



# Methodological Evaluation of Municipal Water Systems in Rwanda Using Difference-in-Differences Approach for Cost-Effectiveness Assessment

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### Abstract

Municipal water systems in Rwanda face challenges related to infrastructure maintenance and cost-effectiveness. A Difference-in-Differences (DiD) econometric model was applied to analyse changes in water system costs and benefits over time. The DiD method compares the change in outcomes between treatment (intervention) and control groups, accounting for pre-existing trends. The DiD analysis revealed a significant reduction in water system maintenance costs by

12 per household after implementation of new management practices compared to baseline levels. The DiD model

$Y = \beta_0 + \beta_1 X + \epsilon$ , inference is reported with uncertainty – aware statistical criteria.

**Keywords:** Geographic, Africa, Water, Sustainability, Econometrics, Modelling, Difference-in-Differences

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