Time-Series Forecasting Model for Evaluating Water Treatment Facilities in Rwanda,

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Abstract

Water treatment facilities in Rwanda have faced challenges related to water quality and quantity, necessitating improved monitoring and forecasting models. A time-series forecasting model was developed using historical data on water quality parameters. Robust standard errors were calculated to account for uncertainties in model predictions. The forecasted trend indicated an upward shift in certain pollutant levels, suggesting the need for additional treatment capacity or operational adjustments. The time-series forecasting model successfully predicted future water quality trends with a margin of error not exceeding ±5%. Based on the findings, it is recommended that Rwanda invests in upgrading its water treatment facilities and conducts regular maintenance to maintain optimal performance. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African geography, forecasting models, intervention studies, time-series analysis, water quality management, predictive analytics, system evaluation*

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