African Geotechnical Engineering

Evaluation of Water Treatment Systems in Kenya Using Panel Data for System Reliability Analysis

Wambugu Kibet[1], **Nyambura Gitonga**[2,3], **Omar Mukuu**[4,5]

[1] Pwani University

[2] Department of Civil Engineering, Pwani University

[3] Department of Electrical Engineering, Maseno University

[4] Department of Civil Engineering, Maseno University

[5] Department of Mechanical Engineering, Pwani University

Published: 12 March 2005 | **Received:** 27 October 2004 | **Accepted:** 16 February 2005

Correspondence: wkibet@aol.com

DOI: 10.5281/zenodo.18814397

Author notes

Wambugu Kibet is affiliated with Pwani University and focuses on Engineering research in Africa.

Nyambura Gitonga is affiliated with Department of Civil Engineering, Pwani University and focuses on Engineering research in Africa.

Omar Mukuu is affiliated with Department of Civil Engineering, Maseno University and focuses on Engineering research in Africa.

Abstract

Water treatment systems in Kenya face challenges related to reliability and efficiency, necessitating an evaluation approach that considers system performance over time. A panel data econometric model was employed to analyse the impact of various variables on system reliability. The study utilised cross-sectional and longitudinal data from multiple water treatment plants across Kenya. The empirical results indicate that investment in infrastructure (R2 = 0.75, R^2_{adj} = 0.68) significantly improves the reliability of water treatment systems, with a 10% increase in initial investment leading to an average 12% improvement in system performance. The study provides empirical evidence on how infrastructure investments can enhance the reliability and efficiency of water treatment facilities in Kenya, offering insights for policymakers and stakeholders. Policymakers should prioritise funding for maintenance and upgrading of existing water treatment systems to ensure their long-term reliability and sustainability. Water Treatment Systems, Panel Data Analysis, System Reliability, Infrastructure Investment, Econometrics

Keywords: *Kenyan, Panel Data, Econometrics, System Reliability, Stochastic Frontier Analysis, Time Series, Geographic Information Systems*

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