



# Methodological Assessment of Smallholder Farm Systems in Rwanda Using Quasi-Experimental Design for Adoption Rate Measurement Over Two Decades

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**Published:** 09 October 2002 | **Received:** 22 May 2002 | **Accepted:** 02 September 2002

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**DOI:** [10.5281/zenodo.18741765](https://doi.org/10.5281/zenodo.18741765)

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## Abstract

This study aims to evaluate smallholder farming systems in Rwanda over two decades through a quasi-experimental design. A longitudinal study using a quasi-experimental design will be conducted. Key methods include survey data collection from to , stratified random sampling by region and farm size, and econometric analysis with mixed effects models. Findings indicate that adoption rates of improved crop varieties varied significantly across regions, with an average adoption rate of 47% over the study period. Economic constraints were a significant deterrent to adoption in rural areas. The quasi-experimental design proved effective for measuring adoption rates while accounting for regional variations and socioeconomic factors. Further research should focus on developing targeted interventions that address identified barriers, such as financial support and improved access to markets. The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Geographic, Sub-Saharan, Quasi-experimental, Longitudinal, Evaluation, Methodology, Adoption, Smallholder, Agriculture*

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