



Methodological Evaluation of Smallholder Farms Systems in Nigeria: A Randomized Field Trial for Measuring Cost-Effectiveness

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Abstract

Smallholder farms in Nigeria face significant challenges in adopting innovative agricultural technologies due to limited resources and uncertain return on investment. A systematic review of published studies and grey literature focusing on randomized controlled trials (RCTs) conducted in Nigeria. Studies were selected based on relevance to smallholder farming systems and adherence to RCT principles. One study demonstrated a $Y = -5X + 100$ cost-effectiveness ratio, indicating that for every X dollar increase in input costs, output increased by Y dollars. This finding suggests potential savings if inputs are optimised. The reviewed studies highlight the importance of RCTs in demonstrating cost-effectiveness but also reveal inconsistencies in implementation and data collection methods across trials. Standardization of RCT methodologies is recommended to ensure comparability and credibility of results. Further research should focus on long-term sustainability and farmer adoption rates.

Keywords: *African agriculture, randomized controlled trials, smallholder farming, cost-benefit analysis, econometric methods, resource allocation models, geographic information systems*

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