



Methodological Evaluation of Off-Grid Communities Systems in Uganda: A Randomized Field Trial for Measuring Adoption Rates

Methodological
Evaluation of Off-Grid
Communities Systems

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Abstract

The adoption of off-grid communities systems in Uganda has been observed to vary significantly across different socio-economic groups and geographical regions. A randomized field trial was employed in four purposively selected off-grid communities across different regions of Uganda. Participants were randomly assigned to either receive an off-grid system or serve as controls. Data on system usage and community feedback were collected via structured interviews and surveys, ensuring a robust understanding of the systems' effectiveness. The findings indicated that participation in the trial significantly increased by 20% among communities that received the off-grid system compared to control groups ($p < 0.05$). This randomized field trial provided valuable insights into how community engagement and system quality influence adoption rates, offering a structured method for future research. Future studies should consider expanding the sample size and duration of trials to further validate these results across diverse settings in Uganda. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sum}_{i \in I} \ell(y_i, f(\theta; \xi)) + \lambda \sqrt{\theta} \sqrt{\theta}^2$, with performance evaluated using out-of-sample error.

Keywords: *Geographic, Sub-Saharan, Randomized Controlled Trial, Community Development, Social Impact Assessment, Sampling Theory, Qualitative Research Methods*

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

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