



# Methodological Assessment of Smallholder Farm Systems in Senegal: A Randomized Field Trial for Yield Improvement Evaluation

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## Abstract

Smallholder farmers in Senegal play a crucial role in agricultural productivity and food security, yet their yield improvement remains underexplored. This systematic literature review employs rigorous methodologies to analyse existing studies and reports on methods used in yield improvement trials among smallholder farmers. The analysis includes quantitative data from relevant publications and expert interviews. A key finding is that the majority of randomized field trials have reported a positive impact, with improvements ranging between 10-25% in crop yields across different agricultural systems. The review underscores the effectiveness of randomized field trials as a method for evaluating yield improvement strategies among smallholder farmers in Senegal. These methods are vital for enhancing agricultural productivity and sustainability. Further research should focus on replicating these trials with diverse crop types and environmental conditions to establish broader applicability, and integrating farmer feedback into the design of future interventions. The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African agriculture, smallholder farming systems, randomized controlled trials, yield assessment, agronomy methods, sustainability indicators, participatory rural appraisal*

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