

ADAPTING COASTAL CITIES AND TERRITORIES TO SEA LEVEL RISE IN WEST AFRICA

Challenges and Leading Practices



OCEAN & CLIMATE
PLATFORM



SHARING SOLUTIONS WITH COASTAL
CITIES TO TACKLE SEA LEVEL RISE

Partners



Centre de Suivi Ecologique

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Contact: Théophile Bongarts Lebbe, Project Manager of the Sea'ties Initiative, Ocean & Climate Platform: tbongarts@ocean-climate.org

Website: <https://ocean-climate.org/seaties/>

Editing and layout: Natacha Bigan

Translation: Delphine Siret

Cover photos: ©Bente Marei Stachowske, ©Demba Joob, ©Peeterv

Back cover photos: ©Lopez Robin, ©Lunamarina, ©Lunamarina

The Ocean & Climate Platform: Who are we?

The Ocean & Climate Platform (OCP) is an international network of more than 100 organisations from civil society - including NGOs, research institutes, foundations, local authorities, international organisations, and private sector entities - working together in order to spread the following message: “a healthy ocean for a protected climate”. The Platform draws on the best available science and expertise of its members to promote ocean-based solutions to tackle climate change and biodiversity loss. Through its role as a science-policy interface, the OCP supports decision-makers in need of scientific information and guidance in the definition and implementation of public policies.

The OCP's agenda on adaptation at the United Nations Framework Convention on Climate Change (UNFCCC)

As an observer organisation to the UNFCCC, the OCP has been working towards the integration and mainstreaming of ocean-related mitigation and adaptation measures into climate strategies, most notably the Parties' Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), and as such, is mobilised to scale up States' ambitions to meet the goals of the Paris Agreement.

The Ocean and Climate Change Dialogue under the Subsidiary Body for Scientific and Technological Advice (SBSTA). Pursuant to the [decision 1/CP.26 paragraph 64](#), the Ocean and Climate Change Dialogue was mandated by the 26th Conference of the Parties (COP 26) to be organised annually to strengthen the understanding of and action on ocean and climate change adaptation and mitigation. The OCP actively takes part in sessions of the Dialogue by submitting the collective contributions of its members and supporting the work of the co-facilitators.

Expert Group on “Ocean and Coastal Zones” of the Nairobi Work Programme on adaptation (NWP-Ocean). Acting under the aegis of SBSTA, the NWP-Ocean aims to develop knowledge tools for a better understanding and integration of marine issues in States' adaptation strategies, in particular developing countries, including the Least Developed Countries and Small Island Developing States. Since 2019, the OCP has been one of the 23 constituting organisations.

The Global Climate Action Agenda under the Marrakech Partnership (MP-GCA). The MP-GCA establishes a dialogue between Parties and non-Party stakeholders (e.g., cities, regions, NGOs, businesses, and investors) around seven priority climate actions, including the ocean, divided into seven groups. As focal point for the “Ocean and Coastal Zones”, the OCP mobilises non-state actors around key messages, aligned with the Ocean Pathway, to scale up ocean-based climate action towards a resilient, nature-positive, and net-zero future.

TABLE OF CONTENTS

Acknowledgements	3
The Ocean & Climate Platform, who are we?	4
About the Sea'ties initiative	8
Foreword: Seydina Issa Laye Sambe, Mayor of the municipality of Yoff	10
Executive summary	12
List of acronyms	13
Summary for decision-makers	14
Introduction	17
West Africa faced with rising sea levels	
A proactive adaptation still anchored in protective works	
1. Strengthening and sharing knowledge about the West African coastline to inform adaptation	23
1.1 Gaining a better understanding of the West African coast	
1.2. Establishing a dialogue between researchers, policymakers and funding organisations to make knowledge actionable	
2. Promoting integrated, place-based governance of the West African coastline	35
2.1. Developing an integrated coastal approach	
Implementing and improving the legislative and administrative framework for coastal management	
Fostering coordination among coastal municipalities and regions	
2.2. Apprehending coastal adaptation at the local level	
Building the capacity of local stakeholders	
Encouraging active participation of non-state actors	
3. Increasing funding for sustainable adaptation strategies in coastal cities and territories of West Africa	47
3.1. Unlocking finance for hybrid, sustainable and flexible coastal adaptation strategies	
3.2. Strengthening and supporting cities in accessing international funding	
3.3. Making cities more self-sufficient and diversifying their funding sources	
Strengthening the financial autonomy of coastal cities	
Stimulating private investment in coastal city adaptation projects	
Resources	55

Case studies

- **Case study 1.** ORLOA - Improving knowledge and assisting decision-making to reduce risk at the regional level **32**
- **Case study 2.** Preparing the managed retreat at the intermunicipal level in Saint-Louis, Senegal **44**

Boxes

- **Box 1.** OSS Saint-Louis, Senegal: Harnessing the potential of satellite imagery to produce decision-support indicators, Space Climate Observatory (SCO) **25**
- **Box 2.** ENGULF programme: Factoring subsidence into the assessment of exposure to relative sea level rise along the Gulf of Guinea **29**
- **Box 3.** Good ecological governance programme in the intermunicipal agreement of Senegal's Petite Côte for integrated coastal zone management (EIPC-ICZM) **39**
- **Box 4.** APPEL: An alliance of parliamentarians and local elected officials for environmental protection in West African coastal countries **41**
- **Box 5.** ReCoL-CI: A network of 29 municipalities for concerted management of Côte d'Ivoire's coastline **42**
- **Box 6.** CICLIA: A facility to support sub-Saharan African cities in preparing resilience projects (AFD) **51**

The Sea'ties Initiative

The Sea'ties Initiative aims to facilitate the development of public policies and the implementation of adaptation solutions to support coastal cities threatened by sea level rise. Led by the Ocean & Climate Platform, the initiative is intended for elected representatives, administrators and stakeholders involved in this transition as a forum to exchange knowledge and experiences of sustainable solutions towards coastal resilience. Observing that a diversity of solutions has already been implemented across the world and can be inspirational for other coastal cities and territories, Sea'ties mobilises coastal experts and cities from five regions of the world featuring a diversity of climatic, geographic, social, economic, and political contexts. By connecting experiences, characterising them through scientific works and disseminating them in a range of formats, we can promote leading practices and support the choices of political decision makers and regional administrators.

Primary goals

- 1/ **Compile scientific knowledge and data** into accessible summaries and databases to identify and analyse solutions deployed by coastal cities across the world.
- 2/ **Foster the emergence of good practices and facilitate the exchange of knowledge and experiences**

among coastal stakeholders during regional workshops. Leverage this collective reflection to identify enabling factors for the deployment of sustainable, equitable adaptation solutions.

3/ Encourage the integration of adaptation challenges into national and international policies by submitting policy recommendations to decision makers that are informed by real world experience complemented with scientific knowledge

Regional workshops

By bringing together experts and key stakeholders working on adapting coastal cities and territories to sea level rise - e.g., scientists, regional planners, NGOs, civil society representatives, elected officials - regional workshops aim to provide an understanding of the plurality of adaptation responses deployed in diverse geographical and socio-economic settings. To highlight the diversity of approaches and solutions implemented across the world, five regional workshops were scheduled between 2021 and 2023. To improve the integration of adaptation challenges into public policies, returns on experience shared by participants will inform the production of recommendation and the advocacy work of the Ocean & Climate Platform, including at the UNFCCC.



Reference tools and documents

The Sea'ties Initiative contributes to the enhancement and diffusion of knowledge on adaptation issues through the production of scientific papers, reports, reference tools, and other material for the scientific community, policy makers, and the public.

Regional Reports

Each Sea'ties workshop, complemented by preliminary interviews, informs the production of a regional report providing an overview of the current obstacles and needs to be addressed to implement adaptation strategies, highlighted by regional experiences. Intended for policy makers, city planners, and residents willing to pursue transformational change on their coasts, the reports shed light on good practices to inspire action. The reports "Adapting Coastal Cities and Territories to Sea Level Rise: Challenges and Best Practices" in [Northern Europe](#), the [Mediterranean region](#) and the [U.S. West Coast](#) are available on the [Sea'ties webpage](#).

The Sea'ties Declaration

Initiated by the OCP, the French Government and the City of Brest, with the support of ICLEI and the "Race to Resilience" campaign, the Sea'ties Declaration commits more than 40 mayors, governors, and city networks across the world to the challenges of adapting coastal cities and territories to sea level rise. The Declaration is a call to accelerate adaptation action addressed to the international community, and highlights four priority strategies: (1) mobilising science and observation systems, (2) integrating societal issues within adaptation plans, (3) fostering of adaptive and hybrid solutions, and (4) increasing of public funding and private investments for adaptation to sea level rise.

Scientific Article - Designing Coastal Adaptation Strategies to Tackle Sea Level Rise

The article "Designing Coastal Adaptation Strategies to Tackle Sea Level Rise" is a synthesis of scientific literature and presents four archetypes of adaptation strategies to sea level rise. These are analysed according to their governance modalities and characterised based on their degree of implementation complexity. This synthesis was co-written by scientists from the RTPi-Sea'ties, co-led by the OCP and CNRS, and was published in the Journal Frontiers in Marine Science, Ocean Solutions section in November 2021.

The Blue-Tinted White Paper, Investment Protocol: Unlocking Financial Flows for Coastal Cities Adaptation to Climate Change and Resilience Building

highlights the financial gaps and opportunities for coastal cities' adaptation and provides recommendations to unlock financial flows at scale.

Policy Brief - Adapting Coastal Cities and Territories to Sea Level Rise

The policy brief "Adapting Coastal Cities and Territories to Sea Level Rise" addresses the challenges faced by stakeholders in the field of adaptation and highlights the essential elements of a sustainable transition of coastal territories.

Map of Solutions

The Map of Solutions is an interactive map listing hybrid responses implemented around the world to tackle the risks associated with sea level rise. It provides project leaders with concrete feedback, highlighting the outcomes, takeaways, and cautionary remarks to inspire and support coastal stakeholders in the implementation of adaptation strategies in their coastal cities and territories.



Foreword

MUNICIPALITY OF YOFF, SENEGAL

Yoff, a municipality in the Dakar department, is in close communion with the sea. Witness to the history of peoples and cultures, the coastline is a driving force for the future of the city. For centuries, fishing communities have lived in Yoff. In addition to being one of the main sources of income and food, fishing now guarantees social cohesion and identity. Today, the development of tourism and other blue economy sectors, attracts a significant proportion of Yoff's young population which is now moving to live by the sea. As the municipality continues to develop, its future is increasingly linked to the preservation and conservation of the coastline and its ecosystems.

However, Yoff is struck in full force by the impacts of climate change and sea level rise. Beaches are rapidly receding, undermining the local economy and threatening public infrastructure. In addition to coastal erosion, there are a multitude of other risks, including flooding caused by heavy rainfall. Hospitals, schools, roads and homes are regularly flooded and are at risk from rising sea levels.

Aware of the magnitude of the challenges and willing to ensure the sustainable development of Yoff, we are gathering local, national and international forces to scale up adaptation. The municipality has already initiated awareness-raising, consultation and participation activities to help citizens grasp the issues of coastal erosion and marine pollution.

But we cannot do this alone. To succeed in this transition, the city needs financial and political support, as well as new knowledge and information on leading practices to be developed. With this in mind, the municipality of Yoff joins the efforts of the Sea'ties initiative led by the Ocean & Climate Platform, by participating in the Sea'ties regional workshop held in Dakar in October 2022 and signing the Sea'ties Declaration. By endorsing this report, the municipality of Yoff wishes to not only shed light on the challenges of adaptation in West Africa, but also to promote cooperation between coastal cities around the world in order to find innovative and transformative solutions.

Mr. Seydina Issa Laye SAMBE,
Mayor of the municipality of Yoff

ACRONYMS

EXECUTIVE SUMMARY

This report draws on discussions held during the Sea'ties workshop "Adapting coastal cities and territories to sea level rise in West Africa" organised by the Ocean & Climate Platform, in partnership with the Centre de suivi écologique, and with the support of Climate Chance, on October 5, 2022, in Dakar, Senegal, as well as a series of individual interviews conducted between October 2022 and February 2023. The Sea'ties workshop brought together more than 60 participants to discuss their practices, the obstacles encountered and their needs in terms of producing and sharing knowledge, how to mobilise financial and private stakeholders to fund solutions, and engage and include local actors in adaptation strategies.

Intended for policymakers, city planners and all stakeholders involved in adaptation planning who pursue transformational changes, this report provides an overview of current challenges and highlights, through case studies and boxes, some examples of leading practices and possible responses in West African coastal cities.

While the West African coastline is highly appealing, and, as a result, home to a growing population, it is particularly exposed to the impacts of sea level rise. It is therefore urgent to envision new approaches to adaptation that prioritise longer-term planning and involve all stakeholders in the decision-making process. The main obstacles to informed decision-making are the lack of data and risk and vulnerability analysis, as well as the limited interaction between knowledge production, decision-making and investment choices. Furthermore, adapting coastal cities and territories to climate change adds complexity to an already fragmented coastal governance, and represents an additional burden for municipalities with limited resources. Strengthening intermunicipal cooperation and empowering local stakeholders, especially non-state actors, can help address these needs while promoting an integrated, place-based approach to adaptation. Finally, inadequate funding and directed towards unsustainable solutions - delays the transition of coastal cities. To ensure that coastal adaptation projects adequately address local challenges, cities must be directly involved in their technical and financial conduct, while financial stakeholders should develop innovative mechanisms to promote dynamic and adaptive strategies.

ACT-SL - Association des collectivités territoriales de Saint-Louis au Sénégal (Association of territorial authorities of Saint-Louis in Senegal)

ADM - Agence de développement municipal au Sénégal (Municipal development agency in Senegal)

AFD - Agence française de développement (French development agency)

ANAGIL - Agence nationale de gestion intégrée du littoral en Côte d'Ivoire (National agency for integrated coastal management in Côte d'Ivoire)

APPEL - Alliance des parlementaires et élus locaux pour la protection de l'environnement dans les pays du littoral ouest-africain (Alliance of parliamentarians and local elected officials for environmental protection in West African coastal countries)

CICLIA - Cities and CLimate in Africa

CMIP - Coupled Model Intercomparison Project

CSE - Centre de suivi écologique (Ecological monitoring centre, Senegal)

EIPC - Entente intercommunale de la Petite Côte au Sénégal (Intermunicipal association of the Petite Côte of Senegal)

GDP - Gross Domestic Product

GHG - Greenhouse gases

GIS - Geographic Information System

GLOSS - Global Sea Level Observing System

GMES - Global Monitoring for Environment and Security

IOC - UNESCO - Intergovernmental Oceanographic Commission of

IPCC - Intergovernmental Panel on Climate Change

ICZM - Integrated Coastal Zone Management

MPA - Marine Protected Area

MSIP - Multi-Sector Investment Plan

ORLOA - Observatoire régional du littoral ouest-africain (Regional observatory of the West African coast)

PAGIL - Plan d'aménagement et de gestion durable du littoral en Côte d'Ivoire (Sustainable coastal development and management plan in Côte d'Ivoire)

PROGEP - Projet de gestion des eaux pluviales et d'adaptation au changement climatique au Sénégal (Stormwater management and climate change adaptation project in Senegal)

ReCoL-CI - Réseau des communes littorales de Côte d'Ivoire (Network of coastal municipalities in Côte d'Ivoire)

REPES - Réseau des Parlementaires pour la Protection de l'Environnement au Sénégal (Network of parliamentarians for environmental protection in Senegal)

RESALOA - Réseau d'alerte du littoral ouest-africain (West African coastal warning system)

SCO - Space Climate Observatory

SERRP - Saint-Louis Emergency Recovery and Resilience Project (Senegal)

TAP - Transformative Actions Programme

WACA - West Africa Coastal Areas management programme

WACA-FFEM - Project on coastal risk monitoring and soft solutions in Benin, Senegal and Togo carried out as part of the WACA programme, in collaboration with the French Facility for Global Environment (FFEM in French)

WACA-ResIP - Resilience Investment Project for West Africa Coastal Areas

SUMMARY FOR POLICYMAKERS

Coastal states in West Africa are witnessing a rapid retreat of their shoreline. The World Bank estimates that in Benin, Côte d'Ivoire, Senegal and Togo, more than half the coastline is eroding at an average rate of 1.8 metres per year. The impacts of climate change, combined with anthropic activities, are accelerating this phenomenon, which is expected to continue in the long term as global mean sea level is projected to rise by more than one metre by 2100 (RCP 8.5). West African coastal cities and their populations are at the forefront, since the coastal urban population is expected to exceed 80 million by 2050³, concentrated mainly on the urban periphery and in medium-sized cities⁴. As a result, the socio-economic, cultural, institutional, political and environmental challenges are colossal. Although States are making commitments and developing legal frameworks to tackle erosion, planning and implementing coastal adaptation policies place an additional burden on local authorities responsible for these plans, when they are already struggling with a chronic lack of resources and information. Three avenues can be explored to facilitate the adaptation of West African cities to sea level rise.

1

STRENGTHENING AND SHARING COASTAL KNOWLEDGE TO INFORM ADAPTATION

Conceiving and implementing informed coastal adaptation policies hinge on gaining an integrated understanding of the shoreline and its dynamics. Yet, this is hindered by insufficient data at local and regional levels. It is therefore essential to increase, standardise and diversify the data collected and its subsequent analysis. This requires increased investment in research capacity building, and fostering cross-border networks to pool resources and expertise. To address resource limitations, it is imperative to devise less expensive and complex research protocols which involve stakeholders on the ground notably through participatory research programmes. To ensure that the data is effectively used in public policies and investment decisions, it must be transformed into actionable information. Indicators should provide information on physical, environmental and socio-economic changes so that decisions can be formulated timely and at

1/ Croitoru, L., Miranda, J.J., Sarraf, M. (2019). *The Cost of Coastal Zone Degradation in West Africa : Benin, Côte d'Ivoire, Senegal and Togo*. World Bank, Washington, DC. © World Bank. <https://documents1.worldbank.org/curated/en/822421552504665834/pdf/The-Cost-of-Coastal-Zone-Degradation-in-West-Africa-Benin-Cote-dIvoire-Senegal-and-Togo.pdf>

2/ IPCC. (2021). *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. et al. (eds.)]. Cambridge University Press. Cambridge, United Kingdom and New York, NY, USA, 2391 pp. doi:10.1017/9781009157896

3/ World Bank. (2022). *Compendium : Coastal Management Practices in West Africa - Existing and Potential Solutions to Control Coastal Erosion, Prevent Flooding and Mitigate Damage to Society*. Washington, DC: World Bank. © World Bank. https://horizon.documentation.ird.fr/exl-doc/pleins_textes/2022-06/010085571.pdf

4/ Förster, T., Ammann, C., (2018). *African Cities and the Development Conundrum*. *International Development Policy*, 10 | 2018. <https://doi.org/10.4000/poldev.2621>

scale. Creating a productive dialogue between knowledge producers, decision-makers, investors and civil society relies on providing tools (e.g., open data platforms) and dialogue structures as well as supporting multi-stakeholder networks for exchanging knowledge, all of which are already being developed in West Africa.

2

PROMOTING INTEGRATED, PLACE-BASED COASTAL GOVERNANCE

Given the strong interdependence of West African shorelines and hinterlands from an ecological, demographic and socio-economic point of view, adapting to rising sea levels requires better coordination of cities and territories. Managing the coastline in an integrated manner, taking into account specific local characteristics and the challenges of rising sea levels, involves defining specific legislation to coastal areas and facilitating coordination between different levels of governance. Thus, it is particularly relevant to encourage municipalities to pursue their effort in grouping together within intermunicipal associations or networks of cities and elected officials. Similarly, the systematic participation of non-state groups and customary law authorities is crucial to account for the political, economic and socio-cultural power dynamics that currently influence city planning, and thus ensure that livelihoods are preserved or even improved.

3

INCREASING FUNDING FOR SUSTAINABLE ADAPTATION STRATEGIES FOR COASTAL CITIES

Coastal cities lack access to the funding needed to adapt, whether it be international grants or loans, resources redistributed by governments or private investments. Involving municipalities in the technical and financial management of adaptation policies is one way of ensuring that local issues are taken into account. In line with this, central governments, relevant ministries and international donors are responsible for supporting local financial engineering and for guaranteeing greater financial autonomy of cities. It is thus imperative to mobilise an ecosystem of local economic stakeholders comprising banks, local development agencies and chambers of commerce and industry. Furthermore, adaptation funds are generally earmarked for unsuitable protective structures, and released in emergency situations. A paradigm shift is needed for coastal adaptation to be anticipated and geared towards long-term solutions. This requires raising awareness among all stakeholders and rethinking funding mechanisms – beyond the project duration – to strengthen local capacities.



INTRODUCTION

West Africa faced with rising sea levels

From Mauritania to Benin, West African coastal cities are home to a growing population. In 2020, a third of the region's inhabitants lived along the coast, half of whom were city dwellers⁵. This trend is set to accelerate since, from 2020 to 2050, the coastal urban population is expected to increase from 36 million to more than 80 million⁶. Although a significant proportion of the population is concentrated in the major capitals of West Africa (Dakar, Conakry, Abidjan, Accra, Lagos, etc.), middle-sized cities and their outskirts are experiencing the fastest population growth. This increase is primarily attributed to the rural exodus, with people drawn to the economic prospects offered by coastal cities, where over half of the region's gross domestic product (GDP) is generated⁷.

In these areas where critical socio-economic issues are concentrated, the impacts of sea level rise are a major current and future concern. The combination of climate-related and anthropic pressures is already responsible for a rapid retreat of the coastline, albeit with large local variations. In 2019, the shoreline receded by an average of 1.6 metres in Senegal and 2.4 metres in Togo. In the future, some areas will be particularly vulnerable, such as the Saloum Delta in Senegal, where the coastline is anticipated to retreat more than 268 metres by 2050, i.e., more than 8 metres per year⁸. The West African coast is mainly characterised by low-lying areas, comprising soft sediments and highly mobile geomorphological formations (sandy beaches, dune belts, creeks and mangrove estuaries). This renders it an unstable environment, especially since it is subject to tides and meteorological events, such as periods of high waves and heavy rainfall leading to significant flooding. In a scenario where greenhouse gas (GHG)

emissions continue to increase (RCP 8.5), sea level rise is expected to accelerate and exceed one metre by 2100, with an increase and intensification of extreme events⁹ thereby accelerating erosion and the frequency of marine submersion. Simultaneously, climate change is expected to reduce rainfall in certain regions, leading to lower river flow and subsequently decreasing sediment transport to the coast¹⁰, which in turn, is projected to exacerbate erosion.

Human activities exert additional pressure on the coastal environment. A study conducted by the *Institut de Recherche pour le Développement* (IRD) in collaboration with local experts from the *Centre National d'Etudes Spatiales* (CNES) revealed that socio-economic development on the West African shoreline is likely to be the main factor amplifying vulnerability and risks associated with coastal flooding in the future, surpassing the impacts of sea level rise¹¹. Indeed, rapid and unplanned urban development coincides with large sprawl in areas most at risk from erosion and submersion. Hitherto occupied to a limited extent and concentrated around cities, coastal areas are now undergoing increasing artificialisation, leading to the destruction of ecosystems that are key for protecting the shoreline by attenuating wave power and holding back sediment such as mangroves. Economic development involves the installation of infrastructure, which often accelerates erosion processes. This is the case in Benin and Togo, where sedimentary budgets have been considerably reduced by the construction of river dams on the Mono and Volta rivers in the 1960s, and the ports of Cotonou and Lomé.

The economic and social impacts and the effect on the physical and mental health of populations are already

5/ Op. cit., World Bank. (2022). *Compendium : Coastal Management Practices in West Africa - Existing and Potential Solutions to Control Coastal Erosion, Prevent Flooding and Mitigate Damage to Society*.

6/ Ibid.

7/ Ibid.

8/ Sakho, I., Sadio, M., Camara, I., et al. (2022). *Sea level rise and future shoreline changes along the sandy coast of Saloum Delta, Senegal*. *Arabian Journal of Geosciences*, 15:1547, <https://doi.org/10.1007/s12517-022-10741-y>

9/ Op. cit., IPCC (2021). *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*.

10/ WACA. (2016). *Knowledge sheet 6: The effects of climate change on coastal erosion in West Africa*. https://www.wacaprogram.org/sites/waca/files/knowdoc/The%20effects%20of%20erosion%20in%20West%20Africa_0.pdf

11/ Dada, O. A., Almar, R., Morand, P., Bergsma, E. W. J., Angnuureng, D. B., Minderhoud, P. S. J., (2023). *Socioeconomic development change, rather than sea level rise, forms the main hazard for the future West African coast*. *Nature Communications Earth & Environment*, 4:150. <https://doi.org/10.1038/s43247-023-00807-4>

visible and will have long-term implications. The decline in high-value activities and supporting infrastructure, such as ports, could cause important economic disruption. The port of Nouakchott in Mauritania is considered the most exposed to coastal hazards in the region. According to the World Bank, the cost associated with erosion in Benin, Côte d'Ivoire, Senegal and Togo in 2017 amounted to USD 964 million, i.e., 1.4% of average GDP¹². Rising sea levels also pose serious health and human rights issues. In addition to destroying homes, flooding increases the risks of water contamination, mosquito infestations and water-borne diseases. Besides, disruptions to the cultural and spiritual connection that traditional communities, like the fishing communities of the Lebu people in Senegal, maintain with the coast, is a major concern¹³.

Coastal populations are unequally exposed to risks. Those living on the outskirts of cities and in peri-urban areas are particularly vulnerable, as they tend to inhabit informal settlements with limited access to essential public services and facilities like roads, hospitals, protective and drainage infrastructure. Women are disproportionately vulnerable to disasters and the impacts of sea level rise. In some municipalities facing the impacts of climate change, such as Gandiol and Guet Ndar in Saint-Louis (Senegal), mobility towards safer areas and with more economic prospects has mainly been accessible to men, while women have remained in prone-risk areas¹⁴.

A proactive adaptation still anchored in protective works

Regional and national stakeholders are increasingly working together to better manage the coastline and prepare it for climate change. Article 10 of the Abidjan Convention on coastal erosion stipulates that contracting Parties shall take "all appropriate measures to prevent, reduce, combat and control [...] coastal erosion resulting from human's activities [...]"¹⁵. This commitment was renewed in 2019, when the State Parties signed four protocols, including the Pointe-Noire Protocol and the Calabar Protocol, aimed at improving the management of their respective and collective ocean and coastal zones. Several strategic frameworks and regional programmes further support these commitments by promoting multi-scale, multi-stakeholder coastal management that integrates climate change and coastal hazards adaptation. These include the [West African coastal master plan](#)¹⁶ (SDLAO) and [the West Africa Coastal Areas management programme \(WACA\)](#). Launched in 2018, the first investment phase of the WACA programme (WACA-ResIP 1) gathered six countries (Benin, Côte d'Ivoire, Mauritania, Sao Tome and Principe, Senegal and Togo) and regional organisations to give them access to the funding and technical expertise needed to manage climatic and anthropogenic coastal risks¹⁷. Three other countries, namely the Gambia, Ghana and Guinea Bissau, have since joined the second phase of the project (WACA-ResIP 2).

However, the spatial development of coastal cities and territories still tend to exacerbate the vulnerability of populations, while the risks associated with rising sea levels are rarely taken into account in national policies. Even though some States have adopted legal frameworks – such as land codes – to limit the

settlement of facilities and populations in prone-risk areas, these are poorly applied in practice, and urban development continues without factoring in the vulnerability of new infrastructure. Faced with these immediate risks, the approach often remains reactive and focuses on hard protection¹⁸. Yet, experience shows that the initial investment and maintenance costs of engineering works are high. Besides, seasonal, interannual variabilities of oceanographic factors (wave climates, swells, potential anomalies of the North Atlantic Oscillation)¹⁹ are poorly assessed in the design, thus limiting the lifespan of hard structures. As a result, many protective works have failed or been abandoned, as shown by the collapse of dykes across Senegal (Diokoul, Keuri Kaw and Keuri Souf) and of a seawall in Ghana (Jamestown)²⁰. The same can be said for soft protection measures. Beach nourishment operations are rapidly developing despite their time-limited effectiveness and high maintenance costs impeding regular renewal. In the Gambia, despite the government's investment of USD 20 million to replenish a 100-metre-wide beach in Kololi, the latter has receded 134 metres in seven years²¹. In addition, protective structures and beach nourishment tend to create a false sense of security among decision-makers and local populations who continue to settle in these exposed areas. As in the rest of the world, a "hold the line" approach is technically, economically and socially less and less viable in West Africa.

In light of this, decision-makers are trying to anticipate risks more effectively and develop more flexible responses. Some cities are combining different types of adaptation responses across space and time to overcome the technical, socio-economic and environmental limitations of protection measures. Until now, the development of early warning systems has been hindered by their unreliability and the limited availability of human, technical, and financial

resources necessary for consistent data collection. Their adaptability to local conditions and positive impact on strengthening risk culture, have since then encouraged some States to invest in innovative early warning systems. Since 2014, Benin has been developing a [national and community-based early warning system](#) in 21 municipalities and 31 villages²². In addition, cross-border projects, such as [the WACA-FFEM programme promoting soft solutions in Benin, Senegal and Togo](#)²³, are testing ecosystem-based adaptation responses at a broader scale. This programme encourages regional feedback on nature-based solutions (NbS), which are still not widely recognised in coastal management policies. In response to disasters and rapid erosion, several municipalities have decided to relocate communities in a somewhat coordinated and long-term manner. This is, for instance, the experiment being conducted in the [municipality of Guet Ndar in Saint-Louis](#)²⁴. In spite of these examples, too few West African cities have tackled adaptation and even fewer are looking beyond the immediate future. Moreover, cities – and particularly secondary cities – that wish to innovate are confronted with even greater difficulties in accessing finance. As a result, coastal cities remain insufficiently prepared for rising sea levels.

12/ Op. cit. Croitoru, L., Miranda, J.J., Sarraf, M. (2019). *The Cost of Coastal Zone Degradation in West Africa: Benin, Côte d'Ivoire, Senegal and Togo*.
 13/ Sidibé, I. (2015). *Enquête dans des quartiers traditionnels du littoral dakarais, Sénégal: quelle action publique ?* Géocarrefour, Vol. 90, n°1, pp.73-82
 14/ Zickgraf, C., (2022). *Relational (im)mobilities: a case study of Senegalese coastal fishing populations*. Journal of Ethnic and Migration Studies, 48:14, 3450-3467, DOI: 10.1080/1369183X.2022.2066263
 15/ *Convention relative à la coopération en matière de protection et de mise en valeur du milieu marin et des zones côtières de la région de l'Afrique de l'Ouest et du Centre*. https://abidjanconvention.org/themes/critai/documents/cop/13/Presentation_des_Rapports_Nationaux.pdf
 16/ UEMOA, UICN. (2010). *Étude du suivi du trait de côte et schéma directeur littoral de l'Afrique de l'Ouest*. <https://www.coastal-management.online/PACO/FR/DOCS/1%20SDLAO%20-SCHEMA%20DIRECTEUR%20GENERAL%20HR.pdf>
 17/ Price, T. L. (2022). *WACA: Supporting the coastal resilience of Western Africa, Adaptation through integrated coastal management*. Atelier Sea'ties Adapter les villes et territoires côtiers à l'élévation du niveau de la mer en Afrique de l'Ouest.

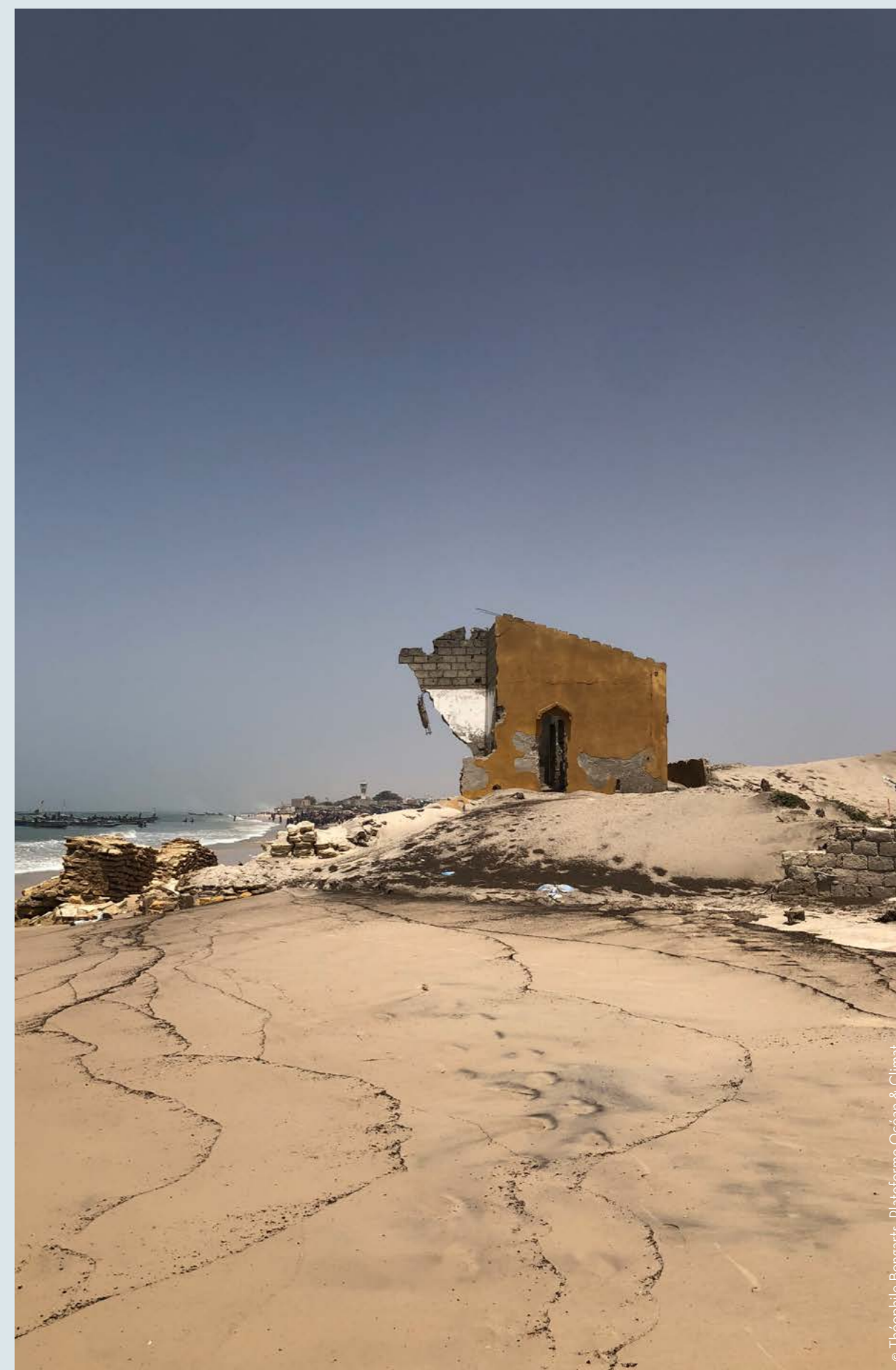
18/ Op. cit., World Bank. (2022). *Compendium: Coastal Management Practices in West Africa - Existing and Potential Solutions to Control Coastal Erosion, Prevent Flooding and Mitigate Damage to Society*.
 19/ Burningham, H. Palotti Polizel, S., Bousso Dramé, A., (2022.) *Morphodynamics of Tropical Atlantic River Mouths and Their Adjacent Shorelines*. In: Humphreys, John and Little, Sally, (eds.) *Challenges in Estuarine and Coastal Science: Estuarine and Coastal Sciences Association 50th Anniversary Volume*. pp. 1-18. Pelagic Publishing <https://discovery.ucl.ac.uk/id/eprint/10152517/>.
 20/ Op. cit., World Bank. (2022). *Compendium: Coastal Management Practices in West Africa - Existing and Potential Solutions to Control Coastal Erosion, Prevent Flooding and Mitigate Damage to Society*.
 21/ Ibid.
 22/ VNG International. (2023). *A flooding Early Warning System for all in Benin*. Retrieved February 16, 2023, from <https://www.vng-international.nl/node/775>
 23/ Fonds Français pour l'Environnement Mondial. (2018). *Des solutions douces contre l'érosion côtière en Afrique de l'Ouest*. retrieved February 16, 2023, from <https://www.ffem.fr/fr/carte-des-projets/des-solutions-douces-contre-lerosion-cotiere-en-afrique-de-louest>
 24/ Georges, N., Bergeron, E. (2022). *Sénégal: des murs contre l'océan*. [Video] ARTE. <https://www.youtube.com/watch?v=HuGS8-THcbE>

This report sheds light on current practices and the obstacles to defining and implementing strategies for adapting to rising sea levels in West African cities and territories. Based on the conclusions of the Sea'ties workshop "Adapting coastal cities and territories to sea level rise in West Africa" and a series of individual interviews, it complements the analyses of previous reports on [Northern Europe](#), the [Mediterranean region](#) and the [West coast of the United States](#). Three major issues specific to the region are addressed:

1. It is essential to improve the understanding of coastal dynamics across West Africa and to better coordinate research with decision-makers, populations and investors. The high level of uncertainty about future climate change remains an obstacle to the development of informed responses tailored to local contexts in the short, medium and long term. With limited data and poor levels of interaction between decision-makers and researchers, the risk of maladaptation is high in the region.

2. Promoting an integrated, place-based approach to the management of the West African shoreline is critical. The adaptation of coastal cities and territories adds complexity to an already fragmented coastal governance. Pooling resources and devising joint strategies that include several cities and communities are key drivers for developing large-scale and shared responses that are appropriate to local needs.

3. It is imperative to increase and diversify funding towards sustainable adaptation strategies for West African coastal cities and territories. West African cities encounter difficulties in financing coastal adaptation and heavily rely on international funding, which has long favoured a reactive approach focusing on unsustainable infrastructure development. Municipalities and local stakeholders should be empowered to direct investments by strengthening their autonomy and diversifying their funding sources through innovative mechanisms that foster dynamic and adaptive strategies.





© NASA Johnson - STS037-084-067 Senegal and Guinea-Bissau, Africa April 1991

1 STRENGTHENING AND SHARING KNOWLEDGE ABOUT THE WEST AFRICAN COASTLINE TO INFORM ADAPTATION

KEY TAKEAWAYS

- Increasing, diversifying, standardising and cross-referencing various types of data is crucial to reach an integrated understanding of coastal risks and vulnerabilities, and to improve the accuracy of global sea level rise modelling. This will necessitate significant investment in human resources (university education), research facilities (centres of excellence, laboratories) and technical capabilities (hardware and software, measuring instruments, GPS).
- To compensate for the scarcity of resources, cost-effective and simpler research methods and protocols can be developed, such as using declarative and perception surveys and focusing research efforts in the most exposed areas, while further involving stakeholders through participatory research and observation programmes. Similarly, establishing cross-border networks and platforms to share data and knowledge allows the pooling of resources and expertise, leading to a more comprehensive understanding of regional coastal dynamics.
- Strengthening dialogue between researchers on the one hand, and decision-makers, financial organisations and communities on the other is crucial to facilitate the practical application of available knowledge. New tools and multi-stakeholder networks for exchanging and disseminating knowledge (platforms, social media, information meetings) can be mobilised for researchers and decision-makers to express and identify their respective needs while supporting informed approaches.

In West Africa, adaptation planning faces significant challenges due to a high degree of uncertainty surrounding sea level rise and the limited extent of available knowledge. The scarcity of data and their in-depth analysis at local and regional levels hampers our ability to understand vulnerabilities, both present and future. Meanwhile, knowledge is not adequately shared and utilised, whether among populations, decision-makers, or even donors. This highlights a dual challenge: a lack of actionable

knowledge and insufficient connections between research and decision-making processes. Elected officials and administrators frequently report a disconnect between the data produced and the actual needs for project implementation. The information available is often incomplete and of little relevance to undertake action, with an under-representation of local scales and short and medium-term time horizons, as well as a lack of studies on sectoral (infrastructure, buildings, environment, energy,

mobility) and cross-cutting issues (combining data on development, erosion risk, vulnerability and environment). This section proposes ways of bridging the knowledge gap and strengthening interaction between scientists and decision-makers.

1.1. Gaining a better understanding of the West African coast

It is essential to develop an at-scale, regularly updated database in order to remedy the insufficient level of understanding of coastal dynamics, which partly stems from the scarcity of data at local and regional levels. To achieve this, a comprehensive approach is necessary, involving the expansion and diversification of data sources and measurement methods. The integration of diverse measurement, such as *in situ*, satellite data, statistical surveys, participatory observations, will contribute to gaining a more comprehensive vision of the issues. Incorporating additional environmental indicators like pH, turbidity, oxygen, salinity, wave speed, energy and height, while investing in higher-resolution topo-bathymetry would also improve the accuracy of numerical models used for simulating coastal processes²⁵. For example, satellite imagery can be used to map coastal ecological features, land use and shoreline dynamics on a large scale and at relatively low cost²⁶. This approach has been applied in **the OSS Saint-Louis project (see Box 1), which combines satellite imagery with other measurements to produce a holistic analysis of short and long-term risks and vulnerabilities.** A cross-cutting approach is relevant since climate risks are cumulative, occur simultaneously and are compounded by pressures related to human activities. Thus, monitoring economic activities such as sand extraction and dredging is crucial to better understand current coastline dynamics in West Africa²⁷. Finally, multidisciplinary studies encompassing socio-economic, institutional, cognitive

25/ Dramé, A. B., (2022). *Le littoral ouest-africain face au changement climatique : enjeux socio-environnementaux et gaps dans la recherche scientifique*. Atelier Sea'ties Adapter les villes et territoires côtiers à l'élévation du niveau de la mer en Afrique de l'Ouest.

26/ Centre de Suivi Ecologique (2020). *Etude de faisabilité pour la mise en place de l'Observatoire Régional du Littoral Ouest Africain (ORLOA), Rapport d'étape - Livrable 1 : Production de la donnée par l'amélioration et la valorisation de la connaissance scientifique et technique.*

27/ Ibid.

(risk perception and knowledge) and behavioural vulnerabilities are equally valuable as physical data. Indeed, on the one hand, populations and economic activities are concentrated along the West African coast. On the other hand, the existing differences in income, housing, age and gender already influence individuals' and communities' responses and resilience to coastal risks²⁸.

Global climate risk projections could significantly improve as data availability increases. The lack of information on the region directly affects the accuracy of models, such as CMIP3 and CMIP5 used by the IPCC, as well as their ability to simulate climate change scenarios for the region²⁹. In addition, standardising the measurements and data collection processes is imperative. One of the limitations of global sea level rise projections lies in the non-compliance of West African tide-gauge observatories with the international standards of the Global Sea Level Observing System (GLOSS) programme of UNESCO's Intergovernmental Oceanographic Commission (IOC - UNESCO)³⁰. Of the five observatories certified by the GLOSS programme, only the one in Dakar meets the international criteria³¹.

Improving data collection and analysis hinges on greater investment in building local human and technical capacity. As such, the increase of investment in research and research facilities is a positive signal³². At national level and in relation to their GDP, West African countries such as Benin, Guinea and Mauritania have a significant number of researchers in ocean science³³. At regional level, the establishment of several centres of excellence,

28/ Adzawla, W., Baanni Azumah, S., Yao Anani, P., Donkoh, S.A. (2019). *Gender perspectives of climate change adaptation in two selected districts of Ghana*. Heliyon 5, Elsevier Ltd. <https://doi.org/10.1016/j.heliyon.2019.e02854>

29/ Sultan, B., Lejeune, Q., Menke, I., Maskell, G., Lee, K., Noblet, M., Sy, I., Roudier, P. (2020). *Current needs for climate services in West Africa: Results from two stakeholder surveys*. Climate Services, Volume 18, 2020, 100166, ISSN 2405-8807, <https://doi.org/10.1016/j.cliser.2020.100166>

30/ Op. cit., Centre de Suivi Ecologique (2020), *Etude de faisabilité pour la mise en place de l'Observatoire Régional du Littoral Ouest Africain (ORLOA), Rapport d'étape - Livrable 1 : Production de la donnée par l'amélioration et la valorisation de la connaissance scientifique et technique*

31/ Ibid.

32/ IOC-UNESCO. (2020). *Global Ocean Science Report 2020 Charting Capacity for Ocean Sustainability*. K. Isensee (ed.), Paris, UNESCO Publishing. https://gosr.ioc-unesco.org/files/GOSR2020_IOCUNESCO_full_report.pdf

33/ Ibid.

OSS Saint-Louis, Senegal: Harnessing the potential of satellite imagery to produce decision-support indicators, Space Climate Observatory (SCO)

The Space Climate Observatory is an international initiative bringing together a group of public and private entities involved in the Earth observation sector. It supports the development of a set of actionable tools for policymakers and the public, making full use of satellite and socio-economic data to help mitigate and adapt to climate change at the local level. These tools must be co-built with their users to specifically meet a range of needs and must be easily transposable to other areas facing the same climate challenges.

The OSS Saint-Louis project operates in an area particularly representative of the coastal hazards and risks encountered in Senegal, and more generally in West Africa: the shoreline of Saint-Louis. This project is being carried out by RESALLIANCE, the University of Rouen Normandy in France and the Amadou Mahtar Mbow University in Dakar, Senegal.

It adopts a multi-sensor approach to assessing vulnerabilities related to compound coastal risks by combining existing *in situ* data (water depth, DGPS readings, etc.), population surveys, statistical processing, cartographic modelling and multi-sensor satellite data. Spatial data provides crucial information on coastline evolution, land use, beach slope and elevation, sea level rise and regional anomalies. By combining this data with other measurements, scientists are able to calibrate and validate satellite data processing algorithms that can be deployed in vulnerability studies of other sites. Finally, by cross-referencing this composite data, the project aims to develop tools and vulnerability indicators of populations, economic activities and infrastructure to guide the decision-making process. In particular, the project will produce flood simulations and mapping based on several scenarios of sea level rise, as well as current and future hotspots³⁶.

36/ Space for Climate Observatory. (2022). OSS Saint-Louis fait son bilan 2021. Retrieved February 09, 2023, from <https://www.spaceclimateobservatory.org/fr/oss-saint-louis-fait-son-bilan-2021>

such as the **Africa Centre of Excellence in Coastal Resilience (ACECoR) at the University of Cape Coast** in Ghana, demonstrates collaborative efforts to train future researchers and decision-makers, and effectively pooling and building capacity³⁴. Despite these promising developments, researchers are often faced with insufficient financial and technical resources to produce the data they need. These resource constraints encompass limited internet access and speed, logistical hurdles for organising field trips, inadequate hardware, software, GPS, DGPS devices, and drone equipment³⁵.

34/ ACECOR (2023). About us. Retrieved May 17, 2023, from <https://acecor.ucc.edu.gh/about-0#history>

35/ Op. cit., Centre de Suivi Ecologique (2020), *Etude de faisabilité pour la mise en place de l'Observatoire Régional du Littoral Ouest Africain (ORLOA), Rapport d'étape - Livrable 1 : Production de la donnée par l'amélioration et la valorisation de la connaissance scientifique et technique*

At the same time, research methods need to be tailored to West African and field conditions. The integration of local knowledge and the development of participatory research and observation programmes are ways of improving knowledge levels in a cost-effective manner, while raising community awareness of adaptation issues. Indeed, local and traditional knowledge plays a pivotal role. Owing to their daily and historical interaction with the shoreline, local stakeholders possess a unique understanding of the coastal dynamics and are often the first to observe the changes affecting it. In Senegal, a study comparing the risk perceptions of the coastal communities of Guet Ndar and the Langue de Barbarie with those of Gandiole, located inland, demonstrated how coastal proximity influences perception of and sensitivity

to coastal erosion and submersion.³⁷ The aim is therefore to recognise and associate this knowledge with scientific research processes and structure it through community-based data collection training. Drawing inspiration from biodiversity sentinels where citizens are mobilised to observe and collect data on changes in biodiversity, a similar model could be adopted for monitoring and observing the coastline.

At the same time, less cumbersome data collection protocols could be deployed in areas where data and resources are scarce. Research projects have shown that declarative and perception surveys among populations can yield valuable insights into trends in phenomena, such as sea level rise³⁸. For instance, a survey conducted in Ghana in the community of Anlo Beach demonstrated that inhabitants' perceptions of the seasonality and development of coastal flooding since the 1990s corresponded to the changes actually measured³⁹.

Finally, in the absence of comprehensive coverage of the coastline, adopting a “hotspot” approach may be compatible with the data requirements and limited resources of research laboratories. Aimed at focusing research efforts on places most exposed to sea level rise, this approach could help draw general conclusions for other areas. By concentrating technical and human resources on one stretch of coastline, it allows to carry out multidisciplinary measurements and improve the quality of analysis and models⁴⁰.

Enhancing the sharing of data, methods, tools and models is pivotal to elevating research capacity.

This sharing process must extend beyond foreign knowledge networks and occur within the region itself. Cross-border research programmes involving scientists from several countries are key to exchanging national knowledge and expertise, enabling technology transfer

and so reducing research costs^{41,42}. **The African Union, in partnership with the European Union through its global monitoring for environment and security (GMES & Africa) initiative, is developing ocean and marine services.** The objective is both to promote the use of Earth observation tools (satellite imagery and derived products) to create geospatial data (coastal vulnerability indices and monitoring of oceanographic factors, such as swell, waves, ocean temperature variations) and to couple them with artificial intelligence to produce monitoring data for the West African coastline. As part of this partnership, workshops are being organised to enhance skills in the acquisition, processing and dissemination of coastal monitoring data using Earth observation resources⁴³. The gender issue is a central focus of this project, which includes in its roadmap opportunities for funding Master’s degrees and doctorates, as well as work experience for women⁴⁴. At the regional level, initiatives such as the **regional observatory of the West African coastline (ORLOA)** (see *Case study 1*) have been launched, contributing to the pooling and sharing of data to gain a comprehensive understanding of coastal dynamics. Lastly, tools such as online and open data platforms are essential for cataloguing and making accumulated knowledge easily accessible. This is the objective of [gis.orloa.net](https://orloa.net) a platform developed by ORLOA (see *Case study 1*). With a view to providing access to a holistic, actionable knowledge of the coastline, more inclusive platforms can be envisioned. These platforms would incorporate the knowledge accumulated by researchers, regional programmes, local decision-makers, the private sector and communities. Furthermore, by adhering to international standards for metadata definition, they could also facilitate interoperability and data sharing on a larger scale⁴⁵.

.....
41/ Op. cit., IOC-UNESCO. (2020). *Global Ocean Science Report 2020 Charting Capacity for Ocean Sustainability*.

42/ IRD. (2023). International Research Network WACA-VAR: West African coastal areas-mapping vulnerability, adaptability and resilience in a changing climate. Retrived May 22, 2023, from <https://www.ird.fr/irn-waca-var-west-african-coastal-areas-mapping-vulnerability-adaptability-and-resilience-changing>

43/ GMES & Africa (2023). Activities. Retrieved May 16, 2023, from: <https://gmes.rmc.africa/activities>

44/ African Union Commission. (2022). *Women In GMES & Africa : 2023-2025, A Continental roadmap for more women in the geospatial industry in Africa*. [Otieno V., Niang T., Dramé, A.B., Moussavou C., Aikohi A., Sidi M'hmed H. N., Munthali, M., Trabelsi. F.; Yohannes-Gelassie T. G., Asongfar L. R., Karim, O., Olwoch-Mukarugwiza J.]

45/ IOC-UNESCO. (2023). *27th Session of the IOC Committee on International Oceanographic Data and Information Exchange - Assembly Report*. <https://oceanexpert.org/document/32021>.

.....
37/ Morand, P., Almar, R. (2022). *Des risques littoraux aux réponses durables : la production, la synthèse et le partage de la connaissance - Apport et rôles des laboratoires de recherche*. Atelier Sea'ties Adapter les villes et territoires côtiers à l'élévation du niveau de la mer en Afrique de l'Ouest.

38/ Ibid.

39/ Ibid.

40/ Ibid.



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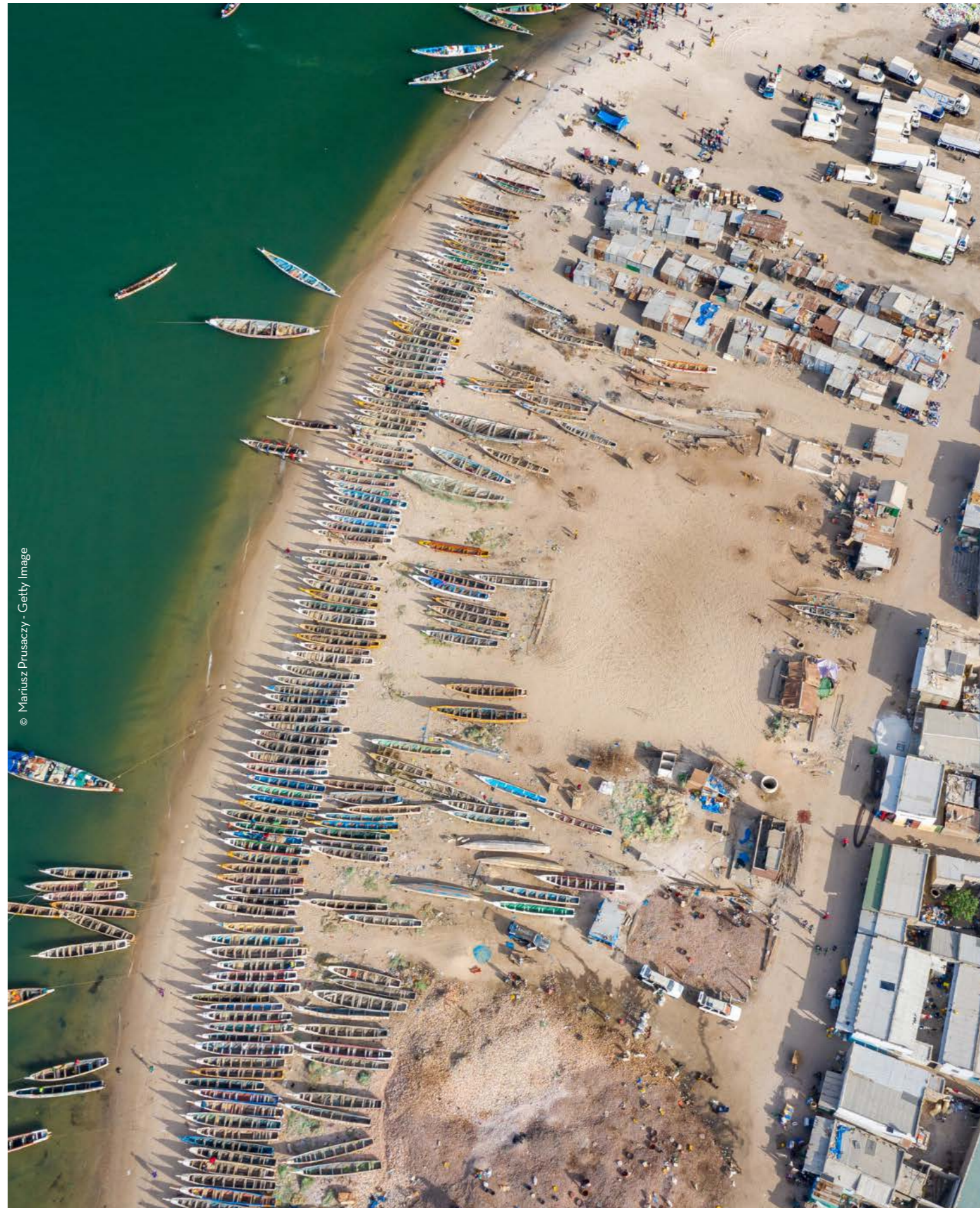


ENGULF : Factoring subsidence into the assessment of exposure to relative sea level rise along the Gulf of Guinea⁴⁶

The ENGULF research programme aims to better assess the exposure of coastal areas along the Gulf of Guinea to relative sea level rise, i.e., the combination of the absolute rise caused by climate change and local loss of altitude caused by subsidence. This involves quantifying the current subsidence rates along the entire coastline from Côte d'Ivoire to Nigeria, understanding their causes, and then making projections for the next few decades.

A first working group is assessing current subsidence rates along the entire shoreline by analysing satellite measurements over several years. A second group is focusing specifically on the city of Lagos. A numerical model of the processes at work will be built to make projections of future subsidence according to various scenarios. The approach developed for Lagos will then be extended to other areas identified as particularly vulnerable to sea level rise.

ENGULF also aims to raise awareness among local researchers and decision-makers so that subsidence is taken into account in coastal adaptation and management projects. Knowledge dissemination and sharing events will be regularly organised to build a regional community of interest.



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1.2. Establishing a dialogue between researchers, policymakers and international donors to make knowledge actionable

To ensure that knowledge effectively informs adaptation strategies, it must be relevant to decision-makers. **Conceiving adaptation policies that transcend mere protection measures (see Introduction), requires planners to have access to indicators of changes in physical, environmental and socio-economic variables so that they can adjust their responses to sea level rise in the short, medium and long term^{47,48}.** These should enable decision-makers to identify priority action areas according to levels of vulnerability and help them assess the impact of policies implemented. The indicators can be more or less detailed, as in the projects developed under the WACA programme, which define in their performance indicators "the number of households located in the targeted coastal areas less exposed to the risks of coastal erosion thanks to the project" or the number of "households located in the targeted coastal areas with access to improved subsistence activities"⁴⁹.

Ensuring the usefulness of knowledge requires making it accessible, considering factors such as the level of technical complexity, format, and dissemination media. At times, the level of technical expertise required to understand, interpret and utilise information is not aligned

47/ Pour plus d'information sur les trajectoires d'adaptation, consulter : Haasnoot, M., Warren, A., Kwakkel, J.H. (2019). *Dynamic Adaptive Policy Pathways (DAPP)*. In: Marchau, V., Walker, W., Bloemen, P., Popper, S. (eds) *Decision Making under Deep Uncertainty*. Springer, Cham. https://doi.org/10.1007/978-3-030-05252-2_4

48/ Pour plus d'information sur les trajectoires d'adaptation dans le contexte des villes côtières, consulter : Glavovic, B.C., R. Dawson, W. Chow, M. Garschagen, M. Haasnoot, C. Singh, and A. Thomas (2022). *Cross-Chapter Paper 2: Cities and Settlements by the Sea*. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegria, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2163–2194, doi:10.1017/9781009325844.019.

49/ WACA. (2018). *Projet d'Investissement pour la Résilience des Zones Côtières Ouest Africaines (WACA-ResIP)*. Toolkit Côte d'Ivoire. Retrieved February 06, 2023 from <https://www.wacaprogram.org/sites/waca/files/inline-files/Toolkit%20WACA%20Cote%20D%27Ivoire.pdf>

46/ Agence Française de Développement. (2022). *Programme ENGULF - Evaluer l'exposition à la montée relative du niveau marin dans le Golfe de Guinée*. Retrieved February 09, 2023, from <https://www.afd.fr/fr/carte-des-projets/programme-engulf-evaluer-l'exposition-la-montee-relative-du-niveau-marin-dans-le-golfe-de-guinee>

with the capabilities of local decision-makers and administrators. In addition to training for decision-makers and investors, several tools and media can help translate complex scientific research into digestible content. While open data platforms are often put forth, their development should involve both academic and non-academic users. Indeed, the content of these platforms can be too technical, sporadic and irrelevant to the operational needs of city planners. Thus, although some open data platforms ([ISIpedia](#)) are used by government departments and international financial institutions to develop action plans and broad guidelines, they are rarely used by local administrators for operational planning of adaptation strategies⁵⁰.

Visual tools can also facilitate the appropriation of knowledge. A compelling example is the **ORLOA's GIS platform (gis.orloa.net)** which provides severity maps of coastal risks in West Africa in the framework of the SDLAO. Likewise, policy briefs of scientific reports, information meetings and panels remain relevant for raising awareness of decision-makers and communities, while social networks are indispensable to reach out to young people.

Facilitating the identification and timely response to knowledge needs, as well as ensuring appropriation by decision-makers, call for the establishment of mechanisms and structures for systematic dialogue between researchers, stakeholders, financing organisations, and communities. The rollout by the Global Center on Adaptation (Netherlands) of rapid climate risk assessments in five African coastal cities, such as Libreville (Gabon) and Conakry (Guinea), demonstrated that involving local champions in risk assessments not only improves the identification of climate risks and the production of data, but also enables knowledge to be better connected to the implementation of solutions which are tailored to the contexts of municipalities⁵¹. Several dialogue

frameworks can be devised, such as workshops and individual interviews between researchers and administrators, to improve the sharing of complex information⁵².

50/ Sultan, B., Lejeune, Q., Menke, I., Maskell, G., Lee, K., Noblet, M., Sy, I., Roudier, P. (2020). *Current needs for climate services in West Africa: Results from two stakeholder surveys*. Climate Services, Volume 18, 2020, 100166, ISSN 2405-8807, <https://doi.org/10.1016/j.cliser.2020.100166>

51/ Global Center on Adaptation. (2022). *State and Trends in Adaptation Report 2022: Africa*. [https://gca.org/reports/sta22/#:~:text=State%20and%20Trends%20in%20Adaptation%202022%20Report%3A%20Africa%20\(Volume%202.country%20level%20for%20specific%20topics](https://gca.org/reports/sta22/#:~:text=State%20and%20Trends%20in%20Adaptation%202022%20Report%3A%20Africa%20(Volume%202.country%20level%20for%20specific%20topics)

52/ Serrao-Neumann, S., Di Giulio, G., Low Choy, D. (2020). *When salient science is not enough to advance climate change adaptation: Lessons from Brazil and Australia*. Environmental Science & Policy, Vol. 109, pp. 73-82. <https://doi.org/10.1016/j.envsci.2020.04.004>

ORLOA - Improving knowledge and assisting decision-making to reduce risk at the regional level

SUMMARY

The regional observatory of the West African coast (ORLOA) – currently in its implementation phase – is the result of a feasibility study as part of the WACA-ResIP project financed by the World Bank. ORLOA aims to improve the resilience of coastal communities to climate change and support sustainable development of coastal areas using a data production and provision system to assist decision-making. This observatory, which currently covers 12 countries, will eventually extend to Gabon and encompass 17 countries.

CLASSIFICATION

-  **Risks:** Submersion, erosion, marine pollution
-  **Budget:** More than EUR 1 million
-  **Typology of solutions:** Research-action project, capacity building and knowledge sharing
-  **Typology of actors:** National, regional and local authorities; universities and research institutions; private sector and companies; civil society
-  **Geographical location:** 12 West African countries (Benin, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Mauritania, Liberia, Sao Tome & Principe, Senegal, Sierra Leone and Togo)
-  **Project duration:** 2018-2023 (first phase), 2023-2028 (second phase)



OBJECTIVES

ORLOA's goal is to: "Observe to better understand, better understand for better decisions". It focuses on:

- Supporting, enhancing and using scientific and technical knowledge
- Providing a tool designed to support and share understanding, knowledge and management of coastal hazards
- Implementing sustainable and integrated coastal policy

ACTIVITIES

1. Support, enhancement and use of scientific and technical knowledge:

- Review of existing coastal knowledge to target gaps at local and regional levels.
- Acquisition of baseline data based on harmonised production methods, protocols and formats.
- Instrumentation, equipment and estimation of operating costs.
- Exploitation of acquired data, in particular by pooling and sharing data between the countries involved in the project, and by improving early warning systems at national, regional and local levels.

2. Provision of a tool designed to support and share understanding, knowledge and management of coastal hazards. ORLOA recently launched the gis.orloa.net online platform, which includes data layers and maps from the [West African coastal master plan \(SDLAO\)](#).

3. Implementation of a sustainable and integrated coastal policy by:

- including coastal risks in urban planning documents
- improving coastal risk monitoring and forecasting
- structuring the management of coastal protection structures
- providing support for natural processes.

RESULTS

ORLOA is currently in its implementation phase. Among the short-term indicators targeted at the regional level, the baseline coastline has been produced. Methodologies for monitoring marine oil pollution and polluting industries are being developed. Several national observatories are being designed to monitor the indicators.

KEY TAKEAWAYS



- The regional approach makes it possible to anticipate the impacts of actions in cross-border areas, facilitates coastal co-management and provides a comprehensive solution to coastal risks.
- The relevant stakeholders are the public institutions involved in national observatories, civil society, the private sector, the regional scientific committee, territorial authorities, NGOs, etc. Local knowledge can also be taken into account by involving communities in monitoring indicators.



2 PROMOTING INTEGRATED, PLACE-BASED GOVERNANCE OF THE WEST AFRICAN COASTLINE

KEY TAKEAWAYS

- Legislations that are specific to the management of coastal areas should be defined, applied and updated to allow for an integrated approach. National and regional guidance ought to be provided to encourage local stakeholders to conceive the risks and opportunities of adaptation in collaboration with neighbouring municipalities as well as inland communities, over the long term and in an innovative way.
- Additional resources, training and cooperation frameworks can facilitate the achievement of this sustainable, place-based approach. Networks of cities and local elected officials, even diasporas, are key drivers for developing cooperation, pooling resources and building capacity.
- The design and implementation of adaptation strategies must account for the political, economic and socio-cultural power dynamics that influence city planning in order to avoid maladaptation. This implies greater representation and engagement of customary law authorities, organised groups (associations, women, young people, fishermen, etc.), as well as taking into account informal settlements that develop outside legal provisions.

In West African States where decentralisation has been initiated, local authorities are responsible for policies relating to urban planning, housing, the environment and natural resource management. In practice, local authorities encounter challenges in implementing integrated coastal management policies that are tailored to local characteristics and address the complexities of adapting to rising sea levels. The absence of specific frameworks and guidelines for coastal development coupled with insufficient consideration of climate impacts, further complicates the task of balancing sustainable growth with adaptation. Yet, better coordination between cities is needed, since coastal and hinterland areas are highly interdependent from an ecological, demographic, economic and social perspective. Furthermore,

the ability of cities to take action remains limited by the strong centralisation of resources by the States, thus preventing a place-based approach to adaptation capable of responding to their distinct needs. Strengthening the intermunicipal level and the power of local stakeholders, in particular from civil society, are avenues that this section seeks to explore in order to better prepare governance frameworks for the challenges raised by coastal adaptation.

2.1. Developing an integrated coastal approach

Implementing and improving the legislative and administrative framework for coastal management

West African countries have developed multiple tools and policy frameworks that apply to coastal areas but are not specific to their management. As a result, a multitude of legal frameworks cover the same territory, involving many stakeholders whose responsibilities are not clearly delineated, making it difficult to apply laws designed to protect the coastline. For instance, in Benin, coastal areas are being developed despite the provisions of the Code on private and State-owned land, which defines the shoreline as the “State’s natural public domain”⁵³, which should serve the public interest. Added to this is the fact that the impact of climate change and sea level rise has not been fully incorporated into regional and national coastal development strategies⁵⁴. Both locally and globally, all these factors make it more difficult to adopt an integrated approach to coastal management.

First, the challenge for West African States is to ensure enforcement at the local level of the existing legislation contributing to the preservation of the coastal zone. In that sense, the adoption and understanding of texts must be fostered at all levels. The WACA-FFEM diagnostic report on land regulations and tenure issues along the shoreline of Benin, Togo and Senegal, identifies communities’ lack of knowledge of coastal-related risks and legislation⁵⁵ as a contributing factor behind non-compliance with regulations and continued settlement in exposed areas. This diagnostic suggests improving communication between national and local authorities and communities by using information tools and organising public consultation meetings on coastal regulations and management strategies. It

53/ WACA-FFEM. (2022). *Diagnostic de la réglementation et des enjeux fonciers sur le littoral du Bénin et amorce de la réflexion sur les premières pistes d'évolution du droit*. In : *Rapport final de l'étude menée dans le cadre du projet WACA-FFEM « Suivi des risques côtiers et solutions douces au Bénin, Sénégal et Togo »*

54/ WACA-FFEM. (2022). *Rapport final de l'étude menée dans le cadre du projet WACA-FFEM « Suivi des risques côtiers et solutions douces au Bénin, Sénégal et Togo »*

55/ Ibid.

also stresses the importance of informing prospective acquisition of land about current and future risks, as well as potential restrictions and adaptation strategies. The report recommends the creation of an agency responsible for coastal management and adaptation since, in these three countries, there is no dedicated coastal management body “with enhanced expertise in land acquisition or management and specialised in environmental matters”⁵⁶. This is also the wish expressed in Côte d’Ivoire with the national agency for integrated coastal management (ANAGIL), which was due to be set up in May 2023⁵⁷.

Second, an integrated coastal approach presupposes defining specific frameworks and strategies for shoreline management and adaptation. Several regional initiatives are in line with this approach. In 2017, Côte d’Ivoire adopted a law on the development, protection and integrated management of the coastline (Law 2017-378 of June 2, 2017)⁵⁸. Similarly in Senegal, a bill was tabled in the National Assembly, aimed at promoting an integrated coastal development policy. The proposed principles of extending urban centres towards areas remote from the coast, protecting coastal sites of ecological, landscape, cultural and tourist interest, and relocating industrial facilities to appropriate areas⁵⁹ would reduce the exposure of activities and populations in the short term and facilitate long-term adaptation. In Benin, the coastal master plan divides the shoreline into development sectors and defines strategic priorities, such as the restoration and preservation of natural resources and protection against coastal erosion⁶⁰.

56/ ORLOA. (2022). *Bulletin de liaison, Trimestriel de l'Observatoire Régional du Littoral Ouest Africain (ORLOA)*, n°14

57/ Djagoua, E. V., (2020). *Webinaire : Protéger 30% de la planète bleue d'ici 2030 : Ressources marines, économie bleue et gouvernance des océans*. Ministère de l'environnement et du développement durable, République de Côte d'Ivoire. https://www.afdb.org/sites/default/files/2020/06/16/2-1_gouvernance_des_oceans_cas_de_la_cote_divoire.pdf

58/ LOI n° 2017-378 du 2 juin 2017 relative à l'aménagement, à la protection et à la gestion intégrée du littoral (Côte d'Ivoire)

59/ WACA-FFEM. (2022). *Diagnostic de la réglementation et des enjeux fonciers sur le littoral du Sénégal et amorce de la réflexion sur les premières pistes d'évolution du droit*. In : *Rapport final de l'étude menée dans le cadre du projet WACA-FFEM « Suivi des risques côtiers et solutions douces au Bénin, Sénégal et Togo »*

60/ WACA-FFEM. (2022). *Diagnostic de la réglementation et des enjeux fonciers sur le littoral du Bénin et amorce de la réflexion sur les premières pistes d'évolution du droit*. In : *Rapport final de l'étude menée dans le cadre du projet WACA-FFEM « Suivi des risques côtiers et solutions douces au Bénin, Sénégal et Togo »*



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Finally, in a long-term adaptation perspective, the aim is to align all legislation relating to coastal management with the challenges posed by climate change and develop strategic guidelines at regional and national levels to assist local action. These guidelines are crucial to favour an adaptation approach and governance methods that are more inclusive and innovative at local level. They should actively promote certain types of solutions that have not yet been fully explored, such as ecosystem-based adaptation and managed retreat. In that sense, regional guidelines would encourage States and municipalities to break free from the paradigm of hard protection often favoured despite its socio-economic cost and environmental impact. In this regard, **the Multi-**

Sector Investment Plan (MSIP) for adaptation to coastal risks due to climate change in Benin, which was developed within the framework of the WACA programme, provides for investments not only in “technical” measures, such as protective structures, but also in “non-technical” ones, such as relocation and evacuation of exposed areas⁶¹. Guidelines that incorporate the time horizons of adaptation (10, 30, 50 and 100 years) are also crucial for encouraging administrators to adjust their short-term actions to the long term.

61/ Antea Group. (2017). *Plan d'investissement multisectoriel pour l'adaptation aux risques côtiers face aux changements climatiques au Bénin, Rapport Final*. pp.1-119.

Fostering coordination among coastal municipalities and regions

Coordination between local authorities is important for three main reasons. Firstly, broadening the scale of action is relevant from an ecological point of view, since it better reflects the geographical scale of coastal dynamics, thus mitigating the impact of development decisions on adjacent shorelines. Secondly, local authorities must work together to address population movements between cities and rural areas along the coast, especially towards secondary cities and city outskirts⁶², so that they do not lead to people relocating to areas exposed to coastal hazards, or to the degradation of natural coastal ecosystems. Lastly, considering the high costs of adaptation, local authorities have an interest in cooperating to pool resources and skills. This is all the more true in a context of strong centralisation of governance by central States and concentration of resources by large cities. For all these reasons, working as an intermunicipal body would improve resource availability to municipalities and their ability to respond to their respective needs.

This holistic approach is central to the **integrated coastal development and management plan (PAGIL) developed in Côte d'Ivoire**. The comprehensive and multidisciplinary study of the coastal area highlighted the interdependence between the shoreline and inland territories concerning various risks (marine submersion, erosion, river flooding and pollution) and revealed demographic, economic and social imbalances between these areas, along with overlapping governance frameworks. Aiming to design a "balanced, safe, healthy and productive coastline over the long term through integrated coastal management", this plan advocates for an inclusive territorial model to better connect coastal and inland areas. This involves rethinking the management and organisation of populations, their activities and infrastructure, as well as that of natural ecosystems. Measures to relocate activities away from prone-risk areas are thus designed in conjunction with actions contributing to rebalancing urban distribution (building roads, developing economic activities, etc.) so as to alleviate demographic pressures along the coastline and offer inland municipalities development opportunities. The project tested in

62/ Op. cit., Förster, T., Ammann, C., (2018). African Cities and the Development Conundrum.

Grand Béréby is intended to be replicated on the entire Côte d'Ivoire shoreline to achieve a better demographic balance between coastal urban centres and reduce exposure to risks⁶³.

An integrated approach to adaptation involves facilitating collaboration between territories and their stakeholders at all levels. At the regional level, better coherence between policy and legislative frameworks would facilitate integrated management of the West African coastline. The creation of **the alliance of parliamentarians and local elected officials for environmental protection in West African coastal countries (APPEL)** is a significant step in this direction with the objective of "promoting coherent national legislative and institutional frameworks and strengthening the implementation of policies for the development and integrated management of marine and coastal resources⁶⁴" in order to reduce collective threats, such as erosion risks and the impacts of climate change (see Box 4)⁶⁵. Locally, the example of **the good ecological governance programme in the intermunicipal agreement of the Petite Côte (EIPC) for integrated coastal zone management (ICZM)**⁶⁶ in Senegal demonstrates the significance of State representatives (prefects, governors) and civil society organisations acting as intermediaries between municipal representatives and various communities to facilitate dialogue around adaptation in an intermunicipal context.

Cooperation frameworks such as marine protected areas (MPAs) can help structure coastal management between rural, urban and peri-urban areas. For instance, **Saint-Louis's MPA covers urbanised municipalities, such as Saint-Louis, and more rural ones, such as Ndiébène Gandiol**⁶⁷. Stakeholders are

63/ WACA. (2022). PAGIL : Plan d'Aménagement et de Gestion Intégrée du Littoral Ivoirien, Résumé Exécutif.

64/ Op. cit. Diedhiou, M. (2022). Contribution des élus dans la gouvernance des océans : le cas du REPES et de l'APPEL.

65/ Ibid.

66/ Climate Chance. (2022). Programme de Bonne Gouvernance Ecologique dans l'Entente Intercommunale de la Petite Côte pour une Gestion Intégrée des Zones Côtières réussie (EIPC - GIZC). Retrieved February 08, 2023, from <https://www.climate-chance.org/bonne-pratique/programme-de-bonne-gouvernance-ecologique-dans-lentente-intercommunale-de-la-petite-cote-pour-une-gestion-integree-des-zones-cotieres-reussie-eipc-gizc/#:~:text=Le%20Programme%20de%20bonne%20gouvernance,pour%20une%20gestion%20inclusive%20des>

67/ Op. cit., WACA-FFEM. (2022). Diagnostic de la réglementation et des enjeux fonciers sur le littoral du Sénégal et amorce de la réflexion sur les premières pistes d'évolution du droit.

coordinated by a Management Committee, which is responsible, in particular, for participatory zoning, resolving conflicts between socio-professional groups and monitoring rule enforcement on ecosystem preservation. In fact, in addition to promoting agreement between municipalities on coastal

preservation, the MPA helps ensure the resilience of ecosystems and communities, as activities that could disrupt the ecological balance of ecosystems are prohibited, as is sand extraction.

Box 3

Good ecological governance programme in the intermunicipal agreement of Senegal's Petite Côte for integrated coastal zone management (EIPC-ICZM)⁶⁸

Municipalities are highly interdependent when it comes to the challenges of coastal use and erosion. The EIPC-ICZM programme aims to support five municipalities on Senegal's Petite Côte (Mbour, Saly, Ngaparou, Somone, Malicounda) in their ecological, energy and economic transition by providing them with a portfolio of intermunicipal projects contributing to inclusive management of natural resources. It promotes effective environmental governance by fostering a strong sense of citizenship. The programme will educate, raise awareness, communicate and provide training in eco-citizenship, coastal environmental monitoring, and the inclusive implementation of climate change resilience programmes.

During the first phase of the programme relating to coastal erosion issues, non-governmental organisations (ENDA Energie) and associations (*Jeunes Volontaires de l'Environnement*) played a key role in lobbying local decision-makers to take concerted action to develop emergency measures to protect the coastline.

At the same time, they conducted awareness-raising campaigns aimed at the inhabitants of the five municipalities to put an end to sand extraction activities, responsible for accelerated retreat of the shoreline.

In total, 246 stakeholders, including students, teachers, district leaders, the Badienou Gokh (a group that provides support for women, children and families) artists, civil society organisations, local elected officials and companies, were trained in ten themes using various media, such as local radio programmes, environmental clubs, a comic book and music.

By the end of the project, the expected results include the implementation of environmental monitoring for a healthy and secure coastline. This monitoring will be achieved by creating a platform for sharing, managing and transferring knowledge and good practices and for networking between communities, the EIPC and national experts⁶⁹.

68/ Niang, D. (2022). Programme de Bonne Gouvernance Ecologique dans l'Entente Intercommunale de la Petite Côte (EIPC) pour une Gestion Intégrée des Zones Côtière (GIZC) réussie - EIPC-GIZC. Atelier Sea'ties Adapter les villes et territoires côtiers à l'élévation du niveau de la mer en Afrique de l'Ouest.

69/ Op. cit., Climate Chance (2023). Programme de Bonne Gouvernance Ecologique dans l'Entente Intercommunale de la Petite Côte pour une Gestion Intégrée des Zones Côtières réussie (EIPC - GIZC).



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2.2. Apprehending coastal adaptation at the local level

Building the capacity of local stakeholders

In order to develop responses tailored to the contexts of coastal cities and territories, it is crucial to approach adaptation at the local level. In practice, local authorities lack financial and human resources, and political power remains highly hierarchical, with the central State exerting significant predominance. This hierarchical structure can result in local authorities having limited decision-making

authority and insufficient incentive to take proactive coastal risk prevention measures, as civil protection typically falls under the responsibility of the State. Furthermore, the lack of resources and insufficient training of local administrators can hinder their ability to effectively respond to coastal challenges.

In this regard, it is essential to build the capacity of local stakeholders by allocating adequate financial resources to local authorities and providing training on adaptation issues. The participants targeted by these training courses should be diverse and inclusive, ranging from local decision-makers and government representatives, to social and economic groups, such as fishermen, fishmongers and young

people, as well as traditional leaders that influence coastal development.

Networks for sharing experiences and multi-stakeholder technologies are key drivers for capacity building. Training parliamentarians plays a key role since they devise overall guidance policies and often serve as both deputies and mayors. To this end, the **REPES and APPEL networks provide training to parliamentarians on environmental issues, in particular those impacting the coastline** (see Box 4).

APPEL: An alliance of parliamentarians and local elected officials for environmental protection in West African coastal countries⁷⁰

APPEL is a sub-regional network supported by national parliaments, international and sub-regional conservation organisations (WWF, IUCN, FIBA, etc.), as well as technical and financial partners (MAVA Foundation, Embassy of the Kingdom of the Netherlands, UNESCO, UNDP), which aims to improve policies, legislation and regulations for better governance of natural and cultural resources in West African coastal countries. In particular, the alliance promotes consistency between national legislative and institutional frameworks, as well as building decision-makers' knowledge and capacity to implement policies relating to the development and integrated management of marine and coastal resources.

In fact, it has contributed to the ratification of international environmental conventions and conducted studies on their application in member countries. The alliance is also implementing a legislative co-production process with parliamentarians in the context of drafting legislation on coastal management, such as the Coastal Framework Act in Senegal. Finally, it organises field visits and awareness-raising workshops with elected representatives from member countries to share and train in good practices for environmental and coastal protection.

⁷⁰/ Op. cit. Diedhiou, M. (2022). Contribution des élus dans la gouvernance des océans : le cas du REPES et de l'APPEL..

ReCoL-CI: A network of 29 municipalities for concerted management of Côte d'Ivoire's coastline

In December 2021, well aware of their territory's interdependence and the increasing impacts of climate change, and agreeing on the need for cooperation between cities on integrated coastal management, 29 mayors of coastal municipalities in Côte d'Ivoire signed the Declaration of Mayors in Grand Bassam. In line with this, the network of coastal municipalities in Côte d'Ivoire (RECoL-CI) was formed. This network's ambition is to bring together all member municipalities to preserve the environment and natural resources

through measures of development, protection and integrated coastal management, with the purpose of promoting initiatives to make coastal areas and communities in Côte d'Ivoire more resilient. RECoL-CI has a number of objectives, including: 1) assisting skill transfer to territorial authorities, particularly for environmental management; 2) building the knowledge, skills and capacity of municipalities and the civil society; 3) sharing experience at all levels; 4) ensuring that local people's interests and rights are respected and that their demands are taken into account in decisions regarding coastal development, and 5) promoting exchange and partnership between local stakeholders.

City networks, such as the [ICLEI international network and its African branch](#), are key players in supporting communities and sharing leading practices between peers. In 2023, the [CitiesWithNature network launched a coastal community of practice](#) which aimed to provide a forum for exchanging resources, experiences and good practices among cities on coastal resilience and adaptation, with a focus on the inclusion of ecosystems in urban adaptation strategies⁷¹.

In Côte d'Ivoire, 29 mayors of coastal cities, convinced of the need to exchange views on these issues, have come together to form the [network of coastal municipalities of Côte d'Ivoire \(RECoL-CI\)](#). This collaborative network aims to enhance the capacities of these municipalities to implement informed, integrated coastal management so that they can address the challenges related to coastal erosion (see Box 5). Similarly, the [EIPC's good governance programme explores the potential of diaspora networks](#) to support cities' adaptation measures. Diasporas possess valuable expertise in local socio-cultural norms while having access to financial resources and key skills, making them well-positioned to assist the transition of the areas they already support economically. Although diasporas contribute significantly to the growing economy of West African countries through

71/ Cities with Nature. (2023). Coastal community of practice. Retrieved April 20, 2023 from <https://citieswithnature.org/coasts/>

remittances, their expertise is a lever for action that is still little used.

Encouraging active participation of non-state actors

In order to avoid maladaptation, it is crucial to design and implement adaptation strategies to rising sea levels that take into account the power, economic and socio-cultural dynamics influencing the development of coastal and inland cities. **Therefore, involving stakeholders who have hitherto existed outside legal frameworks - in particular, people living in informal settlements - is essential to reduce their vulnerability.** Excluding communities from urban planning decisions has contributed to the development of informal settlements outside built-up areas and planning regulations (local urban plans, building standards, etc.)⁷². As a result, these settlements are mainly built in areas that are poorly served by public services and highly exposed to risks, i.e., along low-lying coastlines and deltas⁷³. Furthermore, adaptation decisions can exacerbate the vulnerabilities of communities. Informal settlements

72/ Dodman, D., Leck, H., Rusca, M., Colenbrander, S. (2017). African Urbanisation and Urbanism: Implications for risk accumulation and reduction. International Journal of Disaster Risk Reduction, Vol. 26, pp. 7-15. <https://doi.org/10.1016/j.ijdrr.2017.06.029>
73/ Ibid.

- already rarely covered by risk prevention and protection works - are all the more exposed due to the lack of mobility and access to public services and disaster relief. Lastly, the potential willingness of public authorities to relocate some homes and activities exposes people without property rights to the risks of forced eviction⁷⁴.

It is also crucial that non-state stakeholders get involved as their influence on coastal development is central. **Representatives of customary law communities and traditional leaders retain a strong influence**, in particular in coastal peri-urban areas where the highest population growth is observed⁷⁵.

In this regard, leveraging and capitalising on the experience of associations to encourage citizen participation is relevant. The organisation of communities often serves as a powerful catalyst to mobilise decision-makers and citizens alike. **In Senegal, experienced and well-recognised associative networks (ENDA Energie Environnement Développement, JVE, SOS Littoral and Green Senegal) all advocate adaptation to climate change with decision-makers.** Their legitimacy stems from their ability to mobilise a wide variety of stakeholders (students, teachers, journalists, etc.), with whom they work on-site. Similarly, women's groups are key drivers for addressing gender inequalities, which are exacerbated by climate change and maladaptation. As part of the [WACA project in Côte d'Ivoire, three women's networks have thus been created since 2021 in the municipalities of Grand-Lahou](#). The aim is to "encourage a more engaged and dynamic participation by women and empower them" in the consultation process on the challenges posed by erosion and adaptation on the Grand-Lahou pilot site⁷⁶.

74/ Op. cit., Förster, T., Ammann, C., (2018). African Cities and the Development Conundrum.

75/ Ibid.

76/ WACA. (2022). Côte d'Ivoire : les femmes du littoral s'engagent à travailler avec WACA. Retrieved May 17, 2023, from <https://www.wacaprogram.org/fr/article/cote-divoire-les-femmes-du-littoral-sengagent-travailler-avec-waca>

Institutionalising and systematically engaging in dialogue between administrators and communities will ensure that consultation is formalised in practice and becomes an integral part of decision-making. Existing local consultation bodies, such as MPA management committees, can be brought into the consultation process. District councils, sometimes inherited from customary organisations, play a central role in land and coastal management⁷⁷. As part of its efforts to mitigate coastal erosion, **the municipality of Yoff in Dakar, Senegal, has mobilised district councils to involve residents in co-designing and setting up protection works**⁷⁸. Several committees have been formed, including a youth committee responsible for overseeing public works funded by the city, and an elder committee in charge of managing land disputes.

77/ Sidibé, I. (2015). Enquête dans des quartiers traditionnels du littoral dakarais, Sénégal : quelle action publique ? Géocarrefour, Vol. 90, n°1, pp.73-82

78/ Sambe, S. I. L. (2022). Yoff face à l'érosion côtière. Atelier Sea'ties Adapter les villes et territoires côtiers à l'élévation du niveau de la mer en Afrique de l'Ouest.

Preparing the managed retreat at the intermunicipal level in Saint-Louis, Senegal

Project leaders -

NATIONAL AND REGIONAL DEVELOPMENT AGENCIES,
MUNICIPAL DEVELOPMENT AGENCY OF SAINT-LOUIS

SUMMARY

The stormwater management and climate change adaptation project (PROGEP) aims to improve urban resilience in several Senegalese cities, including the Saint-Louis conurbation, by incorporating climate risks into urban planning and management tools that are developed at national and regional levels. In line with the project's aim of setting up an intermunicipal body, the association of territorial authorities of Saint-Louis (ACT-SL) has been created. This body is key to providing innovative, integrated and sustainable responses to challenges related to climate change, governance and the concerted management of shared challenges. The plan for relocating the coastal communities of the Langu de Barbarie in Saint-Louis is an example of one such response.

CLASSIFICATION

 **Hazards:** Erosion, submersion

 **Budget:** More than EUR 1 million

 **Typology of solutions:** Territorial planning, managed retreat

 **Typology of actors:** State departments, local and regional authorities, civil society, development agencies and international financial institutions

 **Geographical location:** Saint-Louis conurbation and municipality of Gandon (Senegal)

OBJECTIVES

The component “support for the creation of PROGEP’s intermunicipal body” aimed to:

- develop integrated territorial dynamics, which provide innovative, sustainable responses to the challenges posed by climate change
- promote solidarity and cooperation between local authorities in defining and implementing structured responses to shared challenges

- coordinate and harmonise territorial development, and pool the resources of local and regional authorities in order to build infrastructure of common interest, the cost of which cannot be borne by a single authority.

ACTIVITIES

Initially, the activities carried out as part of the PROGEP project focused on studying the evolution of Saint-Louis’s coastal area, and developing decision-support tools that can help review and extend the urban planning master plan (PDU).

In response to the recurrent flooding of the Langu de Barbarie, the World Bank, with the support of the Senegalese government, has launched the Saint-Louis Emergency Recovery and Resilience Project (SERRP), which included building a protective structure and introducing emergency and temporary rehousing measures. In the longer term, five adaptation scenarios have been studied and budgeted. It has been decided to let the rapidly expanding breach of the Langu de Barbarie evolve freely, undertake long-term relocation of the communities impacted to a neighbouring municipality, Gandon, while implementing temporary protections (beach nourishment and the construction of a seawall). The managed retreat was decided for a strip of land 20 metres wide and 3.6 kilometres long, requiring the rehousing of about 15,000 people.

Relocating people beyond the municipal boundaries of Saint-Louis has highlighted the necessity of working at the intermunicipal level. Indeed, Saint-Louis is a multidimensional territory, simultaneously a city, department and region, where coastal communities earn their living mainly from fishing. Meanwhile, the municipality of Gandon is a rural and remote location from the sea. Relocating people to this area requires a collective approach to redeveloping the economic and social layout necessary to facilitate the reintegration of communities. The local authorities

of the Saint-Louis conurbation have indicated their political will to become an association to address common challenges, in particular enhancing climate resilience. As part of the PROGEP project, a formalised intermunicipal body has been set up within the association of territorial authorities of Saint-Louis (ACT-SL). This agreement forms the basis for building territorial dynamics that take into account the challenges posed by climate change, and for promoting cooperation and solidarity between local authorities, particularly with regard to the relocation and reintegration of communities.

KEY TAKEAWAYS



- Transitioning from emergency responses to the long-term planning of coastal protection and resettlement.
- Applying a holistic, multidisciplinary approach to assessing and monitoring challenges.
- Introducing social engineering measures aiming to monitor and support communities involved in the project.
- Forming an intermunicipal association promoting feedback, the pooling of resources and an integrated approach to adaptation measures.



3 INCREASING FUNDING FOR SUSTAINABLE ADAPTATION STRATEGIES IN COASTAL CITIES AND TERRITORIES IN WEST AFRICA

KEY TAKEAWAYS

- To ensure that coastal adaptation strategies effectively address local challenges, cities should actively participate in both their technical and financial conducts. To this end, cities need assistance in designing financial engineering tailored to their needs, which should be provided by national governments and ministries, as well as intermediaries such as banks, local development agencies and chambers of commerce and industry, support programmes and city networks.
- Faced with the considerable expenses of adaptation and aiming to reduce their reliance on international funding, coastal cities need to diversify their sources of finance. Striving for greater financial autonomy, cities should seek out new funding sources and mechanisms, notably through increased private investment in sustainable adaptation projects.
- It is essential that investments support sustainable adaptation projects, based on dynamic, multi-criteria analyses that integrate the effects of climate change. In that sense, local planners and financial donors must develop financial engineering tools that can help build long-term adaptation projects.

With little access to government resources to finance adaptation projects, West African coastal cities are turning to international funding. A paradoxical situation can be observed: on the one hand, cities are finding it difficult to access international financing due to a lack of human and technical capacity to set up projects with substantial budgets; on the other hand, international donors and private investors struggle to identify local projects providing sufficient guarantees to invest. Secondary cities, in particular, are not as appealing or as well-resourced as major capitals along the Gulf of Guinea when it comes to mobilising financing. In addition to being insufficient and not very diversified, too few investments are channelled towards long-term adaptation projects, most generally favouring the construction of unsustainable protective structures. These investments are channelled through time-limited projects, thus hindering cities' ability to implement place-based, long-term adaptation strategies⁷⁹.

79/ Coalition for Urban Transitions. (2021). *Financing Africa's urban opportunity: the 'Why, what and how' of financing Africa's green cities.* <https://urbantransitions.global/wp-content/uploads/2021/09/FinancingAfricaUrbanOpportunity-FINAL-REPORT.pdf>

3.1. Unlocking finance for hybrid, sustainable and flexible coastal adaptation strategies

Current funding tends to favour short-term and protection-based (dykes, breakwaters, beach nourishment) approaches. This trend reflects a lack of understanding of, or disregard to the negative impacts of these adaptation responses, as well as a strong preference for economic development among policymakers and investors. Generally, decisions are based on cost-benefit analysis that fails to account for the impacts of climate change, the value of hybrid solutions and a dynamic approach to adaptation. In fact, all too often financing is earmarked for protection measures that maintain the economic *status quo* in the short term. This inclination also reflects the timing of donor intervention, which tends to be in response and recovery to extreme events. For instance, in Saint-Louis (Senegal), following the flooding of the Langue de Barbarie in 2007, the World Bank and the French development agency (AFD) released funds to build an emergency dyke⁸⁰. Despite the need for these interventions, those involved on the ground deplore a lack of foresight.

In addition to increasing funding for adaptation efforts, it is equally crucial to prioritise the sustainability of adaptation projects. In this respect, a traditional cost-benefit analysis is not always the best suited method for evaluating the economic value of projects, incorporating ecosystem restoration activities or managed retreat. Conversely, multi-criteria evaluations offer a more accurate assessment of ecosystem services, considering their benefits over several time horizons, as well as the effects of climate change. This type of analysis provides a different perspective on the options at hand and in some cases can question the relevance of protection measures and beach nourishment operations, for which maintenance entails increasing costs in the long-term.

It is also advisable to include a skills-building component in funding plans to move away from

80/ Agence Française de Développement (2018). *Lutter contre l'érosion côtière du littoral de Saint-Louis*. Retrieved February 08, 2023, from <https://www.afd.fr/fr/carte-des-projets/lutter-contre-lerosion-cotiere-du-littoral-de-saint-louis>

project-based financing towards long-term planning. There is therefore a real need to strengthen the financial engineering of local authorities in project preparation, and establish mechanisms to cover the additional costs implied by capacity building. **Financing facilities such as AFD's Cities and Climate in Sub-Saharan Africa (CICLIA)** which offer technical and financial support for pre-investment assessments for cities' projects, are instrumental in initiating this paradigm shift (see Box 6)⁸¹.

Lastly, encouraging the structuring of adaptation strategies at the intermunicipal level presents a valuable opportunity from both environmental and economic perspectives. These projects devised in an intermunicipal context help prevent the risks of impacts being transferred along the shoreline and align with an integrated coastal management approach (see Section 2). However, while intermunicipal cooperation is a relevant form of governance, both financially and ecologically, it remains challenging. Local development banks, public local development agencies, and chambers of commerce and industry, play a pivotal role in structuring local projects. They seek to accelerate the development of local authorities through the mobilisation of funding and assistance to local project management. For instance, the **municipal development agency (ADM) in Senegal, coordinates action between local authorities to ensure an integrated approach to local development projects**⁸². As part of phases I and II of the **stormwater management and climate change adaptation project (PROGEP I and II)**, the ADM receives and manages international funding to reduce flood risks in the peri-urban areas of Dakar and improve integrated risk management in several cities in Senegal (see Case study 2)⁸³.

81/ Cities Climate Finance Leadership Alliance. (2023). *Financial Instrument Toolkit*. Retrieved February 08, 2023, from <https://citiesclimatefinance.org/financial-instruments/>

82/ Agence de Développement Municipal. (2022). *Accueil*. Retrieved February 08, 2023, from <https://www.adm.sn/>

83/ Agence de Développement Municipal. (2022). *Projet de Gestion des Eaux pluviales et d'adaptation au changement climatique - PROGEP II*. Retrieved February 08, 2023, from <https://www.adm.sn/en/progep>





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CICLIA: A facility to support sub-Saharan African cities in preparing resilience projects

In 2017, the French development agency (AFD) created the Cities and Climate in sub-Saharan Africa (CICLIA) facility based on the observation that translating cities' climate change mitigation and adaptation strategies into investments requires the use of engineering for the preparation and structuring of territorial development operations to address the needs of local authorities. Funding for pre-feasibility or feasibility studies is often lacking, making it difficult for cities to structure projects. Appropriate support during both the preparation and the implementation phases is therefore needed.

CICLIA addresses local authorities and provides them with support in:

1. drawing up local climate strategies and diagnosing vulnerability to climate risks
2. designing and implementing urban projects with climate co-benefits based on pre-feasibility or feasibility studies, additional studies on the impacts of climate change, and Front-End Engineering Design (FEED)
3. managing the implementation of the projects funded

3.2. Strengthening and supporting cities in accessing international funding

Redirecting funding for adaptation to local authorities or non-governmental organisations could help develop strategies that are better tailored to specific contexts⁸⁴. On the one hand, cities have little access to international financing, while the States that receive these funds fail to improve redistribution at

the local level. On the other hand, the large amounts proposed by donors rarely match the management capacity of municipalities.

The need to combine funding requests from multiple cities and local stakeholders is often highlighted and would enable them to apply for large funding packages worth several million euros. And this approach is already called for by regional actors. In this regard, local banks, development agencies and chambers of commerce and industry are pivotal for facilitating cooperation between international donors, States and local authorities (see Section 3.1.).

84/ Africa Europe Foundation. (2022). Africa-Europe Strategic Declaration on Climate Adaptation. <https://www.africaeuropefoundation.org/areas-of-action/africa-europe-strategic-declaration-on-climate-adaptation/>

Facilitating access to international funds is essential so that cities can directly finance their projects. With this in mind, international donors need to communicate and provide information on the various funding options and packages available to local authorities and non-state stakeholders to help finance adaptation. For this purpose, the Cities Climate Finance Leadership Alliance developed the **Financial Instruments Toolkit, which identifies potential financial instruments and highlights their practical application in field projects.**

The criteria for obtaining funding must be streamlined. Concurrently, cities need support in conceiving project financing plans. Indeed, the prerequisites to access international funds rarely align with the resources available to local authorities to prepare - often complex - adaptation projects. Some international development banks, including the AFD, have set up **financing facilities, such as CICLIA** (see Box 6)⁸⁵. Similarly, ICLEI has developed the **Transformative Actions Program (TAP)** to catalyse and increase capital flows to cities and regions for climate change mitigation

85/ Agence Française de Développement. (2022). CICLIA : Cities and Climate in Sub-Saharan Africa. Retrieved February 08, 2023, from <https://www.afd.fr/fr/ciclia-cities-and-climate-sub-saharan-africa>

and resilience projects⁸⁶. The Programme connects local stakeholders with technical experts and financial institutions. The aim is to transform ideas for resilient infrastructure and development into projects that are robust enough to be funded.

3.3. Making cities more self-sufficient and diversifying their funding sources

Strengthening the financial autonomy of coastal cities

Increased financial autonomy is desirable in many respects. For one thing, secondary cities and territories need to have authority to manage their own revenues and expenses and direct funds towards adaptation strategies that meet their needs. The challenge is also to sustain adaptation measures beyond the time-frame of project funding. To this end, it is necessary to reorganise local taxes, offering an opportunity to involve communities in the design of adaptation strategies. However, there are many obstacles to increasing the budgetary capacities of local authorities. This requires a rethink of the way taxes are collected and earmarked, which can be an additional burden for communities.

However, levers exist at community level to mobilise financing directly. Community funds can enable communities to directly access and manage funding for small projects, such as reforestation and coastal restoration operations⁸⁷. These funds are particularly suitable for small projects run by local groups with strong community ties, whose size and low economic returns do not fit into the portfolios of large donors or private interests. **In Saint-Louis (Senegal), local authorities relied on decentralised cooperation** with foreign cities to raise nearly three million euros in funding for coastal resilience programmes. By raising their own funds, local bodies can manage the project themselves, call on local technical experts, and hire the municipality's own human resources (see Box 2).

86/ ICLEI-TAP. (2023). Home. Retrieved February 08, 2023, from <https://tap-potential.org/>

87/ Cities Climate Finance Leadership Alliance. (2023). *Financial Instrument Toolkit: Community fund*. Retrieved February 08, 2023, from <https://citiesclimatefinance.org/financial-instruments/instruments/community-fund/>

Stimulating private investment in coastal city adaptation projects

Increased funding for coastal city adaptation means diversifying funding sources, notably through private investment. At present, the level of private investment on the African continent is low compared to the global average, and has even decreased over recent decades. The perceived risks of potential non-payment by local entities and of failure to achieve expected returns, are often considered to be too high⁸⁸. One limitation of this reasoning is that it neglects to account for non-monetary co-benefits associated with coastal resilience measures. Cities are therefore unable to convince investors of the benefits of financing them⁸⁹. De-risking and encouraging private investment also depend on improving the institutional layout of local authorities. Enhancing the level of transparency and building the capacity of local entities to accommodate private funding are essential measures to boost investor confidence⁹⁰ (see Section 3.1.).

Provided that financing decisions are based on low-carbon, resilient and equitable socio-economic models, increased private investment is beneficial for coastal cities. These investments could have a catalytic effect and encourage other organisations, banks, and businesses to provide additional capital⁹¹. In a context where local authorities need technical and human skills to carry out projects, this dynamic would also enable cities to access private-sector expertise and innovation⁹².

In line with these principles, the blue economy sector, which notably includes port operations, fishing and tourism, could help finance the construction and maintenance of the infrastructure

88/ Campus AFD & FMDV. (2022). Capsule 6 - Cycle de webinaires : Financer la ville durable de demain. <https://www.youtube.com/watch?v=jK59MPhaDEU>

89/ Op. cit., Coalition for Urban Transitions. (2021). Financing Africa's urban opportunity the 'Why, what and how' of financing Africa's green cities.

90/ Op. cit., Campus AFD & FMDV. (2022). *Renforcer la mobilisation du financement privé. Cycle de webinaires : Financer la ville durable de demain.*

91/ Ibid.

92/ Ibid

on which they depend to pursue their activities⁹³, while encouraging these industries to direct their investments towards more sustainable projects.

In Saly, Senegal, where economic activities such as tourism had been severely affected by beach erosion, the government and the World Bank decided to finance the building of breakwaters and beach nourishment operations based on the economic benefits that would be generated by the return of tourists⁹⁴. This example suggests that sectors that directly benefit from such infrastructure, such as the tourism industry, should get involved in financing and maintaining them. Concurrently, demonstrating the economic, social and environmental benefits of investing in adaptation projects in the short, medium and long term will further encourage investment in sustainable measures. Finally, multi-criteria analyses can guide contributions towards more dynamic, hybrid strategies for which the returns on investment are less immediate (see Section 3.1.).

93/ Op. cit., Bongarts Lebbe, T., Beguin Billecocq, I., Vegh, T., & Sarkozy-Banoczy, S. (2022) *Investment Protocol: Unlocking Financial Flows for Coastal Cities Adaptation to Climate Change and Resilience Building. Blue-tinted white paper.*

94/ Op. cit., Georges, N., Bergeron, E. (2022). *Sénégal : des murs contre l'océan.*



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CONTACT

Théophile Bongarts Lebbe

tbongarts@ocean-climate.org

<http://ocean-climate.org/en/seaties-2>



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