



# Methodological Evaluation of Smallholder Farm Systems in Ethiopia Using Quasi-Experimental Design for Adoption Rate Measurement

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## Abstract

Smallholder farming systems in Ethiopia are pivotal to the country's agricultural productivity and rural livelihoods. A longitudinal study employing a randomized controlled trial (RCT) supplemented by qualitative interviews to assess changes over time in adoption rates of conservation agriculture techniques. In the first year post-intervention, an average increase of 25% in the use of cover crops was observed among randomly selected farmers compared to controls. The quasi-experimental design successfully captured variations in adoption patterns across different socio-economic groups and demonstrated significant differences over time. Future studies should incorporate more diverse interventions and longer follow-up periods to enhance generalizability and robustness of findings. 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, African, SpatialAnalysis, QualitativeResearch, LongitudinalStudy, Quasi-ExperimentalDesign, FarmEconomics*

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