



Methodological Evaluation of Clinical Outcomes in Smallholder Farming Systems Using Difference-in-Differences Models in Tanzania

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Abstract

Clinical outcomes in smallholder farming systems are critical for understanding their productivity and health impacts. In Tanzania, these outcomes have been studied through observational methods but require more rigorous analysis to assess the effectiveness of interventions. The study employs a DiD approach with pre- and post-intervention data from randomly selected control and treatment groups within Tanzanian smallholder farming communities. The analysis accounts for potential confounders using robust standard errors to ensure internal validity. The DiD model revealed a statistically significant improvement in health indicators among the treated farms compared to controls, with an estimated effect size of -0.5 units on a standardised scale. This study provides evidence for the efficacy of certain interventions in improving clinical outcomes in smallholder farming communities, contributing to more targeted and effective public health strategies. Future research could explore longer-term impacts and broader geographical scales while considering additional contextual factors that influence farm productivity and health. The empirical specification follows $Y = \beta_{0+\beta} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, African, SpatialStatistics, CohortAnalysis, TreatmentEffectEstimation, Difference-In-Differences, MixedEffectsModels*

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