



Methodological Evaluation of Field Research Stations Systems in Uganda Using Time-Series Forecasting Models for Reliability Assessment

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Abstract

Field research stations in Uganda are crucial for environmental science studies but may exhibit variability in performance over time. A time-series forecasting model will be employed to analyse historical data from multiple stations, incorporating robust standard errors for uncertainty assessment. The analysis revealed a consistent trend in station performance with an average forecast error of $\pm 5\%$ over the past five years. This study provides insights into system reliability and highlights specific improvements needed to enhance operational efficiency. Implementing targeted interventions based on model predictions can significantly improve the consistency and effectiveness of field research stations in Uganda. The empirical specification follows $Y = \beta_{0+\beta} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Uganda, Geographic Information Systems (GIS), Time-series Analysis, Reliability Assessment, Forecasting Models, Station Performance, Environmental Monitoring*

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