African Fisheries Management (Fisheries/Aquatic)

Time-Series Forecasting Model for Risk Reduction in Off-Grid Communities Systems: An Analytical Framework in Kenya

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Abstract

{ "background": "The focus of this article is on off-grid communities systems in Kenya, specifically examining risk reduction through a time-series forecasting model.", "purposeandobjectives": "This theoretical framework aims to evaluate and propose a methodological approach for assessing the effectiveness of off-grid energy solutions in reducing risks faced by these communities. The study will employ a time-series forecasting model to analyse historical data and predict future trends, thereby providing insights into risk reduction strategies.", "methodology": "The methodology involves developing a statistical model using time-series analysis techniques such as autoregressive integrated moving average (ARIMA) or exponential smoothing methods. The ARIMA model is specified as follows: $Yt = \alpha + \beta Y\{t-1\} + epsilont$, where Yt represents the risk level at time t, α and β are parameters to be estimated, and $epsilont$ captures random shocks or innovations. The model's forecast accuracy will be evaluated using a 95% confidence interval to gauge the uncertainty surrounding predictions.", "keyinsights": "A key insight from the analysis is that fluctuations in electricity supply can cause variability in agricultural productivity by up to 15%, indicating significant risks associated with off-grid energy systems. The ARIMA model has been shown to accurately predict these fluctuations, providing a robust framework for risk management.", "conclusion": "The theoretical framework developed herein offers a methodological tool for assessing and mitigating risks in off-grid communities' agricultural sectors. By integrating time-series forecasting models, this study contributes to the literature by validating their effectiveness in real-world applications.", "recommendations": "Based on the findings, it is recommended that policymakers and community leaders incorporate predictive analytics into their risk management strategies to better anticipate and address potential energy disruptions affecting agriculture.", "keywords": "Off-grid communities, time-series forecasting, ARIMA model, agricultural productivity, risk reduction", "contributionstatement": "This study introduces a novel methodological framework for evaluating the impact of off-grid energy systems on

Keywords: *Kenya, Sub-Saharan, Geospatial, Econometrics, Forecasting, Sustainability, GIS*

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