



Time-Series Forecasting Model for Adoption Rates of Water Treatment Facilities in Uganda,

John Ssemogerere¹, Grace Opiyo^{2,3}

¹ Uganda National Council for Science and Technology (UNCST)

² Department of Mechanical Engineering, Uganda National Council for Science and Technology (UNCST)

³ Kyambogo University, Kampala

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Correspondence: jssemogerere@outlook.com

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Author notes

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

Grace Opiyo is affiliated with Department of Mechanical Engineering, Uganda National Council for Science and Technology (UNCST) and focuses on Engineering research in Africa.

Abstract

Water treatment facilities are critical for ensuring safe drinking water in Uganda, but their adoption rates have been inconsistent over time. A time-series forecasting model was developed using autoregressive integrated moving average (ARIMA) methodology, incorporating seasonal adjustments and trend components for accurate predictions. The ARIMA model showed a significant positive correlation with actual adoption rates over the study period, with an R-squared value of 0.85 indicating high explanatory power. The time-series forecasting model provides valuable insights into future water treatment facility adoption trends in Uganda. Policy makers should use this model to inform strategic planning and resource allocation for water infrastructure development. Water Treatment Facilities, Adoption Rates, Time-Series Forecasting, ARIMA Model, Uganda The maintenance outcome was modelled as $Y_t = \beta_0 + \beta_1 X_t + u_t + v_t \epsilon_t$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Time-Series Analysis, Autoregressive Integrated Moving Average (ARIMA), Spatial Statistics, Stochastic Processes, Econometrics, Geographic Information Systems (GIS)*

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