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Comparative analysis of trend and growth projections in area, production and productivity of oilseeds and pulses in India

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ABSTRACT: Indian agriculture has made good progress, especially in the case of wheat and rice in irrigated areas. However, performance has not been so good in terms of oilseeds and pulses. Therefore, to achieve self-sufficiency, a focus needs to be placed on crop groups like oilseeds and pulses other than cereals. The present study, therefore, focuses on the scenario of oilseeds and pulses in India, as well as their trend and growth in terms of area, production and productivity over the years. The time series data on the area, production and productivity of total oilseeds and pulses grown in the country was collected from secondary sources like the Department of Agriculture, Directorate of Economics and Statistics, website of India stat, etc. The time period for the present study was taken from 1970-71 to 2022-23. The time period was further divided into four parts viz., 1970-71 to 1987-88, 1988-89 to 2005-06, 2006-07 to 2022-23 and the overall time period from 1970-71 to 2022-23. To examine the temporal performance of oilseed and pulses in the country in terms of area, production and productivity, the compound annual growth rate was estimated using the exponential growth function.

Key words: Compound annual growth rate, exponential growth, growth, oilseeds, pulses

Agriculture plays an important role in a country like India, contributing around 15 percent to its GDP. Though the share has declined from 35 per cent in 1990-91 to 15 per cent in 2022-23, still agriculture remains the critical sector as it fulfils the essential requirement of food to live. Agriculture constitutes a variety of crops based on their use, parts used, harvested plant parts, etc. The crop groups include cereals, pulses, oilseeds, fibre crops, tuber crops, etc. The crop groups not only provide nutrition to the human population but also support the security of food, the economic livelihood of the population and agriculture sustainability. Indian agriculture has made good progress, especially in the case of wheat and rice in irrigated areas. However, performance has not been so good in terms of oilseeds and pulses (Kalra and Srivastava, 2022). Therefore, to achieve self-sufficiency, a focus needs to be placed on crop groups like oilseeds and pulses other than cereals. Oilseeds are considered as an important source of cash crops. They are the plant groups that are used for the production of edible oils.

Oilseeds are divided into nine oilseed crops viz.,

groundnut, soybean, sunflower, rapeseed mustard, sesame, linseed, castor, safflower and niger. The Oilseed sector has grown eminently in the last three decades to the tune of 4.1 per cent per annum (Gulati, 2023). According to Paroda, 2023, despite being the largest area in oilseed production among the other countries in the world, India currently imports 50 per cent of the total requirements of the oil at the massive cost of 56, 000 crore rupees (2011-12). Similarly, Pulses are the crop groups that are the sources of proteins and fibres. The important pulses grown in the country are lentils, pigeon peas, mung beans, black gram, kidney beans, chickpeas, etc. Proteins are considered a staple food in the Indian diet as they are a good source of proteins, amino acids, minerals, fibre, etc, making the diet a healthy and balanced one. During the time of the green revolution, technologies were made in favour of wheat and rice (Chand *et al.*, 2010) and the pulses were ignored entirely or shifted to marginal or semi-marginal lands for cultivation (Singh and Usmani, 2024). In the future, seeing the importance of pulses and the efforts of the government in the field of research and development, interventions for

technologies such as draught-tolerant varieties will be introduced (Chauhan *et al.*, 2016). The present study, therefore, focuses on the scenario of oilseeds and pulses in India, as well as their trend and growth in terms of area, production and productivity over the years.

MATERIALS AND METHODS

Methodology

The time series data on the area, production and productivity of total oilseeds and pulses grown in the country was collected from secondary sources like the Department of Agriculture, Directorate of Economics and Statistics, website of India stat, etc. The time period for the present study was taken from 1970-71 to 2022-23. The time period was further divided into four parts *viz.* 1970-71 to 1987-88, 1988-89 to 2005-06, 2006-07 to 2022-23 and the overall time period from 1970-71 to 2022-23. To examine the temporal performance of oilseed and pulses in the country in terms of area, production and productivity, the compound annual growth rate (Kalra and Srivastava, 2023) has been estimated using exponential growth function in the following form:

$$Y_t = ae^{bt}$$

Where Y_t is the value of the variable, that is, area, production and productivity of oilseeds and pulses, a is the coefficient and b is the trend coefficient. The log transformation in the given function is as follows:

$$\text{Log } Y_t = \text{Log } a + bt$$

The compound annual growth rate (CAGR) is worked out as:

$$\text{CAGR in percentage} = [(\text{Antilog } b) - 1] * 100$$

Detailed methodology must be viewed from (Chadha and Srivastava, 2020; Kalra and Srivastava, 2022; Wahid and Srivastava, 2023).

RESULTS AND DISCUSSION

Performance of oilseed area, production and productivity in India

The compound annual growth rate in the area, as well as the production and productivity of oilseeds, is presented in Table 1. The table reveals that oilseeds have shown positive and significant growth in the first period (1970-71 to 1987-88) with a value of 1.11 per cent, whereas the second and third periods (1988-89 to 2005-06) and (2006-07 to 2022-23) respectively, have shown less growth to the tune of 0.23 and 0.35 per cent respectively, but the growth was statistically insignificant. With respect to production, significant and positive growth was recorded during all the study years, with a maximum growth of 2.31 percent in the first period. Over the years, the growth in production decreased but was positive. Productivity has shown a positive growth rate over the years, though it was not significant in the first and second time period. From 2006-07 to 2022-23 the growth in productivity was observed positive (1.81) and significant at 5 per cent level of significance. The trend in the area, production and

Table 1: Compound annual growth rate of oilseeds in India

Time period	Area		Production		Productivity	
	CAGR	R ²	CAGR	R ²	CAGR	R ²
1970-71 to 1987-88 (1 st period)	1.11	0.78*	2.31	0.56*	1.18	0.34
1988-89 to 2005-06(2 nd period)	0.23	0.02	1.41	0.23*	1.18	0.32
2006-07 to 2022-23(3 rd period)	0.35	0.10	2.17	0.56*	1.81	0.59*
1970-71 to 2022-23(Total period)	1.13	0.78*	3.08	0.95*	1.92	0.91*

Table 2: Compound annual growth rate of pulses

Time period	Area		Production		Productivity	
	CAGR	R ²	CAGR	R ²	CAGR	R ²
1970-71 to 1987-88 (1 st period)	0.17	0.05	0.66	0.10	0.54	0.11
1988-89 to 2005-06(2 nd period)	-0.38	0.18	-0.18	0.01	0.25	0.05
2006-07 to 2022-23(3 rd period)	1.93	0.74*	4.26	0.85*	2.35	0.81*
1970-71 to 2022-23(Total period))	0.36	0.34*	1.50	0.71*	1.14	0.82*

productivity of oilseeds over the years in India is graphically shown in Figure 1, which shows that there is an exponential increase in the area of oilseeds grown in the country, while the productivity is increased constantly and linearly.

Performance of pulses area, production and productivity in India

As shown in Table 2, negative growth in the area during the second time period was observed with a value of 0.38 per cent but was statistically insignificant. For the overall time period, the area

showed a positive and significant growth with a value of 0.36 percent. It can be concluded that from 1970-71 to 2022-23, there was increase in the growth of pulses area. Similarly, the production and productivity of pulses increased significantly at 5 per cent level of significance to the tune of 1.50 per cent and 1.14 per cent, respectively. The trend in the three parameters of pulses viz., area, production and productivity are shown in figure 2, which shows that over the years, the absolute area, production and productivity of pulses over the study period increased in a linear fashion

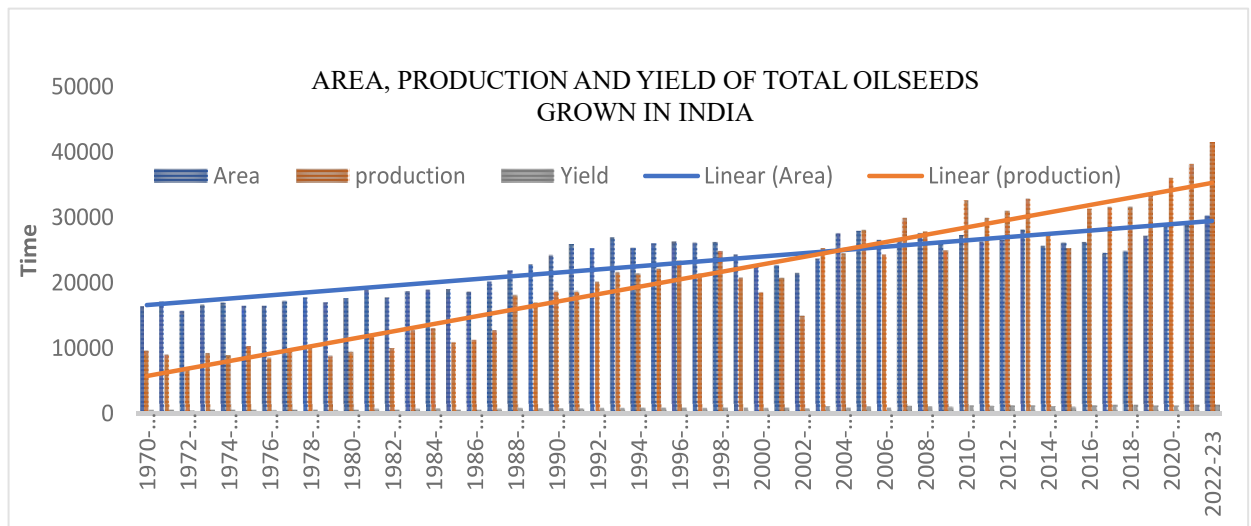


Fig 1: Trend in area, production and productivity of oilseeds in India

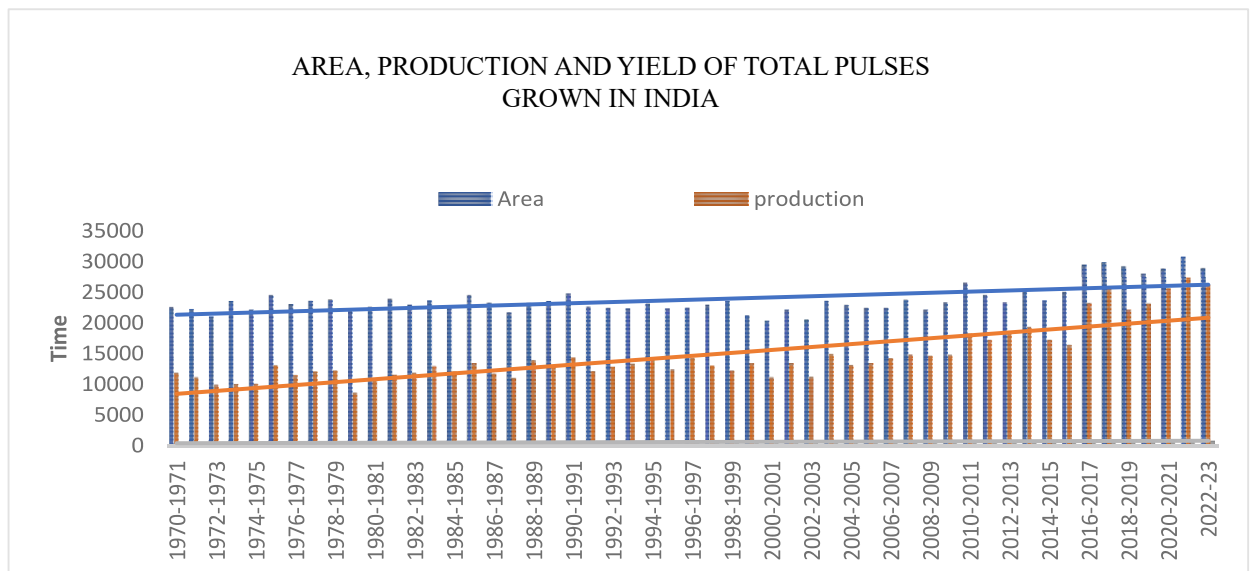


Fig 2: Trend in area, production and productivity of pulses in India

CONCLUSION

The present study has shown that the area of oilseeds has grown linearly and significantly with a growth rate of 1.13 per cent at a 5 per cent level of significance during the study period, while the production has increased with a growth rate of 3.08 per cent. The increase in production (3.08%) was greater than the area (1.13%) and productivity (1.92%). The study has further shown that area, production and productivity of pulses has also increased to the tune of 0.36, 1.50 and 1.14 per cent, respectively. Oilseeds and pulses have a growing demand in both domestic and international markets, providing farmers with a lucrative source of income. By diversifying their crops to include oilseeds and pulses, farmers can reduce their dependence on a single crop, spread risk and increase their overall profitability.

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