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

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Abstract

The water treatment industry in Kenya is crucial for ensuring safe drinking water supply. However, the efficiency of these facilities can vary significantly over time and between different locations. A time-series forecasting model was developed to analyse historical data on water quality parameters from various Kenyan facilities. The model accounts for trends, seasonality, and external factors influencing facility performance. The forecast model identified a consistent trend of increasing efficiency in water treatment processes over the study period, with an estimated improvement rate of approximately 5% annually, as indicated by robust standard errors. The findings suggest that timely interventions could further enhance operational efficiencies and ensure sustainable water supply in Kenya's water treatment facilities. Based on the model's results, it is recommended to introduce regular maintenance schedules and invest in advanced filtration technologies to stabilise and improve efficiency gains. water treatment facility, time-series forecasting, Kenyan industry, efficiency improvement The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Geographic Information Systems (GIS), Time-Series Analysis, Forecasting Models, Econometrics, Water Treatment Efficiency, Stochastic Processes*

ABSTRACT-ONLY PUBLICATION

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