Methodological Evaluation of Off-Grid Communities Systems in Rwanda: Panel Data Estimation for Measuring Clinical Outcomes

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Abstract

The study examines off-grid communities in Rwanda to evaluate their veterinary service delivery systems. Panel data from 20 off-grid communities were collected over three years. A fixed effects model was used to estimate the impact of various variables on veterinary service utilization and outcome measures. There was a significant positive correlation ($p < 0.05$) between access to electricity and improved clinical outcomes, with an average increase in treatment success rate by 12% among communities with reliable power supply. The study confirms the importance of infrastructure improvements for enhancing veterinary service efficacy in off-grid areas. Investment in electrification programmes is recommended to improve access to essential services and outcomes for affected populations. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Rwandan, Off-grid, Panel, Econometrics, Livestock, Random-effects, Spatial*

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