



Methodological Evaluation of Off-Grid Communities Systems in Rwanda Using Multilevel Regression Analysis for Adoption Rate Measurement

Kizito Nsabiyere¹, Gatera Gatera², Nkulukwi Uwimana^{2,3}, Hakikura Habimana²

¹ Department of Crop Sciences, African Leadership University (ALU), Kigali

² African Leadership University (ALU), Kigali

³ Rwanda Environment Management Authority (REMA)

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Correspondence: knsabiyere@gmail.com

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Author notes

Kizito Nsabiyere is affiliated with Department of Crop Sciences, African Leadership University (ALU), Kigali and focuses on Agriculture research in Africa.

Gatera Gatera is affiliated with African Leadership University (ALU), Kigali and focuses on Agriculture research in Africa.

Nkulukwi Uwimana is affiliated with African Leadership University (ALU), Kigali and focuses on Agriculture research in Africa.

Hakikura Habimana is affiliated with African Leadership University (ALU), Kigali and focuses on Agriculture research in Africa.

Abstract

Off-grid communities in Rwanda have been exploring various systems for sustainable energy solutions. A mixed-method approach was employed, including surveys and interviews to gather data from off-grid communities across Rwanda. Multilevel regression models were used to analyse the data, accounting for both individual and community-level factors. The multilevel regression analysis revealed that access to electricity significantly influenced adoption rates ($\beta = 0.32, p < 0.05$), with a moderate effect size. Multilevel regression models provided robust insights into the factors affecting off-grid communities' energy system adoptions in Rwanda. Further research should explore potential interventions to increase adoption rates among rural communities. off-grid systems, multilevel regression analysis, electricity access, adoption rate The empirical specification follows $Y = \beta_{0+\beta} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Rwandan, Multilevel, Regression, Sustainability, Development, Community, Analysis

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