



# Regional Monitoring Networks Efficiency Assessment Using Time-Series Forecasting Models in Ghana,

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### Abstract

This study examines regional monitoring networks in Ghana to evaluate their efficiency over time. A comprehensive analysis was conducted using ARIMA (AutoRegressive Integrated Moving Average) model to forecast network efficiency trends in Ghana. Robust standard errors were used for inference. The ARIMA model showed a significant upward trend in network performance, with an estimated increase of 15% over the study period. The findings suggest that time-series forecasting can effectively measure and improve the efficiency of regional monitoring networks in Ghana. Future research should explore integrating machine learning models to enhance predictive accuracy. Model estimation used  $\hat{\theta} = \operatorname{argmin}\{\theta\} \sum_{i=1}^n (y_i - f\theta(\xi))^2 + \lambda \|\theta\|_2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** Sub-Saharan, Africa, regional, socioeconomic, forecasting, model, evaluation, methodology

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