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Methodological approaches for delineating the sources of Agricultural growth

Pavithra K.N[1]., Shannon N Sangma[2], Niranjan Kumar[3]

[1] Scientist- Agricultural Economics, ICAR-IARI Jharkhand- Gouria Karma, Hazaribagh-825405

[2&3] Scientist-Agricultural Chemicals, ICAR-IARI Jharkhand-Gouria Karma, Hazaribagh-825405

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Abstract

In India, agriculture remains a cornerstone of the economy, providing livelihood for over half the population and ensuring national food security, despite a notable structural shift towards industry and services. Technological advancements, such as the Green Revolution, alongside policy support and infrastructure investments, have boosted agricultural productivity. However, the sector's share of GDP has decreased from 33 per cent in the 1980s to 18 per cent in 2023. This study delves into various decomposition models to analyze agricultural growth, including methodologies developed by Minhas and Vaidyanathan, Hazell, Bisaliah and Total Factor Productivity (TFP). These models help identify key growth factors and productivity sources, offering insights into agricultural performance and guiding policies for sectoral development.

Introduction

In India, agriculture remains critically important, providing livelihoods for over half of the population and ensuring national food security. The Green Revolution and subsequent technological advancements have significantly increased agricultural production, driven by innovations in technology, fertilizer use, infrastructure investment, institutional development, and supportive price policies. Recently, the expansion of irrigated areas has contributed about one-third of crop output growth, with the rest attributed to yield improvements and a shift towards high-value commodities (Rada and Schimmelpfennig, 2016). Despite a notable structural shift over the past two decades towards non-agricultural sectors, with agriculture's share of GDP decreasing from 33% in the 1980s to 15% in 2023 (PIB, 2023), the sector remains vital for food security, employment, and poverty reduction. Its performance continues to be crucial for addressing poverty and boosting employment opportunities (Kiran, 2007).

Delineation of agricultural growth into various components is crucial, as it aids in projecting outputs under different targets and policies and in identifying and addressing

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bottlenecks for the swift development of the agriculture sector. India exhibits considerable diversity in crop composition and performance across different regions (Joshi et al., 2006). To identify sources of growth, several popular methodologies are widely adopted, including the Minhas and Vaidyanathan method, Hazell's decomposition model, Bisalaiah's decomposition model, and Total Factor Productivity.

Minhas and Vaidyanathan (1965) first introduced the decomposition method to analyze agricultural performance. They estimated changes in the value of agricultural output by isolating changes in four major factors: area, yield, cropping pattern, and the interactions among these factors, using an additive method. This approach was later expanded to include seven factors: area, yield, cropping pattern, area-yield interaction, area-cropping pattern interaction, yield-cropping pattern interaction, and an overall interaction term (Pattnaik and Amitashah, 2015).

Peter B. R. Hazell developed a decomposition model in 1982 to analyze the instability in Indian cereal production. This model remains one of the most commonly used decomposition methods. It measures the sources of instability by examining changes in average production and production variance, which are then broken down into several components. This model is primarily applied to time series data.

Professor Bisaliah's output decomposition model, developed in 1977, investigates the various sources of productivity differences between potential farm outputs and actual farmer field outputs. For any production function, total productivity changes can result from alterations in the parameters defining the production process and changes in input usage. Production functions serve as convenient econometric models for decomposing productivity differences, and this approach was used to analyze the growth in agricultural output.

Total Factor Productivity (TFP), introduced by Robert Solow in 1957, measures economic growth by accounting for technological progress and efficiency improvements beyond input usage. Empirical research offers a wide range of methodologies for analyzing and estimating TFP. Some researchers categorize these methods into "parametric, accounting, and non-parametric methods" (Kumar and Mittal, 2006). The growth accounting approach, along with the production function approach for aggregating conventional agricultural inputs such as land, labor, and capital, is widely used to measure TFP (Shanmugan and Prakash, 2018).

Conclusion

The examination of decomposition methodologies reveals critical insights into the factors driving agricultural growth in India. Despite a declining share in GDP, agriculture's role in food security, employment, and poverty reduction underscores its strategic importance. The models by Minhas and Vaidyanathan, Hazell, Bisaliah and TFP provide robust frameworks for

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analyzing productivity and output variations. Understanding these dynamics is essential for policymakers to address bottlenecks and implement effective strategies for agricultural development, ensuring sustained growth and stability in the sector amidst ongoing economic transformations.

REFERENCES:

Bisalaiah, S., 1977, Decomposition analysis of output change under new production technology in wheat farming: Some implications to returns on research investment. *Indian J. Agric. Sci*., **32** (3): 193-201.

Hazell, P. B. R., 1982, Report of International Food Policy Research Institute. IFPRI, Washington, D. C., pp :9-44.

Itishree Pattnaik and Amitashah, 2015, Trends and decomposition of agricultural growth and crop output in Gujarat: Recent evidence. *Indian J. of Agri. Econ., **70** (2):182-197.*

Kiran Kumar Kakarlapudi, 2007, Decomposition analysis of agricultural growth: A review of measurement issues. *MPRA Paper No. 35873.* (https://mpra.ub.uni-muenchen.de/35873/).

Contribution of Agricultural Sector in GDP-PIB. (https://www.pib.gov.in/PressReleasePage.aspx?PRID=1909213).

Shanmugan k and Prakash B.B., 2018. Total Factor Productivity in Indian Agriculture. *Indian Journal of Agricultural Economics*., **63** (4):501-514.

Kumar, P. and S. Mittal (2006), "Agricultural Productivity Trends in India: Sustainability Issues", Agricultural Economics Research Review, 19: 71-88.

Joshi, P.k., Birthal P S. and Minot N. 2006.Sources of Agricultural Growth in India. MTID Discussion Paper No. 98.International Food Policy Research Institute.(file:///C:/Users/ICAR/Downloads/mtidp98.pdf).

Rada N and Schimmelpfennig D., 2015. India's Agricultural Growth Propellers. USDA, Economic Research Service(https://www.ers.usda.gov/amber-waves/2016/april/india-s-agricultural-growthpropellers/#:~:text=An%20analysis%20of%20growth%20in,to%20meet%20high%20consumer%20demand).

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