Time-Series Forecasting Model Evaluation for Cost-Effectiveness Analysis of Municipal Water Systems in South Africa,

Nthaliwe Motshekga[1,2]**, Sibasa Nkosi**[2]**, Mahlangu Khumalo**[3]**, Phalatsi Maduna**[4]

[1] Department of Soil Science, University of Cape Town

[2] University of KwaZulu-Natal

[3] Department of Crop Sciences, University of Cape Town

[4] University of Cape Town

Author notes

Nthaliwe Motshekga is affiliated with Department of Soil Science, University of Cape Town and focuses on Agriculture research in Africa.

Sibasa Nkosi is affiliated with University of KwaZulu-Natal and focuses on Agriculture research in Africa.

Mahlangu Khumalo is affiliated with Department of Crop Sciences, University of Cape Town and focuses on Agriculture research in Africa.

Phalatsi Maduna is affiliated with University of Cape Town and focuses on Agriculture research in Africa.

Abstract

Municipal water systems in South Africa have faced challenges related to cost-effectiveness over time. The evaluation of these systems often requires robust methods for forecasting and analysis. A time-series forecasting model was employed to analyse expenditure patterns and efficiency metrics. The model incorporates ARIMA (AutoRegressive Integrated Moving Average) methodology for trend analysis. The model shows a significant upward trend in water supply costs over the period, with an estimated increase of 5% per annum from to . This study provides insights into the cost-effectiveness of municipal water systems and highlights the need for strategic interventions to manage increasing costs. Future research should explore potential solutions, such as infrastructure upgrades and demand management strategies, to mitigate rising costs. Municipal Water Systems, Cost-Effectiveness Analysis, Time-Series Forecasting, South Africa The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, Time-series analysis, Econometrics, Forecasting models, Cost-benefit analysis, Stochastic processes, Data mining*

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