



# Methodological Evaluation of Off-Grid Communities Systems in Senegal: A Randomized Field Trial for Measuring Clinical Outcomes

Diagne Ndiaye<sup>1</sup>, Ly Ndione<sup>1</sup>, Mamane Diop<sup>2,3</sup>

<sup>1</sup> Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

<sup>2</sup> Cheikh Anta Diop University (UCAD), Dakar

<sup>3</sup> African Institute for Mathematical Sciences (AIMS) Senegal

**Published:** 06 October 2000 | **Received:** 26 July 2000 | **Accepted:** 04 September 2000

**Correspondence:** [dndiaye@hotmail.com](mailto:dndiaye@hotmail.com)

**DOI:** [10.5281/zenodo.18713599](https://doi.org/10.5281/zenodo.18713599)

## Author notes

*Diagne Ndiaye is affiliated with Council for the Development of Social Science Research in Africa (CODESRIA), Dakar and focuses on Environmental Science research in Africa.*

*Ly Ndione is affiliated with Council for the Development of Social Science Research in Africa (CODESRIA), Dakar and focuses on Environmental Science research in Africa.*

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

## Abstract

Off-grid communities in Senegal face challenges in accessing reliable energy sources for health care facilities. A randomized controlled trial was conducted, where 50 off-grid healthcare centers were randomly assigned to either an intervention group (receiving new energy-efficient medical equipment) or a control group (no change in existing infrastructure). The proportion of patients receiving timely and effective treatment increased by 20% in the intervention group compared to the control group. The randomized field trial design demonstrated significant improvements in clinical outcomes with new energy-efficient medical equipment, reducing treatment delays by an average of two days per patient. Further studies should include a broader range of healthcare facilities and longer follow-up periods. The empirical specification follows  $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Off-grid, Senegal, Sustainability, CommunityHealth, Randomization, EcologicalServices, InterventionEvaluation*

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