



Methodological Evaluation of Field Research Stations in Senegal: A Randomized Trial for Yield Improvement Measurement

Madiouba Diop^{1,2}, Toumani Sall^{3,4}

¹ Cheikh Anta Diop University (UCAD), Dakar

² Université Gaston Berger (UGB), Saint-Louis

³ Department of Advanced Studies, Cheikh Anta Diop University (UCAD), Dakar

⁴ Department of Interdisciplinary Studies, Université Gaston Berger (UGB), Saint-Louis

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Correspondence: mdiop@outlook.com

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Author notes

Madiouba Diop is affiliated with Cheikh Anta Diop University (UCAD), Dakar and focuses on Environmental Science research in Africa.

Toumani Sall is affiliated with Department of Advanced Studies, Cheikh Anta Diop University (UCAD), Dakar and focuses on Environmental Science research in Africa.

Abstract

This study addresses a current research gap in Environmental Science concerning Methodological evaluation of field research stations systems in Senegal: randomized field trial for measuring yield improvement 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 field research stations systems in Senegal: randomized field trial for measuring yield improvement, Senegal, Africa, Environmental Science, protocol This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. 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, randomized controlled trial, experimental design, agroecology, geographic information systems, data analysis, precision agriculture*

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