Time-Series Forecasting Model for Evaluating Water Treatment Facility Efficiency in Uganda

Kizza Bassey[1]

[1] Uganda National Council for Science and Technology (UNCST)

Author notes

Kizza Bassey is affiliated with Uganda National Council for Science and Technology (UNCST) and focuses on Engineering research in Africa.

Abstract

Water treatment facilities in Uganda have been a focus of policy analysis to ensure safe drinking water for its population. However, there is limited empirical data on their efficiency over time. The analysis employs an autoregressive integrated moving average (ARIMA) model, which is robust for detecting trends and seasonal patterns in data. Uncertainty in forecasts is quantified using standard error estimates. In the period analysed, water treatment facilities showed a consistent improvement rate of approximately 5% per year, with no significant deviations from this trend. The ARIMA model effectively captured the efficiency trajectory, indicating that continued investment and monitoring are necessary to sustain these gains. Policy makers should prioritise ongoing maintenance and upgrades based on forecasted improvements to ensure long-term water quality. The maintenance outcome was modelled as $Y\{\} = beta\, 0 + beta\, 1\, X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Water scarcity, African geography, Econometric analysis, Time-series analysis, Forecasting models, Water treatment systems, Performance indicators*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge