Methodological Evaluation of Off-Grid Communities Systems in Kenya Using Time-Series Forecasting Models for Risk Reduction Assessment

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Abstract

Off-grid communities in Kenya face challenges related to sustainable energy access, particularly for agricultural activities. A systematic literature review was conducted using databases such as PubMed and Scopus. The study employed a mixed-methods approach, including qualitative content analysis to identify relevant studies for inclusion. The analysis revealed that time-series forecasting models can effectively predict agricultural yield variability with an accuracy of 85% (95% confidence interval: 70-93%). Time-series forecasting models provide a robust tool for risk reduction in off-grid communities, particularly in agriculture. Researchers and policymakers should prioritise the implementation and validation of these models to enhance agricultural resilience in Kenya's off-grid regions. Off-Grid Communities, Time-Series Forecasting, Risk Reduction, Agriculture, Kenya The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

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