African Telecommunications Engineering

Climate Resilient Infrastructure Design for Urban Drainage Systems in Coastal Ghana: A Technical Approach

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Abstract

Urban drainage systems in coastal regions like Ghana are vulnerable to climate change impacts such as increased rainfall intensity and sea-level rise. A combination of hydrological modelling and geospatial analysis was employed to assess potential climate impacts on ATMA's drainage systems. A Bayesian hierarchical model with uncertainty quantification was used for predictions. The study projected a 20% increase in annual precipitation intensity over the next decade, necessitating enhanced drainage capacity designs. Integrating engineered solutions and adaptive management strategies will be crucial to ensuring sustainable urban drainage systems in coastal Ghana under climate change conditions. Immediate planning for infrastructure upgrades should include a phased approach with community engagement and financial support mechanisms. Climate resilience, Urban drainage, Coastal adaptation, Bayesian hierarchical model The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographical Information Systems, Climate Change Adaptation, Hydrological Modelling, Coastal Geomorphology, Sustainable Drainage Systems, Environmental Impact Assessment, Urban Planning Techniques*

ABSTRACT-ONLY PUBLICATION

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