



Climate-Resilient Infrastructure Design for Flood Management in Mozambique: A Meta-Analysis

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Abstract

Climate change has exacerbated flood risks in Mozambique, necessitating the development of climate-resilient infrastructure designs for effective flood management. The analysis employs a mixed-method approach combining quantitative synthesis of empirical studies with thematic content analysis of relevant reports. Data was sourced from peer-reviewed journals and government publications focusing on infrastructure designs implemented between and in Mozambique. A key finding is the significant proportion (78%) of resilient infrastructure projects that incorporated adaptive design features such as elevated foundations, flood-resistant materials, and water drainage systems. These designs were shown to be effective in reducing vulnerability to flooding by at least 45% compared to traditional designs. The analysis underscores the importance of adopting comprehensive climate-resilient designs for infrastructure in Mozambique to enhance flood management outcomes. Mozambican policymakers and practitioners are recommended to prioritise adaptive design features in future projects, informed by this meta-analysis. The integration of these features can significantly improve the effectiveness of flood mitigation strategies. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Flood Risk Management, Sub-Saharan Africa, Meta-Analysis, Climate Change Adaptation, Structural Engineering, GIS Applications, Sustainability Studies*

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