



West Africa Coastal Areas
Management Program

Coastal Protection

IMPACT STORIES



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West Africa’s arcing coastline—a hub for trade, fishing, tourism, and other economic activities—accounts for more than half of the region’s gross domestic product.

It is also a zone of rich biodiversity, which provides valuable ecosystem services such as global climate mitigation (through carbon-capturing mangroves) and benefits for local communities such as livelihoods, food security, and resilience. However, these economic and ecological benefits are at risk. Each year, local economies lose billions of dollars in losses and damages due to pollution, coastal erosion, flooding, and other climate change and human-driven impacts. For Benin, Côte d’Ivoire, Togo, and Senegal alone, the losses totalled US\$3.8 billion in 2017.



About the West Africa Coastal Areas Management Program

The World Bank’s West Africa Coastal Areas Management Program (WACA) was launched in 2018 to enhance coastal resilience. The \$630 million program works with countries to better manage shared resources by fighting erosion, flooding, and pollution. The program is currently in nine countries—Benin, Côte d’Ivoire, The Gambia, Ghana, Guinea-Bissau, Mauritania, São Tomé and Príncipe, Senegal, and Togo—although its regional engagements extend to all 17 countries in the region.

WACA is a collaborative effort that would not have been possible without the support of its financial, implementation, and programmatic partners. Our 11 regional institutions are coordinated by the West African Economic and Monetary Union (WAEMU) to ensure that the work is harmonized and owned by the beneficiary countries. The World Bank and its partners are now exploring ways to scale WACA’s results by boosting Africa’s Blue Economy to generate blue foods and blue jobs, and to protect ecosystems for resilience.

About this Series

This series of stories, which was funded by the Nordic Development Fund, PROBLUE, and the World Bank, showcases WACA’s most impactful flagship projects in the

region to date from various perspectives. This publication focuses on examples of where WACA is working across borders to improve coastal protection.

Publications in the Series

1. [Regional Integration](#)
2. [Coastal Protection](#)
3. [Cross-Border Investments](#)
4. [Social Resilience](#)
5. [Financial Scaling](#)
6. [Partnering with the Private Sector](#)
7. [Marine and Coastal Plastics Pollution](#)
8. [Growing the Knowledge Base](#)

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Why WACA Focuses on Coastal Protection

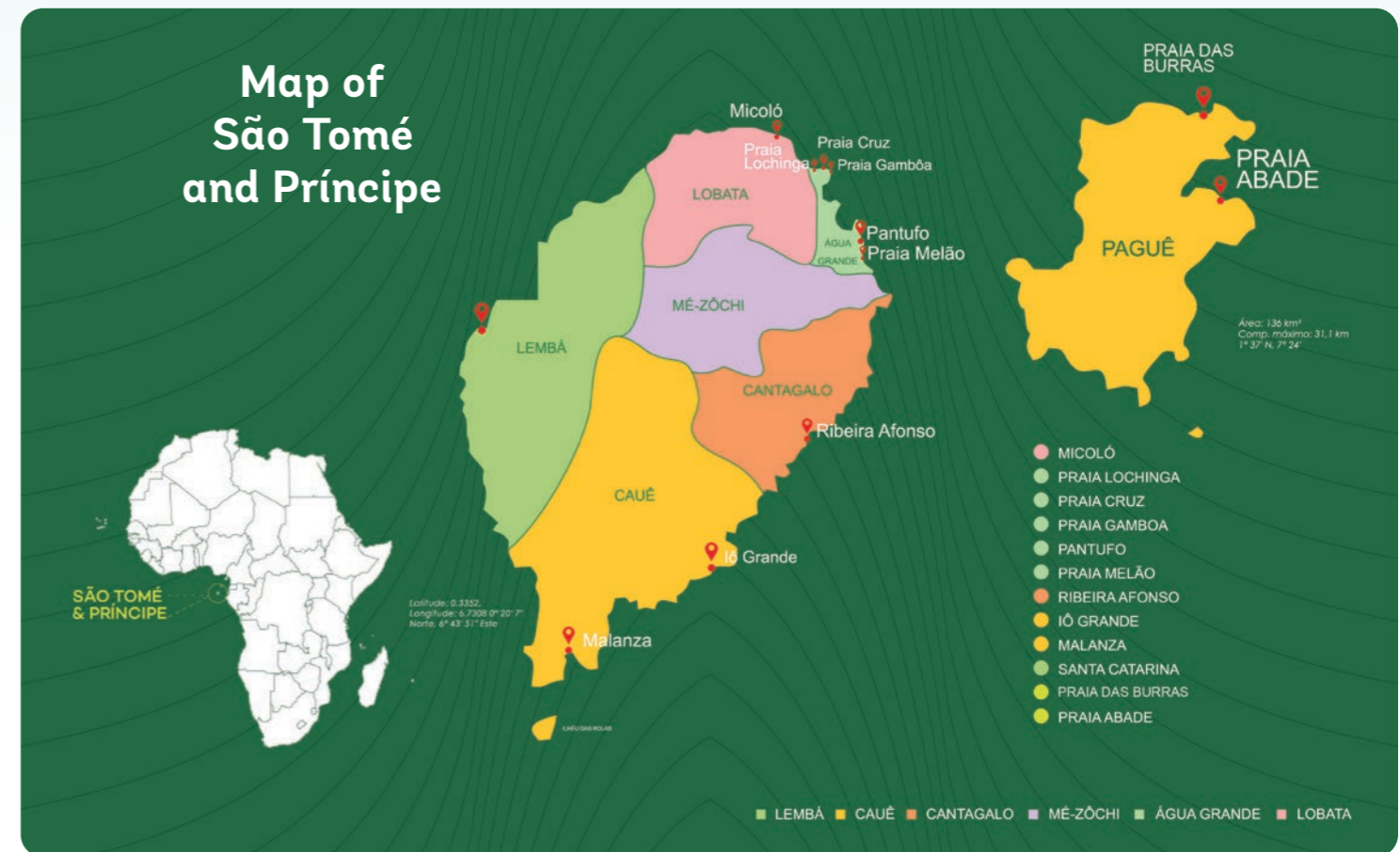
The problems of sustainable development and coastal resilience are problems of scale. Effectively addressing these challenges requires substantial investments at the national level to enhance national institutional capacity and regulatory frameworks, leverage economies of scale when investing in the rollout of physical green and grey infrastructure, and facilitate cross-learning between areas. A national approach also accelerates positive shifts by seeding new ways of coastal resource management at all levels of governance and throughout the country. From here, these shifts can spread and connect, generating a wave of positive change.

Flagship Activity

Planned Relocation in São Tomé and Príncipe Creating safer urban expansion zones through planned relocation

São Tomé and Príncipe is a small, island-based country of just more than 1,000 square kilometers in size off the West Coast of Africa, in the Gulf of Guinea. This lower-middle-income country has the smallest economy in Africa and, like many other small island developing states (SIDS), is economically fragile, geographically isolated, and highly susceptible to external shocks.

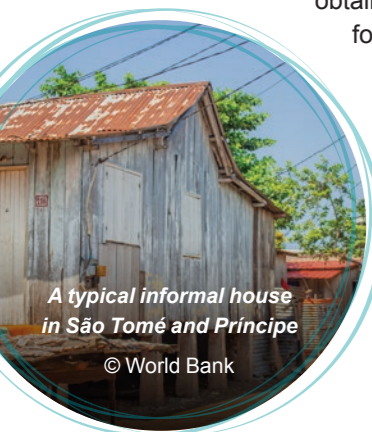
The country’s coastal infrastructure and ecosystems are increasingly being affected by climate change, which is driving an increase in sea levels and intense rainfall, as well as anthropogenic drivers such as rapid urbanization and poor coastal zone management. Together, these factors are increasing the risk of coastal erosion and more frequent and intense flooding.



Map of São Tomé and Príncipe | © World Bank

Flooding is of particular concern in informal settlements along São Tomé and Príncipe's coastline, where up to 53 percent of the total urban population—more than 85,000 people—live, often in structures built from wooden planks obtained by cutting down trees in nearby forests and raised on cement blocks.

With more people migrating to the coast each day, pressure on the country's forests for wood and economic infrastructure for water, sanitation, and energy is increasing. Flooding in these informal settlements take a particularly heavy toll on health, food and freshwater security, and livelihoods.



A typical informal house in São Tomé and Príncipe

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Flooding also affects key economic sectors such as agriculture and fisheries, with the country losing 1.6 percent of its GDP due to flooding in 2020. Assuming current trends continue, losses due to floods could reach 2.2 percent in 2050 and 3.3 percent in 2080 against a 2020 baseline.

Around 30,000 people—13% of the São Tomé and Príncipe population— are affected by flooding each year. This figure is expected to increase to **37,000 people by 2080.**

How the WACA Program contributes to solutions

Between 2018 and 2023, WACA's National Resilience Investment Project (ResIP1) worked closely with the Government of São Tomé and Príncipe to strengthen the resilience along the country's coastlines, with a focus on 12 at-risk informal communities. The US\$15 million investment benefited more than 20,000 people and brought about the following positive impacts:

About 20,730 beneficiaries



The project benefited 20,730 people, which represents nearly 11% of the total population, of which 44% are women.

Approximately

816 households



less exposed to flood risks.

Training of 1,000 artisanal fishermen



and distribution of approximately 1,250 maritime safety kits to fishermen.

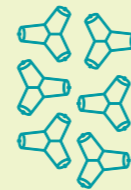
Development of more than 8 diplomas for improved coastal and disaster risk management.

3 schools constructed,



benefiting around 320 students per year.

6 breakwaters



2 protective walls
3 rock revetments

7 safe expansion zones



created in communities vulnerable to climate risks.

Next Steps

With the World Bank's support, the Government of São Tomé and Príncipe is now preparing a second phase of the WACA Program—**WACA+**, which emphasizes the blue economy—by promoting sustainable tourism and sustainable blue economy investments. WACA+ will include additional investments to turn safe expansion zones into nodes of sustainable growth. It will also support the establishment of additional housing, social infrastructure, and green areas, such as parks, using alternative construction techniques and materials that do not harm the environment.

As a small island state that finds itself on the frontline of the global climate crisis, the innovative solutions adopted in São Tomé and Príncipe could inspire other coastal communities facing similar challenges. It is a call for united action to make a difference together.



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“The sea used to invade us and go all the way to the road, but now it doesn't because of the barrier.”

– Valdynácia Barros, a fish seller in Micoló in the District of Lobata.

Valdynácia's house is close to the beach, and the sea would often rise and flood her home, going as far as the nearby road. The barrier is a sea wall that was built as part of a WACA project to build housing and a school in a safe expansion zone in Micoló.

Working Together to Identify Expansion Zones and Relocate At-Risk Homes

With the World Bank's support, the Government of São Tomé and Príncipe worked with six targeted communities to successfully identify areas where the targeted communities could safely expand, and which homes would need to be relocated to avoid being devastated by floods.

The communities actively participated in identifying safe expansion zones near to their homes using local flood-risk maps that the World Bank had developed in an earlier project. These maps indicated both high-flood-risk and safe zones. This collaborative approach allowed the communities to preserve their traditional livelihoods and social connections.

The communities also collaboratively identified which households were the most economically challenged and vulnerable to floods. This information was used to determine which households should be prioritized for relocation to safer areas. In total, seven safe expansion zones in six communities were created, and more than 70 houses and three schools were built, directly benefiting about 350 people. Many more people benefited indirectly through employment and access to improved services, including the 320 students that are expected to benefit from the schools each year.



Malanza before (left) and after (right) the safe expansion zone project identified vulnerable homes for relocation. Malanza is one of the targeted communities. | © World Bank

Other Showcase Initiatives



1 Nature-based solutions to flooding and storm surges in Mauritania

The challenge Mauritania, though one of the least densely populated countries in the world, has experienced rapid population growth over the past 60 years. Its coastal capital city, Nouakchott, is home to more than a million inhabitants, or 26 percent of the population. The country's 754 kilometer (km) coastline supports two national parks and a range of economic activities, including hydrocarbon exploitation and fishing. However, urban growth and industrialization—coupled with poor coastal management—are placing the country's valuable coastal ecosystems at risk. In particular, the extraction of dune sand for construction has weakened natural coastal barriers, putting communities at risk of dune breaches with subsequent flooding and erosion. This is of great concern in Nouakchott, which is partly located below sea level and particularly susceptible to flooding, especially from the storm surges that are becoming increasingly more severe due to sea-level rise.

The solution The WACA program supports a nature-based solutions project that involves using mechanical and biological means to stabilize Nouakchott's dune belt and strengthen its defensive role promoting the use of local species and materials (such as *Sesuvium* and *Typha wood*). The sharing of knowledge and best practice by national research institutes and similar projects in Senegal and France is a key component of the project.



Experts from Senegal and Mauritania exchange knowledge on how *Typha wood* can be used to stabilize dunes. *Typha wood* will find a similar use in Nouakchott in Mauritania.



2 Preventing coastal erosion and marine submersion of coastal fishing villages in Côte d'Ivoire

The challenge About two-thirds of Côte d'Ivoire's 550 km coastline is exposed to storm surges and erosion due to strong Gulf of Guinea currents, which move sand and other sediment along the shoreline, aggravated by human activities such as sand mining, port construction, and mangrove deforestation.

This is a concern for the country, which derives about 60 percent of its real GDP from its coastline. The coast is also home to more than 35 percent of Côte d'Ivoire's people.

Five critical zones for coastal erosion have been identified along the Côte d'Ivoire coastline, namely, Grand-Lahou, San-Pédro, Port-Bouët, Grand-Bassam, and Assinie-Mafia. Grand-Lahou is a coastal town 150 km west of the capital city where the Bandama river meets the Atlantic Ocean. Coastal erosion, exacerbated by climate change, has caused the mouth of the Bandama river to gradually move west in recent decades, placing the local Lahou Kpanda fishing community at risk of marine submersion within the next decade.

The solution In 2024, WACA ResIP is launching works at Grand-Lahou to re-establish and reinforce the Bandama river mouth at its historical location in 1952, while sealing up the current opening between the river and the sea. On the shorefront, beaches will be replenished where needed and vegetation planted to stabilize the coastal barrier. Waterways in the lagoon will also be dredged to improve navigation by local users and the fishing school, so supporting the community's socioeconomic development. The project engages community and local actors to monitor the reinstated river mouth and waterways and maintain them using local materials. All work is based on comprehensive technical studies.



3 Protecting cultural heritage from coastal risks in Senegal

The challenge Projections show that as much as **75 percent of Senegal's 718 km coastline will be at risk of erosion due to sea level rise by 2080**, compared with 25 percent today. Senegal's coastline is currently home to 7.8 million people, or 52 percent of the population, and contributes 68 percent of the country's GDP through industry, fisheries, tourism, and other economic activities. The area is also an agricultural node, producing 70 percent of the vegetables eaten in the country, and hosts important ecosystems such as wetlands and mangroves. Erosion due to sea level rise, together with the salinization of water and soil and rapid urbanization, are putting these benefits at risk. Sea level rise is a particular concern in Gorée, a small island off Dakar with about 2,100 ethnically and culturally diverse inhabitants. The island's most important economic activities include fishing, shipping, and tourism and handicrafts. As a UNESCO World Heritage Site, Gorée boasts several important historical, educational, and religious buildings. With 70 percent of the island's coastline vulnerable to rising sea levels and erosion, these treasures are highly at risk.

The solution With WACA's support, the people of Gorée island co-developed a plan to reduce the impact of coastal hazards. Under this plan, about 1.3 km of ring dikes will be constructed on the east and west sides of the island, with construction due to conclude in early 2025. These works will protect important structures such as the island's mosque, fort, school, and historic slave house. These structures have great cultural value and some of them, like the school and the mosque, are still in use.

Outlook

Sustaining and Expanding Impact

WACA has laid the foundations for integrated coastal management in countries along the coast of West Africa by enhancing institutional and regulatory frameworks and allocating funding to areas severely affected and threatened by coastal erosion, flooding, and pollution.

However, the need is substantial and the World Bank is working to sustain and expand its efforts to develop the region's sustainable blue economy in order to support the objectives of food security, jobs and livelihoods creation, and the management of ecosystems for climate resilience.



Special thanks to our partners who have made WACA possible

Agence Française de Développement, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), European Space Agency, French Global Environment Facility, Global Environment Facility, Global Facility For Disaster Reduction And Recovery, Global Infrastructure Facility, Global Program on Sustainability, International Finance Corporation (IFC), Invest International, Korea-World Bank Partnership Facility, Ministry of Ecological and Solidarity Transition (France), NDC Support Facility, Nordic Development Fund, Private Infrastructure Advisory Facility, Quality Infrastructure Investment Partnership, Spanish Agency for International Development Cooperation (AECID), and the World Bank Group.



Nordic Development Fund



