



Methodological Evaluation of Quasi-Experimental Designs in Municipal Water Systems in Uganda, Context

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Abstract

This review examines quasi-experimental designs used to evaluate municipal water systems in Uganda over a decade. A comprehensive search strategy was employed using databases such as PubMed and Web of Science. Studies were included if they utilised quasi-experimental designs to analyse municipal water system performance. Quasi-experimental designs showed significant variability in their ability to detect efficiency gains, with some studies reporting gains up to 20% in treated areas compared to control zones. The review highlights the need for standardised methodologies and clear data collection protocols to enhance reliability of quasi-experimental findings on municipal water systems effectiveness. Future research should focus on harmonizing quasi-experimental designs, ensuring consistent measurement tools across studies, and incorporating robust statistical models to improve validity. Model estimation used $\hat{\theta} = \operatorname{argmin}_{\theta} \sum_{i=1}^n (y_i - f(\theta(\xi)))^2 + \lambda \|\theta\|_r$, with performance evaluated using out-of-sample error.

Keywords: *African geography, quasi-experimental design, randomized controlled trials, impact evaluation, econometrics, social science methods, water infrastructure assessment*

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