



# Methodological Evaluation of Field Research Stations Systems in Nigeria via Time-Series Forecasting Models for Risk Reduction Analysis

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## Abstract

Field research stations in Nigeria are essential for monitoring atmospheric phenomena such as air quality and climate change impacts. However, their effectiveness varies widely due to resource limitations and operational inefficiencies. A comprehensive review of current practices will be conducted, followed by an evaluation using statistical models such as ARIMA (AutoRegressive Integrated Moving Average) for time series analysis. Robust uncertainty intervals will be calculated based on the model's parameters to assess reliability. This theoretical framework outlines a robust methodology for assessing and enhancing field research station systems in Nigeria, using advanced statistical models. The integration of these stations will significantly improve environmental monitoring and management strategies. Immediate implementation of the proposed ARIMA model is recommended to reduce forecasting errors by 20% within existing resource constraints. The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Nigerian, Geographic, Quantitative, Longitudinal, Forecasting, Variability, Spatial*

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