



Urban Flood Mitigation Strategies in Durban's Coastal Areas Employing Cost-Effective Engineering Approaches and Longevity Metrics

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Abstract

Durban's coastal areas face significant urban flooding challenges, necessitating innovative flood mitigation strategies that balance cost-effectiveness with longevity. The study employed a mixed-methods approach combining field observations, statistical modelling, and expert consultations. A Poisson regression model was used to assess the frequency and intensity of flooding events over five years. A notable proportion (35%) of surveyed flood-prone areas showed improvement in resilience metrics after implementing new drainage systems, with a 95% confidence interval for these improvements. The study highlights cost-effective engineering solutions that enhance urban flood mitigation while ensuring long-term sustainability. Policy makers are encouraged to adopt and scale up the tested methodologies based on this research. 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: *Sub-Saharan, Coastal Settlements, Sustainable Engineering, Life Cycle Assessment, Grey Infrastructure, Green Roofs, Water Sensitive Urban Design*

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