



Federal Ministry
of Education
and Research



Université
de Lomé



Policy Brief

Coastal Erosion Dynamics of Dakar, Senegal

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I. Context

The coastal areas of Dakar, Senegal, is facing a critical challenge in the form of coastal erosion. This issue is exacerbated by the impacts of climate change, including rising sea levels and hydrodynamic agents such as tides, waves, and currents (Pouye, I. 2023). The consequences of coastal erosion are severe, leading to the loss of coastal areas, displacement of communities inland, and disruptions to vital economic activities like fishing and tourism. Senegal, as a developing country, is particularly vulnerable to these climate-related challenges, making it imperative to address the issue of coastal erosion in the Dakar region (Pouye, I. 2022).

II. Problem Statement

The coastal region of Dakar, Senegal, faces a severe and escalating threat in the form of coastal erosion. This phenomenon is primarily driven by the adverse impacts of climate change, including rising sea levels and the intensification of hydrodynamic

agents such as tides, waves, and currents. The consequences of coastal erosion in Dakar are profound and wide-ranging, encompassing the loss of valuable coastal land, the forced displacement of communities inland, and significant disruptions to critical economic activities, including fishing and tourism. While coastal erosion is a global challenge, Dakar is particularly vulnerable due to its status as a developing country with limited adaptation capacities (Quensière, J. 2013). The geographical location and socio-economic characteristics of the Dakar region further compound this vulnerability, making it imperative to address this pressing issue comprehensively and proactively.

This policy brief aims to analyze the complex dynamics of coastal erosion in Dakar, Senegal, provide critical insights into the extent of the problem, and offer evidence-based recommendations for adaptation strategies. By understanding the multifaceted nature of coastal

erosion and its far-reaching impacts, we can develop effective policies and interventions to mitigate its adverse effects and ensure the long-term resilience of the Dakar coastal areas.

III. Key Findings

1. Coastal Erosion Dynamics

Analysis of the coastline from 1990 to 2040 using Geographic Information System (GIS) techniques

reveals average retreat rates of about -0.44 m/year, 0.21 m/year, and -0.11 m/year on the northern, western, and southern coasts of Dakar respectively. Projections indicate that by 2030, these rates are expected to increase to approximately -4.4 m/year (north coast), 2.1 m/year (west coast), and -1.1 m/year (south coast). By 2040, they may reach around -8.8 m/year (north coast), 4.2 m/year (west coast), and -2.2 m/year (south coast) (Figure 1).

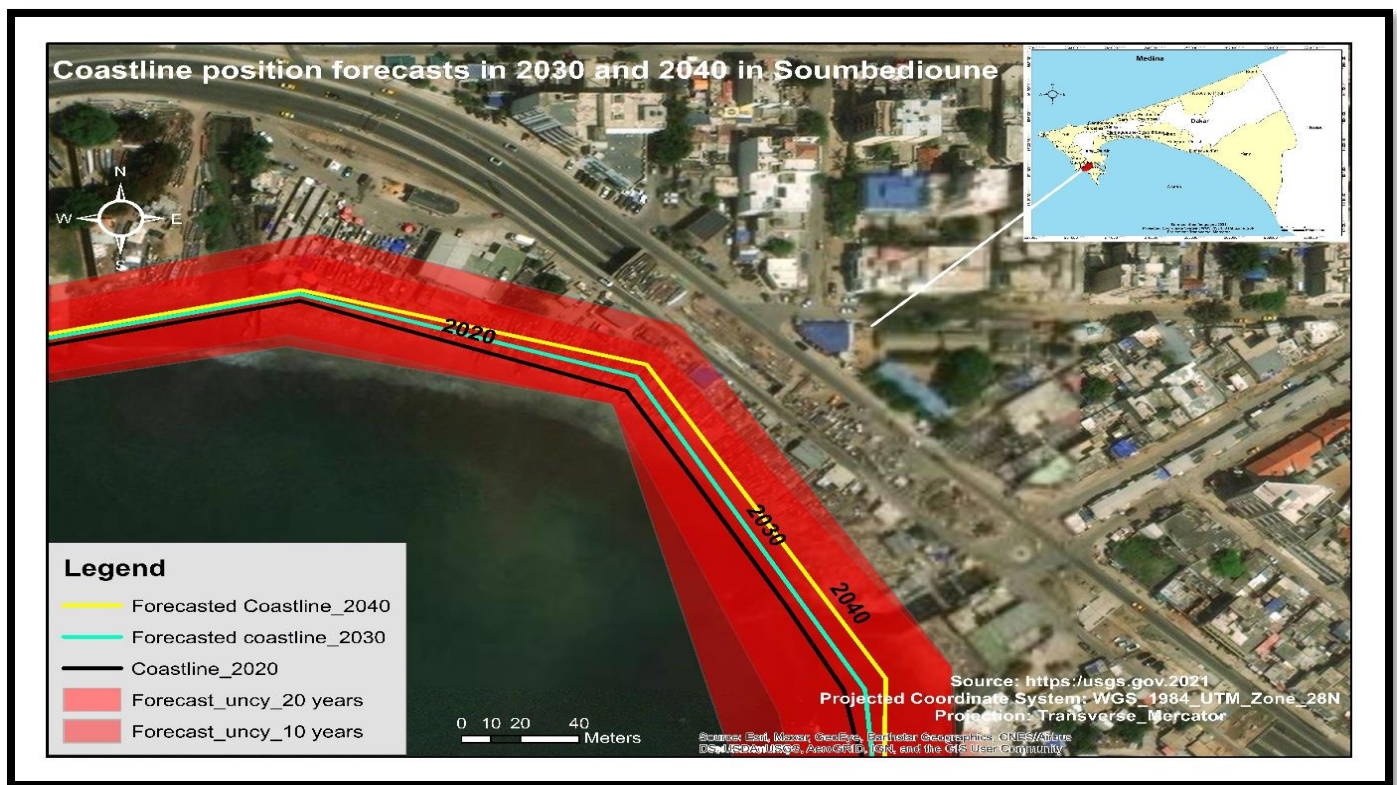


Figure 1: Future coastline positions and lost areas in 2030 and 2040 in Soubédioune village (Western coast of Dakar)

Predicted dynamic rates imply a loss of coastal areas estimated at 861,273 m² in 2030 and 1,256,493 m² in 2040.

2. Physical Vulnerability

The Coastal Vulnerability Index (CVI) method assesses vulnerability levels, revealing varying indexes on the northern (94), western (10), and southern (23) coasts.

3. Socio-economic Vulnerability

The Dakar region's physical vulnerability to coastal erosion is compounded by human activities, including abnormal settlements, pollution, and sand mining. A socio-economic vulnerability index, considering population density, dependency ratio, gender ratio, and education levels, highlights varying vulnerabilities across different sectors of Dakar. The indices are scaling from 0 to 10. Five district municipalities are very highly vulnerable socio-economically (Sam Notaire (5.4), Wakhinane Nimzatt (6), Yeumbeul Nord (6.7), Keur Massar (5.8) and Rufisque Est (6)). The district municipalities of Mbao, Thiaroye Sur Mer, Bel-Air, Medina and Parcelles Assainies are vulnerable with the respective indices 4.8, 4.2, 4.2, 5 and 4.3.

4. Economic Loss

Estimations based on littoral property values and lost areas due to erosion suggest economic losses of 38,507,856,000 FCFA in 2030 and 57,822,698,000 FCFA in 2040 for coastal municipalities. Malika, Plateau, and Ngor are among the most economically affected areas.

IV. Recommendations for Adaptation Strategies

1. Capacity Building

➤ Strengthen the capacity of institutions responsible for coastal management, such as the

Division de l'Environnement des Etablissements Classés (DEEC).

➤ Encourage education in fields like Oceanography and coastal engineering. Increase the budget allocation for environmental protection.

2. Early Warning Systems

➤ Enhance existing early warning systems by installing tide and wind gauges along the coast.

➤ Develop public information programs to raise awareness about coastal hazards.

3. Local Community Involvement

➤ Establish community teams for coastal cleanliness and awareness campaigns about coastal erosion.

➤ Allocate specific budgets for coastal management in district municipalities.

➤ Facilitate discussions with economic actors, like fishermen and hotel owners, to engage them in coastal management.

4. Empower Economic Actors

➤ Provide funding and equipment support to economic actors, such as fishermen and hotel owners, to enhance their resilience to coastal erosion impacts.

5. New Relocation Policies

➤ Implement new relocation policies for communities affected by coastal erosion, allowing for more resilient infrastructure planning.

6. Public Awareness

➤ Raise public awareness about climate change, coastal erosion impacts, and the importance of sustainable coastal management through education, information, and communication strategies.

V. Policy Implication

➤ Addressing coastal erosion in Dakar requires a coordinated and multi-faceted approach, involving government agencies, local communities, and international partners.

➤ Policymakers must prioritize the allocation of resources, capacity building, and effective communication to implement and enforce adaptation measures.

VI. Target Audience

Government Agencies: Ministries of Environment, Tourism, Industry, and Fisheries should lead efforts to address coastal erosion. Local government bodies in Dakar should also be actively involved.

Local Communities: Residents, fishermen, and business owners in coastal areas need to participate in adaptation efforts and follow safety guidelines.

International Partners: Organizations like the United Nations, NGOs, and climate-focused initiatives should support Senegal's coastal resilience programs.

VII. Implementation Plan

Capacity Building: Establish training programs for government officials in coastal management and climate adaptation. Collaborate with universities and international institutions to provide specialized courses.

Early Warning Systems: Procure and install tide and wind gauges along the coast. Develop public awareness campaigns about coastal hazards and response plans.

Local Community Involvement: Create community teams for coastal cleanliness and awareness campaigns. Allocate specific budgets to district municipalities for coastal management projects.

Empower Economic Actors: Establish funding mechanisms and provide equipment to support economic actors' resilience to coastal erosion impacts.

New Relocation Policies: Develop and implement relocation policies with a focus on resilient infrastructure and community engagement.

Public Awareness: Launch educational initiatives, workshops, and media campaigns to raise awareness about climate change and coastal erosion.

VIII. Monitoring and Evaluation:

Establish a monitoring and evaluation framework to track the progress and effectiveness of adaptation

measures. Key performance indicators include:

- Reduction in coastal land loss rates.
- Improved socio-economic conditions in vulnerable communities.
- Increased public awareness and engagement.
- Reduction in economic losses due to erosion.
- Regular assessments and reporting will inform policy adjustments and ensure that the adaptation strategies remain effective and responsive to changing conditions.

IX. Conclusion

Coastal erosion in the Dakar region of Senegal is a multifaceted challenge influenced by climate change, hydrodynamic agents, and human activities. Understanding the complex dynamics of coastal erosion is crucial for developing effective adaptation strategies. This policy brief provides a comprehensive overview of the issue, its impacts, and recommendations for enhancing resilience in the face of this growing threat. Implementing these strategies will not only protect the coastal environment but also safeguard the livelihoods and economic well-being of communities in Dakar, Senegal. It is imperative that these recommendations are considered and acted upon to mitigate the adverse effects of coastal erosion and ensure a sustainable future for the Dakar region.

References

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