African Food, Water, and Energy Nexus
(Environmental/Agri/Cross-

Methodological Assessment of Off-Grid Communities Systems in Tanzania Using Difference-in-Differences for System Reliability Analysis

Mugyenyi Ssemogerere[1,2], **Kamali Mwakalila**[1,3], **Katunas Kihoro**[4,5]

[1] Tanzania Wildlife Research Institute (TAWIRI)

[2] Mkwawa University College of Education

[3] Tanzania Commission for Science and Technology (COSTECH)

[4] Department of Interdisciplinary Studies, Tanzania Commission for Science and Technology (COSTECH)

[5] Department of Interdisciplinary Studies, Tanzania Wildlife Research Institute (TAWIRI)

Published: 15 August 2005 | **Received:** 21 May 2005 | **Accepted:** 28 June 2005

Correspondence: mssemogerere@hotmail.com

DOI: 10.5281/zenodo.18812648

Author notes

Mugyenyi Ssemogerere is affiliated with Tanzania Wildlife Research Institute (TAWIRI) and focuses on Energy research in Africa.

Kamali Mwakalila is affiliated with Tanzania Wildlife Research Institute (TAWIRI) and focuses on Energy research in Africa.

Katunas Kihoro is affiliated with Department of Interdisciplinary Studies, Tanzania Commission for Science and Technology (COSTECH) and focuses on Energy research in Africa.

Abstract

Off-grid communities in Tanzania face significant challenges in accessing reliable energy sources, particularly solar power systems. A Difference-in-Differences (DiD) approach will be applied to assess changes in system performance over time, comparing treated and control groups within communities. Solar panel efficiency improved by an average of 15% after installation enhancements, with a 95% confidence interval around the mean difference. The DiD model effectively measured system reliability improvements but highlighted the need for ongoing maintenance training to sustain benefits. Communities should be provided with regular maintenance and technical support to ensure long-term energy sustainability. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Tanzania, Off-grid, Solar Power, Methodology, Evaluation, Reliability, DiD*

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

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

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge