



# Methodological Assessment of Smallholder Farms Systems in Uganda Using Multilevel Regression Analysis to Measure Yield Improvement

Kizza Musoke<sup>1</sup>

<sup>1</sup> Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit

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**Correspondence:** [kmusoke@outlook.com](mailto:kmusoke@outlook.com)

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## Author notes

*Kizza Musoke is affiliated with Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit and focuses on Environmental Science research in Africa.*

## Abstract

This review examines methodological approaches used in studies assessing yield improvement among smallholder farms in Uganda over a specific period. A systematic literature review was conducted using databases such as Scopus and Web of Science. The methodology assessment included critiquing study designs, data collection methods, and analytical techniques used. Multilevel regression analysis showed a significant improvement in yield by 15% (95% CI: 8-23%) when accounting for farm-level and village-level factors. The review highlights the importance of multilevel regression analysis for accurately measuring yield improvements among smallholder farms, particularly in Uganda's context. Future studies should incorporate both farm and community level data to enhance the robustness of yield improvement assessments. Smallholder Farms, Yield Improvement, Multilevel Regression Analysis, Uganda The empirical specification follows  $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African geography, smallholder agriculture, econometrics, multilevel modelling, yield measurement, regression analysis, spatial statistics*

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