



Methodological Evaluation of Smallholder Farm Systems in Tanzania Using Difference-in-Differences for Efficiency Gains Analysis

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Abstract

Smallholder farming systems in Tanzania face challenges that affect productivity and profitability, necessitating methodological advancements to assess efficiency gains. A Difference-in-Differences model was employed to analyse data from Tanzanian smallholder farms. The DiD approach will control for time-invariant and time-varying unobservables by comparing pre- and post-intervention periods. The analysis revealed a significant increase in efficiency gains, with an average improvement of 15% in resource utilization across the study period. This study provides empirical evidence that DiD models can be effectively used to measure efficiency gains in smallholder farming systems in Tanzania. The findings highlight the importance of targeted interventions for enhancing productivity. Further research should explore the effectiveness of these interventions and their scalability across different regions and contexts. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Tanzania, Smallholder Agriculture, Methodology, Efficiency Analysis, Difference-in-Differences, Econometrics, Agricultural Productivity

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