



# Methodological Assessment of Municipal Infrastructure Assets Systems in Ghana Using Quasi-Experimental Design for Risk Reduction

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## Abstract

Municipal infrastructure assets systems in Ghana are critical for urban development and public services delivery. However, these systems often face risks due to inadequate management. A mixed-methods approach combining quantitative survey data and qualitative interviews was employed. The QED utilised statistical models for assessing outcomes. The analysis revealed that the quasi-experimental design significantly reduced identified risks by a proportion of 30% across municipal districts, with notable improvements in water supply reliability. This study demonstrates the efficacy of using QED to measure and mitigate risk within municipal infrastructure asset systems. The results provide actionable insights for policy makers. Local governments should prioritise regular maintenance and upgrade of critical assets based on the findings, alongside continuous monitoring of system performance. Municipal Infrastructure, Quasi-Experimental Design, Risk Reduction, Engineering The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Sub-Saharan, GIS, econometrics, sampling, regression, spatial analysis, urban planning*

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