African Industrial Engineering

Climate-Resilient Design Strategies for Urban Drainage in Coastal Ghana

Taiwo Akoto[1]

[1] Kwame Nkrumah University of Science and Technology (KNUST), Kumasi

Published: 05 October 2005 | **Received:** 04 May 2005 | **Accepted:** 08 August 2005

Correspondence: takoto@gmail.com

DOI: 10.5281/zenodo.18814509

Author notes

Taiwo Akoto is affiliated with Kwame Nkrumah University of Science and Technology (KNUST), Kumasi and focuses on Engineering research in Africa.

Abstract

Urban drainage systems in coastal areas of Ghana are particularly vulnerable to climate change impacts such as increased rainfall intensity and sea-level rise. A mixed-methods approach combining field surveys with engineering simulations was employed to assess current drainage infrastructure and propose resilient designs. Field surveys revealed that existing drainage networks are predominantly designed based on historical rainfall patterns without considering future climate scenarios. A key finding is the need for at least a 20% reduction in stormwater runoff to mitigate flooding risks under projected climate change conditions. The study concludes that incorporating climate-resilient design principles can significantly improve urban drainage systems' performance against climate-induced challenges, with specific recommendations for material selection and system sizing. Specific recommendations include the use of permeable pavements in new developments to enhance water infiltration capacity and periodic maintenance schedules tailored to local climate forecasts. Climate change, Urban drainage, Coastal resilience, Design strategies, Ghana The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Climate Change, Coastal Engineering, Geographical Information Systems, Sustainable Design, Water Management, Urban Planning, Mitigation Strategies*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge