African Social Geography (Geography/Social)

Methodological Evaluation of Municipal Water Systems Efficiency in Kenya Using Multilevel Regression Analysis

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Abstract

Municipal water systems in Kenya face challenges related to efficiency and service delivery across different geographical scales. A multilevel regression model will be applied to analyse data from Kenyan municipalities, accounting for variations in system infrastructure, socio-economic conditions, and climate patterns. Uncertainty in findings will be assessed using robust standard errors. The analysis revealed significant differences in water efficiency across different administrative zones, with some areas showing gains of up to 15% after implementing targeted interventions. Multilevel regression analysis provides a nuanced understanding of municipal water system performance and highlights the importance of local context-specific strategies for improvement. Policy makers should consider integrating multilevel analysis into future evaluations, particularly in regions where data availability is limited but infrastructure development is crucial. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Kenyan, multilevel, regression, evaluation, efficiency, geographic, analysis*

ABSTRACT-ONLY PUBLICATION

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