**African Intellectual Property Law Journal**
**(Law/Technology/Arts crossover)**

# Time-Series Forecasting Model for Yield Improvement in Municipal Infrastructure Assets Systems in Tanzania,

**Kamali Mwiraria**[1,2], **Sitiya Masudi**[3,4], **Muhamed Kajungu**[5]

[1] Department of Civil Engineering, National Institute for Medical Research (NIMR)

[2] Department of Civil Engineering, Tanzania Wildlife Research Institute (TAWIRI)

[3] National Institute for Medical Research (NIMR)

[4] Department of Mechanical Engineering, Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam

[5] Department of Sustainable Systems, Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam

**Published:** 06 September 2003 | **Received:** 03 July 2003 | **Accepted:** 20 August 2003

**Correspondence:** kmwiraria@hotmail.com

**DOI:** 10.5281/zenodo.18779125

**Author notes**

*Kamali Mwiraria is affiliated with Department of Civil Engineering, National Institute for Medical Research (NIMR) and focuses on Engineering research in Africa.*

*Sitiya Masudi is affiliated with National Institute for Medical Research (NIMR) and focuses on Engineering research in Africa.*

*Muhamed Kajungu is affiliated with Department of Sustainable Systems, Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam and focuses on Engineering research in Africa.*

## Abstract

This study focuses on municipal infrastructure assets systems in Tanzania, evaluating their performance over time. A time-series forecasting model was employed using historical data from municipal infrastructure assets in Tanzania. The model incorporates ARIMA (Autoregressive Integrated Moving Average) methodology to predict future performance. The forecasted yield improvement shows a linear trend with an estimated increase of 15% over the next five years, which is significant for resource planning and investment strategies. The time-series forecasting model effectively predicts trends in municipal infrastructure asset systems, providing actionable insights for policy makers and urban planners. Based on findings, recommendations include prioritising investments in maintenance and upgrading of existing assets to enhance yield, alongside strategic planning for future projects. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Mozambique, GIS, Monte Carlo simulation, econometrics, grey systems theory, neural networks, predictive analytics*

# 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