Methodological Evaluation of Off-Grid Communities Systems in Senegal Using Panel Data to Measure Yield Improvement,

Sabrina Ndi[1]**, Ahmed Ndiaye**[2]**, Salif Sow**[2,3]**, Mariama Diop**[4,5]

[1] Institut Sénégalais de Recherches Agricoles (ISRA)

[2] Institut Pasteur de Dakar

[3] Department of Agricultural Economics, Institut Sénégalais de Recherches Agricoles (ISRA)

[4] Department of Animal Science, Institut Sénégalais de Recherches Agricoles (ISRA)

[5] Université Alioune Diop de Bambey (UADB)

Author notes

Sabrina Ndi is affiliated with Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Agriculture research in Africa.

Ahmed Ndiaye is affiliated with Institut Pasteur de Dakar and focuses on Agriculture research in Africa.

Salif Sow is affiliated with Institut Pasteur de Dakar and focuses on Agriculture research in Africa.

Mariama Diop is affiliated with Department of Animal Science, Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Agriculture research in Africa.

Abstract

Off-grid communities in Senegal have implemented various systems to enhance agricultural yields, but methodological evaluations of these systems are limited. This scoping review employs systematic literature search strategies focusing on articles published between and . Key inclusion criteria involve studies that utilised panel data techniques to evaluate off-grid community systems in Senegal, with a particular emphasis on yield improvement metrics. The methodology aims at identifying commonalities and discrepancies across different research methodologies. A notable finding is the predominance of fixed effects models over random effects models in estimating yield improvements, reflecting the need for further investigation into potential unobserved heterogeneity impacting outcomes. The review underscores the importance of methodological rigor when applying panel data techniques to agricultural yield improvement studies. Future research should consider additional robustness checks and explore mixed-effects models as a viable alternative. Researchers and policymakers are encouraged to adopt transparent reporting practices, which include detailed descriptions of their chosen econometric methods and assumptions regarding unobserved variables. This will facilitate better replication and validation of findings across different studies. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, panel data, econometrics, rural development, agro-ecosystems, sustainable farming, yield assessment*

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