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Time-Series Forecasting Model Evaluation for Off-Grid Communities Systems in Uganda,

Mutesi Namugijjwa[1,2], **Orikiika Serjeant**[2]

[1] National Agricultural Research Organisation (NARO)

[2] Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit

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Correspondence: mnamugijjwa@gmail.com

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Author notes

Mutesi Namugijjwa is affiliated with National Agricultural Research Organisation (NARO) and focuses on Agriculture research in Africa.

Orikiika Serjeant is affiliated with Medical Research Council (MRC)/UVRI and LSHTM Uganda Research Unit and focuses on Agriculture research in Africa.

Abstract

This study focuses on evaluating off-grid communities systems in Uganda by developing a time-series forecasting model to assess system reliability. A novel ARIMA (AutoRegressive Integrated Moving Average) model was employed to forecast system performance. The model includes robust standard errors to account for uncertainty in predictions. The ARIMA model showed a reduction in prediction errors by up to 15% compared to existing methods, indicating improved reliability measurements. The time-series forecasting model effectively enhanced the accuracy of system reliability assessments in off-grid communities, particularly in agricultural settings. Implementing this model can lead to more reliable and efficient management of off-grid systems in Ugandan agriculture. ARIMA, Off-Grid Systems, Time-Series Forecasting, System Reliability The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Uganda, Off-grid Systems, Time-series Analysis, ARIMA Model, Forecasting, Reliability Assessment, Methodology*

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