African Aquatic Veterinary Sciences

Methodological Foundations for Evaluating Smallholder Farm Systems Efficiency in Kenya: A Randomized Field Trial Approach

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Abstract

Smallholder farming systems in Kenya are characterized by high variability and resource constraints, necessitating methodological approaches to evaluate their efficiency accurately. A mixed-method approach combining econometric analysis with spatial data modelling will be employed. The Randomized Field Trial (RFT) design will ensure unbiased comparisons between treatment and control groups, incorporating robust standard errors to quantify uncertainty in estimates. This study provides a structured methodological framework for future evaluations of smallholder farm systems efficiency, contributing to evidence-based agricultural policy and practice in Kenya. Future research should expand the current RFT design by incorporating more diverse farming practices and exploring interactions between different interventions. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agroecology, resource management, stochastic frontier analysis, experimental design, econometrics, productivity measurement, randomized controlled trials*

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