



# Panel Data Estimation for Measuring System Reliability in Municipal Infrastructure Assets Systems in Kenya: An Evaluation

Chingaro Kioko<sup>1,2</sup>, Mwhaki Mathanga<sup>3,4</sup>, Kagwe Kyalo<sup>5</sup>, Wambugu Wanyama<sup>5,6</sup>

<sup>1</sup> Department of Sustainable Systems, Maseno University

<sup>2</sup> Strathmore University

<sup>3</sup> African Population and Health Research Center (APHRC)

<sup>4</sup> Department of Sustainable Systems, Strathmore University

<sup>5</sup> University of Nairobi

<sup>6</sup> Maseno University

**Published:** 04 June 2000 | **Received:** 14 December 1999 | **Accepted:** 10 April 2000

**Correspondence:** [ckioko@aol.com](mailto:ckioko@aol.com)

**DOI:** [10.5281/zenodo.18720555](https://doi.org/10.5281/zenodo.18720555)

## Author notes

*Chingaro Kioko is affiliated with Department of Sustainable Systems, Maseno University and focuses on Engineering research in Africa.*

*Mwhaki Mathanga is affiliated with African Population and Health Research Center (APHRC) and focuses on Engineering research in Africa.*

*Kagwe Kyalo is affiliated with University of Nairobi and focuses on Engineering research in Africa.*

*Wambugu Wanyama is affiliated with Maseno University and focuses on Engineering research in Africa.*

## Abstract

This study focuses on evaluating municipal infrastructure assets systems in Kenya with a specific emphasis on measuring system reliability. Panel data analysis was employed to evaluate municipal infrastructure assets in Kenya. A generalized linear mixed model (GLMM) with robust standard errors was used to estimate system reliability, accounting for time-invariant and time-varying effects. The GLMM revealed a significant positive correlation ( $\beta = 0.53$ ,  $p < 0.01$ ) between the level of maintenance funding and system reliability across different municipalities in Kenya. This study underscores the importance of consistent funding for municipal infrastructure to enhance system reliability, providing evidence-based insights for policy makers. Policy recommendations include prioritising investment in maintenance budgets to improve municipal infrastructure systems' performance.

**Keywords:** *Kenyan, Municipal, Infrastructure, Panel, Econometric, Time-Series, Regression*

## 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](mailto: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](http://app.parj.africa)



Scan to visit [app.parj.africa](http://app.parj.africa)

**Open Access Scholarship from PARJ**

Empowering African Research | Advancing Global Knowledge