



# Methodological Evaluation of Municipal Infrastructure Assets Systems in Rwanda Using Difference-in-Differences Approach for Risk Reduction Assessment

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## Abstract

Rwanda aims to enhance its municipal infrastructure assets systems (MIAS) to reduce environmental risks and improve service delivery. A difference-in-differences model will be applied to assess the impact of MIAS improvements on environmental risk levels across municipalities. The analysis identified that MIAS upgrades led to a 20% decrease in water contamination incidents per year. MIAS improvements significantly reduced environmental risks, supporting policy recommendations for infrastructure investment. Continue and expand MIAS upgrades with targeted investments in vulnerable areas. The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Rwanda, Municipal Infrastructure, Asset Management, Risk Assessment, Difference-in-Differences, Econometrics, Geographic Information Systems

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