



# Methodological Evaluation of Off-Grid Communities Systems in Kenya Using Multilevel Regression Analysis to Measure System Reliability

Oluoch Ochieng<sup>1</sup>, Mwangi Wambugu<sup>1,2</sup>

<sup>1</sup> African Population and Health Research Center (APHRC)

<sup>2</sup> Department of Soil Science, Egerton University

**Published:** 07 July 2013 | **Received:** 18 January 2013 | **Accepted:** 15 May 2013

**Correspondence:** [oochieng@gmail.com](mailto:oochieng@gmail.com)

**DOI:** [10.5281/zenodo.18992065](https://doi.org/10.5281/zenodo.18992065)

## Author notes

*Oluoch Ochieng is affiliated with African Population and Health Research Center (APHRC) and focuses on Agriculture research in Africa.*

*Mwangi Wambugu is affiliated with Department of Soil Science, Egerton University and focuses on Agriculture research in Africa.*

## Abstract

Off-grid communities in Kenya face challenges in accessing reliable energy sources for agricultural productivity. A mixed-methods approach was employed, including surveys, interviews, and data from monitoring devices. Multilevel regression models were used to analyse the data at both individual household and community levels. The average system reliability score for off-grid communities in this study was 82%, with a confidence interval of  $\pm 5\%$ . Multilevel regression analysis revealed that access to clean water significantly improved system reliability by 10 percentage points, while high temperatures reduced it by 6 percentage points. Investment should be directed towards improving water supply systems and building climate-resilient infrastructure in off-grid communities. Off-Grid Communities, Multilevel Regression Analysis, System Reliability, Agricultural Productivity The empirical specification follows  $Y = \beta_{0+\beta}^{\rightarrow} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** Kenyan, Multilevel, Regression, Evaluation, Off-grid, Communities, Systems

## ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ **REQUEST FULL PAPER**

**Email:** [info@parj.africa](mailto:info@parj.africa)

Request your copy of the full paper today!

## SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We welcome your submissions!**

Join our community of African scholars and share your groundbreaking work.

**Submit at:** [app.parj.africa](http://app.parj.africa)



Scan to visit [app.parj.africa](http://app.parj.africa)

**Open Access Scholarship from PARJ**

Empowering African Research | Advancing Global Knowledge