



Replication Field Trial on Smallholder Farms Efficiency in Tanzania: A Methodological Evaluation

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Author notes

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Abstract

This study builds upon existing research on smallholder farms in Tanzania by employing a randomized field trial to evaluate efficiency gains. A randomized field trial was conducted among a sample of smallholder farms across Tanzania. Data collection included input-output ratios, labour productivity, and yield measurements. Statistical analysis employed a linear regression model to estimate efficiency gains. Randomization resulted in statistically significant differences ($p < 0.05$) in efficiency measures between treatment and control groups, indicating the efficacy of our replication methodology. The randomized field trial demonstrated that certain interventions significantly improved smallholder farm efficiencies, supporting the robustness of our methodological approach. Future studies should consider expanding the sample size for greater generalizability and incorporating additional variables to refine efficiency models. smallholder farms, Tanzania, randomized trials, computer science, efficiency gains Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda |Vert\theta|_r Vert 2^2$, with performance evaluated using out-of-sample error.

Keywords: Tanzania, Geographic Information Systems, Sampling Theory, Experimental Design, Econometrics, Agricultural Efficiency, Randomization Technique

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