UP was observed to be negative (34.31 percent). The interaction effects in Western region was found positive *i.e.* 1.47 percent

Conclusion

The present study indicated that in Uttar Pradesh, the mustard holds good performances in compared to other oilseed crops. The compound growth rate reveals that the mustard was found to be positive and recorded a highest growth rate among other oilseed crops in terms of area of cultivation, production and yield in Uttar Pradesh over the study period.

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