African Urban Geography (Geography/Social/Planning)

Methodological Assessment of Smallholder Farm Systems in Kenya Through Randomized Field Trials for Yield Improvement

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Abstract

Smallholder farming in Kenya faces challenges to yield improvement due to resource constraints, climate variability, and lack of access to modern technologies. Randomized controlled trial designs were employed with a sample size of 120 smallholder farmers across diverse agroecological zones. Data collection included pre- and post-intervention yield measurements, soil fertility assessments, and farmer perceptions surveys. A statistically significant increase in maize yields was observed from 2.5 to 3.5 tonnes per hectare with a confidence interval of ±0.2 tonnes (t-test p-value < 0.01). The randomized field trials demonstrated effective yield improvement strategies for smallholder farmers, particularly in enhancing soil health through integrated nutrient management. Scaling up these interventions requires collaboration with local extension services and government agencies to ensure sustainable implementation across Kenya's varied landscapes. Randomized controlled trial, Smallholder farming, Yield improvement, Soil health, Maize The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Kenya, Smallholder Farms, Randomized Trials, Methodology, Yield Analysis, Resource Constraints, Climate Change Adaptation*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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