African Ecology and Conservation (Environmental/Earth Science)

Methodological Evaluation of Municipal Water Systems in Kenya Using Difference-in-Differences Models for Risk Reduction Assessment

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Abstract

Municipal water systems in Kenya face significant challenges related to water quality, supply reliability, and infrastructure maintenance. A systematic literature review was conducted, including studies that applied difference-in-differences (DiD) models to measure risk reduction in Kenyan municipal water systems. The analysis focused on identifying robust empirical evidence and evaluating the effectiveness of DiD models in this context. The findings suggest that using DiD models significantly improved the ability to assess the impact of interventions, with a notable proportion (70%) of studies reporting statistically significant reductions in risk indicators such as water contamination levels. This review highlights the effectiveness of DiD models for evaluating municipal water systems and recommends their use alongside other methodologies. Researchers should consider the application of DiD models when studying interventions aimed at improving municipal water quality and reliability, with a focus on data collection methods that enhance model robustness. Municipal Water Systems, Risk Reduction, Difference-in-Differences (DiD), Kenyan Studies The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Kenya, municipal water systems, methodological evaluation, difference-in-differences, risk assessment, environmental science, sustainability assessments*

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