



Methodological Evaluation of Regional Monitoring Networks for Risk Reduction in Rwanda Using Time-Series Forecasting Models

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Abstract

This study focuses on evaluating regional monitoring networks in Rwanda for risk reduction, with a particular emphasis on agricultural and environmental risks. A comparative study was conducted, employing time-series forecasting models such as ARIMA for analysing data from multiple monitoring networks across Rwanda. The models were evaluated based on their predictive accuracy and robustness to validate their suitability for risk assessment in agricultural regions. The analysis revealed that the time-series models provided a significant improvement over previous methods in terms of reducing forecast errors by approximately 20%, indicating more reliable predictions, which is crucial for effective risk management strategies. The study underscores the importance of integrating advanced forecasting techniques into regional monitoring networks to enhance their predictive capabilities and facilitate more informed decision-making processes. Recommendations include expanding data collection efforts in underserved areas, incorporating real-time feedback loops, and conducting further research on the economic impact of reduced risk levels through these models. Rwanda, Monitoring Networks, Risk Reduction, Time-Series Forecasting, ARIMA The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: African Geography, Time-Series Analysis, Risk Assessment, Monitoring Networks, Statistical Modelling, Geographic Information Systems, Environmental Indicators

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