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Time-Series Forecasting Model for Measuring Adoption Rates in Water Treatment Facilities in Senegal

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Abstract

This study examines the adoption rates of water treatment facilities in Senegal by applying a time-series forecasting model to analyse historical data. A time-series forecasting model was employed using an autoregressive integrated moving average (ARIMA) equation. The uncertainty in predictions was quantified through a 95% confidence interval. The ARIMA model predicted a steady increase in adoption rates over the next five years, with forecasts showing a growth of approximately 12% annually. The study validates the effectiveness of time-series forecasting for measuring adoption trends in water treatment facilities, offering insights into Senegal's water management strategies. Further research should explore inter-regional and cross-sectional comparisons to enhance model accuracy and applicability. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, time-series analysis, econometrics, intervention studies, forecasting, cross-validation, geographical information systems*

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