African Sedimentology and Stratigraphy (Earth Science)

Time-Series Forecasting Model Evaluation for Cost-Effectiveness Analysis of Municipal Water Systems in Uganda,

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Abstract

The study focuses on evaluating municipal water systems in Uganda to determine their cost-effectiveness over a period of time. A time-series forecasting model was developed using the ARIMA (AutoRegressive Integrated Moving Average) method to predict water system costs based on historical data. Robust standard errors were used to account for model uncertainty. The forecasted cost of municipal water systems increased by an average of 5% annually over the study period, highlighting potential future financial burdens if no interventions are made. The ARIMA model effectively forecasts cost trends but acknowledges significant uncertainties due to variability in input data and external factors affecting costs. Investment strategies should consider both short-term and long-term forecasting outcomes to mitigate predicted increases in municipal water system costs. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographical Information Systems, Geographic Information Systems, ARIMA models, Time-series analysis, Econometrics, Spatial econometrics, Stochastic processes*

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