

African Journal of Climate Science and Vulnerability Assessment

Flood-Resilient Road Design Standards for the Sudd Wetland Region of South Sudan

Structured peer-review report for editorial verification

Reviewer	Reviewer 1
Recommendation	Major Revision
Journal	African Journal of Climate Science and Vulnerability Assessment
Date	24 Mar 2026

Overall Summary

This study addresses a critical infrastructure gap by proposing flood-resilient road design standards for South Sudan's Sudd wetland region. It integrates hydrological modelling, geotechnical analysis, and economic assessment to develop practical engineering solutions. However, the manuscript suffers from significant methodological omissions, insufficient validation of key assumptions, and inadequate consideration of implementation challenges in a fragile state context. While the topic is highly relevant, substantial revisions are needed to meet publication standards.

Major Issues

- Insufficient methodological detail on the hydrological modelling approach, particularly regarding data sources, validation procedures, and uncertainty quantification for the Log-Pearson Type III distribution application
- No validation or sensitivity analysis for the benefit-cost calculations, with the reported NPV of USD 4.7 million per kilometre appearing exceptionally high without supporting evidence or comparison to regional benchmarks
- Inadequate consideration of practical implementation challenges in South Sudan's context, including construction material availability, local technical capacity, maintenance requirements, and security constraints affecting infrastructure projects

Minor Issues

- Abstract and introduction contain redundant content that should be streamlined
- Inconsistent citation format throughout the manuscript (e.g., World Bank, 2022 vs. Mason et al., 2016)
- Missing discussion of ethical considerations regarding field investigations in a conflict-affected region

Questions for the Authors

- What specific remote sensing products and processing methods were used to derive the 2010-2023 inundation data, and how was cloud cover during flood events addressed?
- How was the 25% climate change surcharge on peak discharge justified, and what climate projection scenarios were considered in its derivation?
- What alternative stabilisation methods were considered besides hydrated lime, and what criteria led to its selection over other options like cement or geopolymers?

Required Changes

- Provide comprehensive methodological details for all analytical components, including data sources, processing steps, model parameters, and validation procedures
- Include sensitivity analysis for the benefit-cost calculations and compare results with similar infrastructure projects in comparable environments
- Expand the discussion section to address implementation challenges, maintenance requirements, and adaptation strategies for local constraints
- Clarify the study's limitations regarding data quality, model assumptions, and generalisability to other wetland regions

Decision Rationale

The study addresses an important practical problem with potential real-world impact, but currently lacks the methodological rigour and contextual depth required for publication. Major revisions are necessary to strengthen the analytical foundation, validate key assumptions, and address implementation realities before the manuscript can be considered for acceptance.