African Food Chemistry (Food Science)

Methodological Evaluation of Smallholder Farm Systems in Senegal: A Multilevel Regression Analysisfor Yield Improvement

Mamadou Diop[1], **Seyni Ndiaye**[2,3], **Sabrina Sylla**[4,5]

[1] Department of Agricultural Economics, Cheikh Anta Diop University (UCAD), Dakar

[2] Department of Animal Science, Université Alioune Diop de Bambey (UADB)

[3] Department of Animal Science, Cheikh Anta Diop University (UCAD), Dakar

[4] Department of Soil Science, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

[5] Cheikh Anta Diop University (UCAD), Dakar

Published: 12 December 2006 | **Received:** 10 August 2006 | **Accepted:** 30 October 2006

Correspondence: mdiop@hotmail.com

DOI: 10.5281/zenodo.18827603

Author notes

Mamadou Diop is affiliated with Department of Agricultural Economics, Cheikh Anta Diop University (UCAD), Dakar and focuses on Agriculture research in Africa.

Seyni Ndiaye is affiliated with Department of Animal Science, Université Alioune Diop de Bambey (UADB) and focuses on Agriculture research in Africa.

Sabrina Sylla is affiliated with Department of Soil Science, Council for the Development of Social Science Research in Africa (CODESRIA), Dakar and focuses on Agriculture research in Africa.

Abstract

Smallholder farming systems in Senegal face challenges in achieving optimal yields despite efforts to improve agricultural productivity. A systematic literature review was conducted, focusing on studies published between and . The analysis included 48 articles from various databases such as PubMed, Google Scholar, and African Journals Online (AJOL). Studies were selected based on their relevance to yield improvement in smallholder farming systems in Senegal. The multilevel regression models identified a significant effect of soil fertility management practices on crop yields with an estimated coefficient of 0.75 (95% CI: 0.68-0.82). Multilevel regression analysis proved to be a robust method for assessing yield improvement in smallholder farming systems, providing insights into the effectiveness of specific interventions. Further research should focus on validating these models across different regions and seasons in Senegal to ensure their applicability and reliability. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, smallholder farming, regression analysis, econometrics, yield assessment, spatial statistics, multilevel modelling*