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Methodological Evaluation of Municipal Infrastructure Assets Systems in Tanzania: Multilevel Regression Analysis for Risk Reduction Assessment

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Abstract

This study focuses on evaluating municipal infrastructure assets systems in Tanzania, aiming to reduce risks associated with these systems through a methodological approach. Multilevel regression analysis was employed, incorporating data at both the municipality and national levels to assess the impact of various factors on asset system performance and resilience. The analysis revealed that investment in maintenance infrastructure had a significant positive effect ($\beta = 0.35$, $p < 0.01$) on reducing risks associated with municipal assets systems, indicating a moderate influence over time. Multilevel regression analysis provided insights into the effectiveness of different risk reduction strategies, contributing to evidence-based policy development for enhancing municipal infrastructure sustainability in Tanzania. Based on findings, recommendations include increased investment in preventive maintenance and implementation of standardised asset management systems at both local and national levels. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Infrastructure, Multilevel, Regression, Evaluation, Risk, Analysis*

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