



# A Multilevel Regression Framework for Evaluating Municipal Water System Reliability in Kenyan Cities: An African Perspective on Governance and Maintenance Practices

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## Abstract

Municipal water systems in Kenyan cities face challenges related to reliability due to factors including governance and maintenance practices. A multilevel regression analysis will be employed to assess the impact of various governance mechanisms and maintenance strategies on water system reliability. The proposed multilevel regression framework provides a robust method for evaluating and improving municipal water system reliability in Kenyan cities. Policy recommendations include the integration of governance structures that enhance accountability and funding mechanisms to support maintenance activities. The empirical specification follows  $Y = \beta_{0+\beta}^{\vec{p}} X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African geography, multilevel analysis, governance structures, maintenance protocols, reliability indicators, statistical methods, urban infrastructure*

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