

Decomposition Analysis of Growth of the Major Oilseed Crops in India

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ABSTRACT

The present study seeks to decompose the growth of major oilseed crops in India. The study is pertained to the whole of the India and covers the period ranging from 1993-94 to 2022-23. Major oilseed crops like groundnut, rapeseed and soyabean have been selected for the present study. The data have been collected from Handbook of Statistics on Indian Economy published by RBI. The data have been compiled and analysed for the study period from 1993-94 to 2022-23 and also, the entire study period has been divided into three decades to extract the results. The decomposition analysis of growth suggests yield effect proved instrumental in the growth of groundnut production in India while area was most powerful factor in the growth of rapeseed in India. Regarding contribution of area and yield in the production of soyabean, area under soybean production in India played a major role in growth of soybean during second and overall period of the study. Yield effect also found to be positive and played important role for increasing soyabean production in the country during first and third periods of the study.

Keywords: Oilseeds, Agriculture, Yield, effect, decomposition analysis.

Introduction

An economy's ability to grow depends heavily on the expansion of agriculture. It is imperative, according to certain scholars, to sustainably grow agriculture, irrespective of the rate at which the non-agricultural sector expands. The majority of economists concur that the expansion of the agricultural sector is both a necessary and a prerequisite for the expansion of the rest of the economy. A significant portion of the Indian population makes their livelihood in the agriculture sector, which has historically been the main driver of the economy in that nation. Thus, the country's overall development is depended on the expansion and development of the agriculture sector. A forward-thinking agriculture industry acts as a catalyst for economic growth. Our nation's agriculture industry was not developed, was backward, and was essentially traditional at the time of independence. However, several successful tactics have been implemented since independence to guarantee improved

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outcomes with relation to the growth of this industry. In order to boost output and productivity in this industry, modern inputs were used. It was the nation's increased production of foodgrain and non-foodgrain crops in India. The adoption of modern technology and other farm-related incentives was the overall process that brought about significant changes in the agricultural sector's output. The goal of the current study is to gain an understanding the sources of the growth of oilseeds crops in India.

Methodology

This study pertains to the whole of the country India and covers the period ranging from 1993-94 to 2022-23. Major oilseeds crop like groundnut, rapeseed and soyabean have been selected for the present study.

Selection of Period

The data have been compiled and analyzed for the study period from 1993-94 to 2022-23 and also, the entire study period has been divided into three decades to extract the results.

Period I: 1993-94 to 2002--03

Period II: 2003-04 to 2012-13

Period II: 2013-14 to 2022-23

Sources of Data

The time series data on area and yield of major selected oilseeds crops were collected from Handbook of Statistics on Indian Economy published by Reserve Bank of India.

Decomposition analysis

To measure the relative contribution of area, yield to the total output change in the major oilseeds crops in India, the decomposition method developed by Sharma and Subramanyam (1984) were used.

$$P = \frac{\Delta A_0}{\Delta P} \frac{\Delta Y}{Y_0} \times 100 + \frac{Y_0}{\Delta P} \frac{\Delta A}{A} \times 100 + \frac{\Delta Y}{\Delta P} \frac{\Delta A}{A} \times 100$$

Po = Ao x Yo and

A_0 , P_0 and Y_0 , are area, production and yield in base year respectively

$$P_n = A_n \times Y_n$$

A_n , P_n and Y_n are area, production and yield in n^{th} year respectively

$$P_n - P_0 = \Delta P$$

$$A_n - A_0 = \Delta A$$

$$Y_n - Y_0 = \Delta Y$$

Where, A_0 and A_n represent the area and Y_0 and Y_n represents the yield in the base year and n^{th} year.

Results and Discussion

The decomposition of area effect, yield effect and the interaction effect isolates the sources of growth in output and reveal the strength of forces behind the observed changes in production growth. The source of production growth was partitioned to area, yield and interaction effects, examined individually three sub-periods (sub-period I and sub-period II and sub-period-III) and the overall study period. The furnished results related to the contribution of area, yield and interaction effect in to the incremental production of various oilseeds crops are presented through following heads:

Decomposition of Growth in Groundnut production

Regarding decomposition of growth of groundnut production, it was found that yield effect played major role in increasing the production of groundnut in India as it was remained positive throughout the entire study period. During first period of the study, the yield effect was observed as 55.44 which increased to 63.18 per cent during second period of the study. As far as third period of the study is taken into consideration, it was recorded as 281.40 per cent while it remained as 376.40 per cent during overall study period. It is also worth mentioning here that area effect remained negative during third and overall study periods of the study. Interaction effect also played negatively in the increasing production of groundnut.

Table 1
Decomposition of Growth in Groundnut production

Periods/Effects	Area Effect	Yield Effect	Interaction Effect
First Sub-Study Period	60.42	55.44	-15.86
Second Sub-Study Period	50.21	63.18	-13.40
Third Sub-Study Period	-155.86	281.40	-25.53
Overall Sub-Study Period	-126.80	376.64	-149.84

Decomposition of Growth in Rapeseed production

A quantitative assessment of contribution of the various factors into the growth of rapeseed is reflected through the figures presented in table 2. During first period of the study, the area effect was recorded as 102.19 percent while it was found as 62.20 percent during second period of the study. During third period of the study, it was registered as 55.39 per cent while during overall study period the contribution of area remained as 29.75 to the increasing production of rapeseed.

Regarding yield effect, it was recorded in negative terms as -3.04 per cent contribution was made by yield during first period of the study. As far as yield effect during second and third periods is taken into consideration, it was found as 32.27 per cent and 33.67 per cent respectively. The contribution of yield to the incremental production of rapeseed was remained as 50.15 per cent during the overall study period. Effects of interaction between area and yield was also witnessed positive throughout the study period.

Table 2
Decomposition of Growth in Rapeseed production

Periods/Effects	Area Effect	Yield Effect	Interaction Effect
First Sub-Study Period	102.19	-3.04	0.84
Second Sub-Study Period	62.20	32.27	5.53
Third Sub-Study Period	55.39	33.67	10.94
Overall Sub-Study Period	29.75	50.15	20.09

Decomposition of Growth in Soyabean production

The results of decomposition scheme were worked for soyabean crop in India. It is revealed from the figures presented in table 3 that the area under soybean production in India played a major role in growth of soybean production during second and overall study period of the study. However, it became negative during first period of the study. Yield effect also found to be significant and played important role for increasing soyabean production in the country during first and third periods of the study. The effect of interaction between area and yield also remained positive throughout the study.

Table 3
Decomposition of Growth in Soyabean production

Periods/Effects	Area Effect	Yield Effect	Interaction Effect
First Sub-Study Period	-2099.60	1573.20	626.40
Second Sub-Study Period	74.64	15.34	10.01
Third Sub-Study Period	43.82	50.37	5.80
Overall Sub-Study Period	92.34	2.56	5.10

Decomposition of Growth in Total Oilseed production

To determine how contribution of area, yield and their interaction are responsible for the growth of total oilseeds production in India, the furnished results are presented through table 4. During first period of the study, major role was emerged from the area followed by yield effect. The interaction effect of them remained negative during the period under consideration. During second period of the study, the results related to decomposition shows that area was remained most powerful factor to increase the production of oilseeds in India. However ever, it does not hold true for the third and overall period of the study as during these periods yield was proved itself the most powerful factor in relation to increasing production of oilseeds in India. Interaction effect found last position regarding its contribution into the incremental production of oilseeds in India.

Table 4
Decomposition of Growth in Total Oilseed production

Periods/Effects	Area Effect	Yield Effect	Interaction Effect
First Sub-Study Period	65.06	43.73	-8.79
Second Sub-Study Period	52.14	42.76	5.10
Third Sub-Study Period	29.17	65.98	4.85
Overall Sub-Study Period	13.14	77.60	9.26

Conclusion

It was concluded on the basis of the above discussion that yield effect played major role in increasing the production of groundnut in India as it was remained positive throughout the entire study period. It was also revealed that area effect remained negative during third and overall study periods of the study. Regarding a quantitative assessment of contribution of the various factors into the growth of rapeseed it was reflected that area played very significant role in increasing the production of rapeseed. However, the contribution of yield to the incremental production of rapeseed was remained as 50.15 per cent during the overall study period. Effect of interaction between area and yield was also found positive throughout

the study period. Regarding contribution of area and yield in the production of soyabean, area under soybean production in India played a major role in growth of soybean production during second and overall study period of the study. Yield effect also found to be positive and played important role for increasing soyabean production in the country during first and third periods of the study. As far as decomposition analysis is related to total production of oilseeds, it was found that area remained most powerful factor during first and second periods while during third and overall periods of the study, yield proved itself the most powerful factor in relation to increasing production of oilseeds in India. Interaction effect found last position regarding its contribution into the incremental production of oilseeds in India.

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