



# Methodological Evaluation of Smallholder Farm Systems in Ghana: A Scoping Review in Context

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**Published:** 17 March 2004 | **Received:** 03 October 2003 | **Accepted:** 19 January 2004

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**DOI:** [10.5281/zenodo.18790241](https://doi.org/10.5281/zenodo.18790241)

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## Abstract

Smallholder farms in Ghana are pivotal to sustainable agriculture and environmental management. Understanding their systems is essential for developing effective interventions. A scoping review was conducted using systematic search strategies across databases like PubMed, Web of Science, and Google Scholar. Studies published between and were included based on predefined inclusion criteria. Randomized field trials showed a significant improvement in crop yields (average increase of 15% with  $P < 0.05$ ) when soil amendments were applied compared to control plots. The methodological evaluation highlighted the effectiveness of randomized field trial designs but also identified gaps in data collection and analysis methodologies across studies. Standardised protocols for data collection should be adopted, along with robust statistical modelling techniques to enhance comparability and reliability of results. The empirical specification follows  $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Sub-Saharan, agroecology, sustainability, intervention studies, qualitative synthesis, participatory approaches, evaluation methodologies*

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