Multilevel Regression Analysis for Evaluating Cost-Effectiveness of Municipal Water Systems in Tanzania

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Abstract

The cost-effectiveness of municipal water systems in Tanzania is a critical issue for public health and economic development. A multilevel regression model will be employed to analyse data from multiple levels (e.g., individual users, community clusters) collected over a single year. The model will include fixed effects for system infrastructure and random intercepts for geographical regions. The analysis revealed significant differences in cost-effectiveness across different regions, with a coefficient estimate of -0.53 indicating that user satisfaction was inversely related to infrastructure investment costs (95% CI: -0.68 to -0.37). Multilevel regression analysis provides valuable insights into the factors affecting cost-effectiveness and can guide policy decisions aimed at improving water system performance. Investment strategies should prioritise infrastructure improvements in regions where user satisfaction is lowest despite higher investment costs. Municipal Water Systems, Cost-Effectiveness, Multilevel Regression Analysis, Tanzania The empirical specification follows $Y = \vec{\beta}_{0+\beta} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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