

# ACCCE

ADAPTATION TO CLIMATE CHANGE IN  
COASTAL ZONES OF WEST AFRICA



Responding  
to coastal changes  
and its human implications  
in West Africa  
through integrated coastal  
area management

CAPE VERDE • GAMBIA • GUINEA-BISSAU • MAURITANIA • SENEGAL

2008 - 2012



# Adaptation to Climate Change in Coastal zones of West Africa

## COASTAL ZONE DEGRADATION IN WEST AFRICA

- These areas are sources of development; and
- Offer an important biodiversity heritage.

The Adaptation to Climate Change in Coastal Zones Project (ACCC Project) has been designed to respond to changes to the coast and its human implications in West Africa through integrated coastal zone management.

## AN INITIATIVE OF FIVE PARTNER COUNTRIES RESULTING FROM NEPAD PROCESS

This full-sized project (FSP) was approved by the Global Environment Facility (GEF) in 2007. The regional project inception meeting was held in Dakar from 24 to 26 November 2008. The project will be completed by December 2012. Funding was provided by the GEF for this project (US \$3.3 million); it was co-financed by the five Governments, UNESCO IOC and other partners. The executing agency was UNDP and the implementing agency was the UNESCO's Intergovernmental Oceanographic Commission (IOC), which was responsible for the regional coordination.

## MAIN OBJECTIVES

- Maintaining or building ecosystem resilience to climate change, as these zones may not fully benefit in the long term from measures implemented under conventional biodiversity-protection projects if specific adaptation measures in response to the impacts of climate change (sea level rise) are not put in place at the same time.
- While reducing coastal communities' vulnerability to the effects of climate change by strengthening their resilience to coastal erosion.

## IMPLEMENTATION STRATEGY

The project was implemented at three levels:

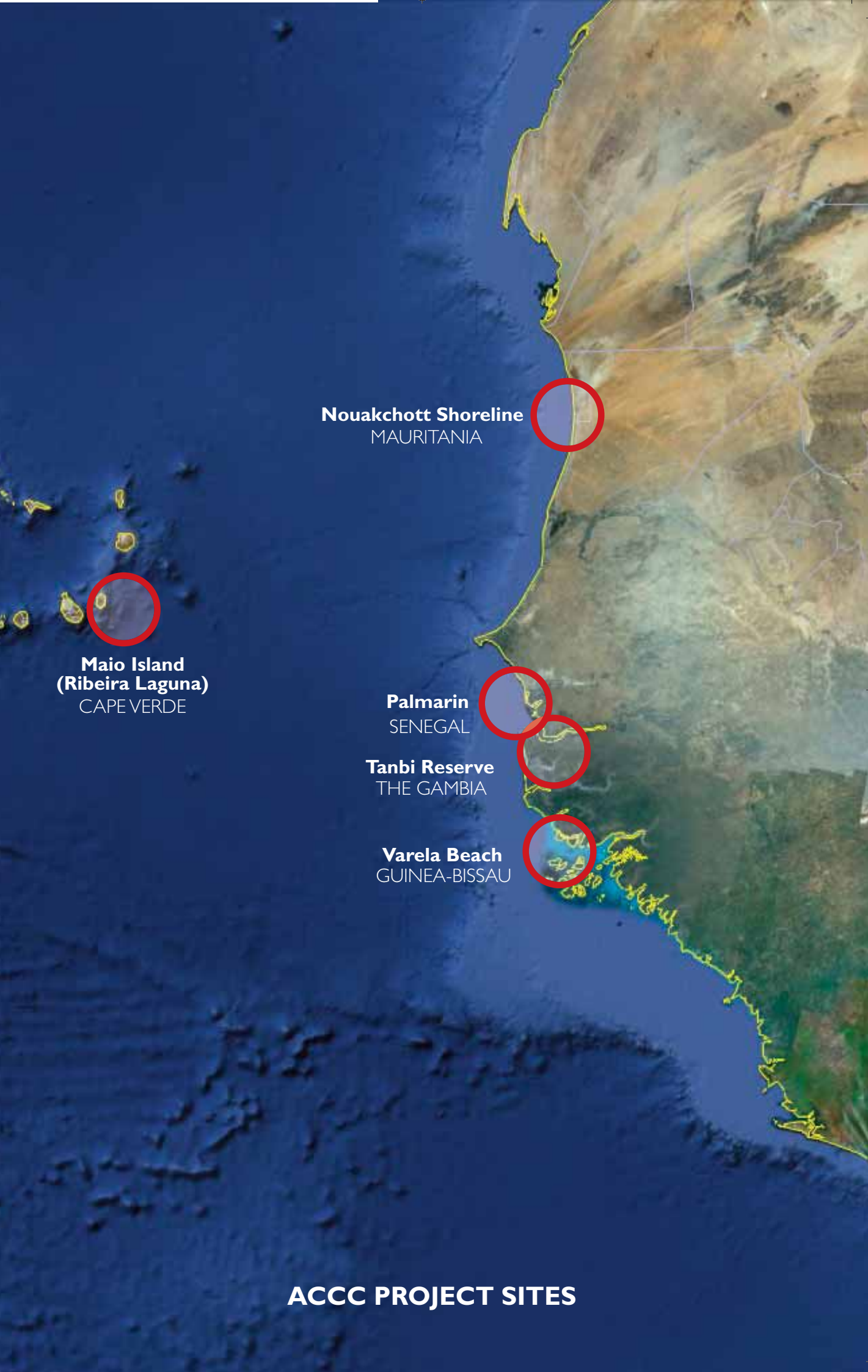
- Locally, through pilot sites (one per country) in which activities were carried out to build coastal ecosystem and local community adaptability and resilience to climate change;
- Nationally, by integrating climate change and adaptation issues into national coastal zone management policies and programmes;
- Regionally, by reinforcing coastal-erosion control and coastal management planning capacities. Coastal erosion is regarded as a serious threat throughout the region. Moreover, the project sought to promote learning geared to improved adaptation management primarily through exchange of experience. It also aimed at strengthening regional cooperation on issues related to climate change and coastal zone management.

## REGIONAL ISSUES

A regional concept involving Cape Verde, Gambia, Guinea-Bissau, Mauritania and Senegal.

These five countries have a number of common characteristics:

- Location in the same ecological-climatic region;
- Belonging to the Canary Current Large Marine Ecosystem (CCLME);
- Upwelling, crucial to coastal productivity; in much of the region;
- Regional migration of species of fishes, mammals, birds and turtles.



**Nouakchott Shoreline**  
MAURITANIA

**Maio Island  
(Ribeira Laguna)**  
CAPE VERDE

**Palmarin**  
SENEGAL

**Tanbi Reserve**  
THE GAMBIA

**Varela Beach**  
GUINEA-BISSAU

**ACCC PROJECT SITES**

# Achievements in the five



Cape Verde

## Ribeira Lagoon (Maio Island)

Cape Verde is composed of ten islands. The site selected for the project is the Ribeira Lagoon on Maio Island, eight kilometres from Porto Inglês. The site is particularly vulnerable to coastal erosion and is very important for its biodiversity (turtles and birds).

**Selected option: anti-salt dyke, soil rehabilitation and reforestation.**

- Anti-salt dyke construction in the Ribeira Lagoon estuary to trap flood-borne sediments, remove salts in order to reclaim salty soil and prevent the lagoon from bursting its banks in the event of flooding, and reduce sea-water infiltration into the estuary.
- Construction of water- and soil-conservation mechanisms to slow down rainwater run-off and increase its percolation into the soil in order to replenish the aquifer.
- Establishment of a plant nursery for species adapted to the local climate in order to reforest 16 hectares.



Guinea-Bissau

## Varela beach

Varela beach, 300 metres away from the village of Varela in the São Domingo region, was selected as the pilot project site in Guinea-Bissau.

**Selected options: reforestation and rehabilitation of tourism**

- Cleaning of Varela beach in conjunction with the local community, from November 2009 to February 2010, involving 40 young people paid by the project. As the bridge over the São Vicente River to São Domingo had been rehabilitated, 5,000 tourists went to the beach in May 2010.
- Capacity-building of Varela Environmental Audit School, owing to the rehabilitation of the biodiversity-dedicated library, which is now equipped with audio-visual hardware.
- Study of Varela's coastal biodiversity and plan for the monitoring of species protected under international conventions (marine turtles and African manatee (*Trichechus senegalensis*));
- A coastal erosion study of the Varela beach, including national training in mapping, geographic information systems (GIS), risk, vulnerability and the economic evaluation of ecosystem goods and services.



Gambia

## Tanbi Reserve

The site selected for the pilot project in Gambia was a reserve located to the South of the River Gambia estuary. Biodiversity in the area is very rich (with protected endangered species), and coastal erosion is significant.

**Selected option: ecotourism camp**

- To reduce the pressure of undesirable human activities on biodiversity in this area and respond to the climate-change impacts that makes land less and less arable, the decision was taken to build an eco-tourism camp, using green materials (bricks made of sand mined far away from the coast, solar facilities, space for energy-efficient stoves in the kitchen and mains water) and to involve local people closely. The camp was completed in 2010, and the transfer of its management (government franchise) is being studied by tourism professionals.
- A 27-kilometre enclosure has been erected to protect the Tanbi site from intruders and an abandoned quarry has been cordoned off by an 80-kilometre fence to prevent illegal sand mining and to protect the birds. Those measures will help to improve the ecotourism sector, generate additional income for the local people and thus increase their resilience to climatic hazards.



# pilot sites



Mauritania

## The Nouakchott shoreline

The Mauritanian coastal region, albeit more temperate, is buffeted by prevailing north-easterly winds that contribute to sand accretion and increase the already high evapotranspiration rate.

**Selected option: “soft” techniques to fix the shoreline**

After an assessment of the shoreline of the pilot project site, the following “soft” techniques were used to fix the breaches in the dune ridge on the fringes of the capital Nouakchott:

- Nursery propagation of 40,000 plants (local species such as *Tamarix*, *Nitraria retusa* and *Atriplex*) for dune afforestation;
- Mechanical stabilization and afforestation of 50 hectares of coastal dunes by Mauritanian service NGOs;
- Filling of two breaches in the dunes by using sand-trapping techniques based on fences erected parallel to the dunes.

The mechanical stabilization and afforestation techniques used at this pilot site are exemplary, particularly since the techniques have an advantageous cost of less than US \$7 per linear metre of dune stabilized by vegetation.



Senegal

## Palmarin

In order to improve estimates of the annual coastline-retreat rate, a mapping tool was first used before any work on the shoreline. The average erosion rate along the Palmarin coast was found to be three to four-and-a-half metres per annum.

**Option selected: strengthening of plant cover**

In that highly unstable sedimentary zone, the solution was to strengthen plant cover in the area. Results were obtained through reforestation and coastal defence activities:

- Reforestation of 15 hectares of mangrove;
- Planting of *Avicennia africana* on three hectares as coastal defences;
- Planting of *Casuarina equisetifolia* trees along six kilometres of the coastline.

To sustain the activity, two wells were sunk and the community plant nursery was restored. The most significant impacts included natural mangrove regeneration, regrowth of the vegetation along the coastline and an increase in bird nests and animal burrows.



## INITIATIVES TO SUPPORT VULNERABLE POPULATION GROUPS AND PUBLIC AWARENESS RAISING

In addition to the work on the pilot sites, initiatives to support local population groups were carried out in each country locally and nationally, including:

- Community training courses on techniques for tree nursery development, adaptive reforestation, mangrove regeneration and numerous income-generating activities at the request of local people, in particular women and fishermen; some funding was provided for the purchase of equipment and pirogues, within the limits of the project’s scant resources; a networking initiative (RACCAO) for the future was designed after an analysis was conducted on needs in this field.

- Training for teachers from the UNESCO Associated Schools Project Network through the Sand-watch project and building the capacities of coordination units through the National Commissions for UNESCO;

- Raising community awareness of climate hazards by disseminating literature and by erecting environmental noticeboards.

- Raising parliamentarians’ awareness through the joint organization with the International Union for Conservation of Nature (IUCN) of a workshop for an “Alliance between members of Parliament and local decision-makers for climate governance in countries covered by the West African Regional Marine and Coastal Conservation Programme (PRCM) and members of the Economic Community of West African States (ECOWAS)”, which was held at the Cape Verde National Assembly in Praia from 3 to 6 August 2009. The Praia Declaration on climate change governance and an action plan were adopted;

- In the framework of this project of limited duration, activities were initiated to support national climate change policies and measures such as the Coastal Ordinance in Mauritania, the Coastal Zone Law in Senegal, the Zoning of the Varela site and the updating of the National Coastal Management Plan. But these related issues still remain fields where much more work needs to be done in the future.

# Capacity-Building

## TECHNICAL TRAININGS

In the last three years, a series of specific training courses was organized by the regional coordinator for the participants and partners from the five ACCC project countries. Those courses were widely attended by the project teams

and relevant stakeholders. A complete list of those events and the coordination meetings (including the project meetings) are listed in full in the table below.

24-26 November 2008	Inception Workshop of the ACCC project: Adaptation to Climate Change in Coastal Zones project	UNESCO-BREDA Dakar, Senegal
23-25 April 2009	Regional training workshop on climate change and coastal zones	UCAD II Dakar, Senegal
27-30 April 2009	Regional training workshop on mangrove restoration techniques	Saly Senegal
13-16 June 2009	Regional training workshop on dune reforestation techniques	Nouakchott Mauritania
23-25 November 2009	Meeting of the ACCC Project steering committee	Banjul Gambia
18 March 2010	Meeting on co-financing opportunities for the ACCC Project	Sofitel Teranga Hotel Dakar, Senegal
26-30 April 2010	Regional training workshop on coastal zone mapping	Centre de Suivi Ecologique [Ecological Monitoring Centre], Dakar, Senegal
24-25 November 2010	Regional meeting of the steering committee 2010	Bissau Guinea Bissau
26-30 November 2010	Regional training workshop on Integrated Coastal Zone Management	Bissau Guinea Bissau
6-7 June 2011	Formation of the local stakeholder network for climate change adaptation in coastal zones	Palmarin Fatick, Senegal
12-13 June 2012	Closing seminar on Integrated coastal zone management and climate change Final meeting of the ACCC steering committee	BREDA Dakar, Senegal

































# Capacity-Building

## A NEW TRAINING TOOL

The regional coordination established a Working Group on Adaptation composed of national experts, who contributed to the design and drafting, for local decision-makers, of a guide to adaptation options. The guide, entitled “**Guide to adaptation options in coastal zones for local decision-makers**”, opens up prospects for the acknowledgement of environmental management as a whole and for the general inclusion of coastal erosion among environmental issues that must be managed by local decision-makers. Whether the issue is about seawall construction, establishment of a

protected marine area or observance of a “biological rest” period, the guide groups together practical experience gained in implementing structural and non-structural options and in the integrated management of natural resources by providing local decision-makers with relevant information. The table below is a synoptic overview of all options and related costs in order to guide local decision-makers in their key choices. It is available in three languages (French, English and Portuguese) and can be accessed on the project’s website.

**Summary of impacts and costs of adaptation options for coastal areas**

HARD ENGINEERING OPTIONS	POSITIVE IMPACTS	NEGATIVE IMPACTS	COSTS
1. Seawalls			
2. Groins			
3. Beach revetment			
SOFTER ENGINEERING OPTIONS			
4. Artificial beach nourishment (or replenishment)			
5. Restoration of dunes			
6. Coast fixing through mangrove restoration			
INTEGRATED RESOURCE MANAGEMENT			
7. Optimizing the use of coastal lands			
8. Integrate management of water resources			
9. Biological recovery through sustainable, community-based fisheries resource management			
10. The role of Marine Protected Areas (MPAs)			

Source: IOC Manual and Guide No. 62, ICAM Dossier No. 7

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**Project website**

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