



Methodological Evaluation of Off-Grid Communities Systems in Rwanda: A Randomized Field Trial on System Reliability

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Abstract

The development of off-grid communities systems in Rwanda aims to provide sustainable energy solutions for remote areas. A randomized field trial was conducted with 100 households across five districts, using a logistic regression model to assess the impact of environmental factors on system performance. System reliability varied significantly between districts (district A: 82%, district B: 75%), suggesting that local conditions influence system effectiveness. Local adaptation strategies are essential for improving the reliability and sustainability of off-grid systems in Rwanda. Further research should focus on identifying optimal energy solutions tailored to specific environmental contexts. off-grid communities, reliability, randomized trial, logistic regression, rural electrification

The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Rwandan, GIS, Randomization, Sustainability, Methodology, Intervention, Evaluation

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