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Article

Decomposition of Productivity Growth in Sri Lanka's Paddy Sector: Roles of Area Expansion and Chemical Fertilizer Use

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Abstract

Following the policy directive on the ban on imports of chemical fertilizers and pesticides, we decomposed productivity growth in the paddy sector focusing on roles of area expansion and chemical fertilizer use. We examined fertilizer usage in the paddy sector under alternative policy regimes, estimated the elasticities of paddy output with respect to fertilizer application and land under cultivation, and computed total factor productivity of paddy in Sri Lanka creating a basis for evaluating outcomes under non-use of chemical fertilizers. Time series data for the period 1960-2020 extracted from the publications of the Department of Census and Statistics, Central Bank of Sri Lanka and Ministry of Finance of Sri Lanka were used for the analysis. Notwithstanding a secular increase in paddy output and average yield during 1960-2020, the fertilizer usage per unit area started to taper off over the last two decades. The production function estimated using Autoregressive Distributed Lag - Error Correction Model (ARDL-ECM) revealed elasticities of paddy output with respect to harvested area and fertilizer application as 0.41 and 0.23 respectively. The average contributions of area expansion and fertilizer application to output growth were 18% and 35% respectively, suggesting that the contribution of total factor productivity to output growth was 47% during the period 1962-2020. A secular increase in contribution of total factor productivity to output growth has been observed. The contribution of fertilizer to the output has always been positive though it was more pronounced during the early years. The results underline the positive and significant roles played by the chemical fertilizers positing the possible effects under their restrained use.

Keywords:

ARDL-ECM, fertilizer, paddy, production function, total factor productivity growth