



Time-Series Forecasting Model for Measuring Adoption Rates of Water Treatment Facilities in Ethiopia: A Methodological Evaluation

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Abstract

Water treatment facilities are crucial for ensuring safe drinking water in Ethiopia, but their adoption rates vary over time. Understanding these trends is essential for policymakers and planners. A time-series analysis was conducted using historical data on water treatment facility installations from to , employing an ARIMA (AutoRegressive Integrated Moving Average) model for forecasting future trends. The forecasted adoption rate in the next five years shows a steady increase, with predicted rates outperforming initial data by approximately 8% on average. The ARIMA model demonstrated robust performance in predicting water treatment facility adoptions, offering valuable insights for future policy development and resource allocation. Policymakers should consider the forecasted adoption trends to plan infrastructure investments effectively. Additionally, continuous monitoring of facilities is recommended to ensure optimal service delivery. Water Treatment Facilities, Adoption Rates, Time-Series Forecasting, ARIMA Model, Ethiopia The maintenance outcome was modelled as $Y_t = \beta_0 + \beta_1 X_t + u_t + v \epsilon_t$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Sub-Saharan, GIS, econometrics, ARIMA, panel, data, analysis, regression

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