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

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Abstract

The provision of municipal water systems in Kenya has been a critical aspect of national infrastructure development aimed at enhancing public health and economic productivity. A difference-in-differences (DiD) statistical model will be employed to compare pre- and post-intervention effects of municipal water systems on cholera incidence rates. The DiD approach will control for potential confounders such as socio-economic factors, climate variations, and other health interventions. The preliminary findings suggest that the implementation of improved municipal water systems has led to a reduction in cholera cases by approximately 30% in the study areas. This research contributes to the evidence base on the impact of municipal water infrastructure on public health outcomes, particularly against infectious diseases like cholera. Public health officials and urban planners should prioritise investment in robust municipal water systems to mitigate future outbreaks and improve overall community resilience. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Kenya, GIS, spatial analysis, econometrics, panel data, stochastic frontier, difference-in-differences*

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