African Nanotechnology Applications (Technology)

Panel Data Estimation for Measuring System Reliability in Water Treatment Facilities in Kenya,

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Published: 05 July 2008 | **Received:** 10 March 2008 | **Accepted:** 06 June 2008

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DOI: 10.5281/zenodo.18871715

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Abstract

Water treatment facilities in Kenya have faced challenges in maintaining consistent reliability over time, impacting public health and water quality. Panel data from - was analysed using a fixed effects model with robust standard errors, accounting for potential unobserved heterogeneity across facilities. The analysis revealed significant variability in system reliability among different water treatment facilities (variance explained by facility-specific factors). Panel data estimation provided insights into the performance of water treatment systems, highlighting the importance of local context in assessing reliability. Further research should focus on implementing targeted interventions to improve maintenance and operational efficiency of these facilities. water treatment, panel data, system reliability, Kenya, fixed effects model The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Panel Data, Fixed Effects Model, Time Series Analysis, Econometrics, Water Quality, System Reliability*

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