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Risk Reduction Strategies in Senegalese Smallholder Farm Systems: A Methodological Comparative Analysis using Randomized Field Trials

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Abstract

This study addresses a current research gap in Physics concerning Methodological evaluation of smallholder farms systems in Senegal: randomized field trial for measuring risk reduction in Senegal. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of smallholder farms systems in Senegal: randomized field trial for measuring risk reduction, Senegal, Africa, Physics, comparative study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, agroecology, randomized trials, resilience, experimental design, sustainable agriculture, smallholder systems*

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