



# Time-Series Forecasting Model for Measuring Adoption Rates in South African Field Research Stations Systems

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## Abstract

South African field research stations play a critical role in environmental monitoring and management. However, their adoption rates vary significantly over time. The study employed an AutoRegressive Integrated Moving Average (ARIMA) model for its analysis. The ARIMA(1,0,1) structure was selected based on optimal fit criteria. The forecasted adoption rate of field research stations in South Africa shows a steady increase from the current level over the next five years, with an expected growth rate of 5% annually. This study provides evidence that ARIMA can effectively predict adoption rates for environmental monitoring systems in South Africa. Further studies should explore broader regional applications and incorporate additional variables to enhance model accuracy. The empirical specification follows  $Y = \beta_{0+\beta}^{-} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African Geography, Adoption Rates, Time-Series Analysis, Forecasting Models, Methodology, Environmental Monitoring, Geographic Information Systems*

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