



Replication Study on Climate-Resilient Urban Drainage Infrastructure Design in Coastal Ghana, 201X

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Abstract

Climate change exacerbates coastal flooding in Ghana's urban areas, necessitating resilient drainage infrastructure that can withstand increasing storm events. The replication study uses a hybrid modelling approach combining machine learning algorithms with traditional hydrological simulations to predict stormwater management outcomes under varying climate scenarios. A preliminary model suggests that incorporating green infrastructure elements like permeable pavements and bioswales can reduce peak discharge by up to 30% in high-impact rainfall events, aligning with local climate projections. The replication study confirms the effectiveness of the designed drainage system models in simulating realistic stormwater management responses for coastal Ghana's urban settings. Local authorities should consider integrating these design elements into future infrastructure projects to enhance resilience against future flooding events. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

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Techniques

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Concepts:

Urban Drainage Systems

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