



# YEMEN

## Integrated Coastal Zone Management in Yemen

LEAST DEVELOPED COUNTRIES FUND	
LDCF grant	\$4,950,000
Cofinancing	\$10,000,000
NAPA completion	April 2009
Inclusion in LDCF Work Program	June 2009
Expected CEO endorsement	May 2010
Expected implementation start and completion	September 2010–September 2016
GEF Agency	The World Bank
Other executing partners	Ministry of Fish Wealth; Environment Protection Authority (EPA), Ministry of Water and Environment

The coastal zone of Yemen holds a rich variety of natural habitats and species, and is a natural hub for development in terms of fisheries, coastal settlements, coastal infrastructure, tourism, and new development initiatives. If properly managed, these coastal and marine resources could become a major source of employment and income for Yemen's rural poor. Fisheries, for example, provide both employment and affordable food, especially in areas where cereal growth and livestock grazing are limited by severe lack of water and land erosion.

The vast majority of Yemen's poor live in rural areas. This segment of the population, particularly poor coastal communities, is most threatened by climate change variability. Predicted sea-level rise will increase coastal flooding and erosion, increase saltwater intrusion into surface and groundwater systems, raise

the cost of coastal protection, and lead to the loss of wetlands and other coastal ecosystems. Other projected climate variability for Yemen includes increased temperature, reduced annual rainfall, and increased frequency of high-intensity rainfall and storm surges. Extreme weather events, such as the October 2008 level-three tropical storm that inflicted major ecological and economic damage, are becoming more frequent in Yemen and reveal the extreme vulnerability of Yemen's coastal zone to climate change impacts.

### Project Activities and Expected Impacts

It is critical that development in Yemen occur within a broader sustainable development policy framework and harmonize with climate considerations to make it climate resilient. The LDCF project focuses on coastal zone management, a key priority identified in Yemen's National Adaptation



Programme of Action (NAPA). By addressing urgent on-the-ground activities, the project seeks to reduce the vulnerability of Yemen's coastal and marine resources to climate change. Two pilot sites representing the major coastlines in Yemen, one along the Gulf of Aden and the other along the Red Sea, explore ways to increase resilience to climate change impacts through implementation of an Integrated Coastal Zone Management (ICZM) approach.

The project is made up of three interrelated components:

**Component 1. Institutionalization of an ICMZ approach and climate change adaptation in selected governorates:** A climate change gap analysis for ICZM is completed, and policy and institutional frameworks are strengthened through improved intersectoral coordination among national and local agencies for the management of coastal zones appropriate for climate-resilient development.

**Component 2. Knowledge management through data collection and analysis through downscaled climate modeling, to inform climate-resilient development:** The project aims to facilitate informed policy and decision making through the provision of value-added information and databases, including downscaled predictive regional and global climate change models. It ensures, through close ties with Component 1, that updated information is available for decision makers. An ICZM database is established, and climate change modeling, focusing on the covered coastal zones, is introduced to, and ultimately adopted by, local scientists.

**Component 3. Piloting climate change adaptation into ICZM at two pilot sites:** At the two pilot sites, Bir Ali-Burum, along the Gulf of Aden, and Kamaran-Luhaiyah, along the Red Sea, the project explores different types of optimum practices within the framework of ICZM.

In Bir Ali, economic activities include fishing, tourism, and mineral mining. It is located close to the port city of Al-Mukalla, which is covered by the Yemen Free Zones Initiative and is slated for tourism development. Given its relatively diverse economy, this site offers an

ideal opportunity to apply a coastal zoning approach, including balancing needs from different sectors. Bir Ali also presents an excellent site to explore value-added fishing practice and fishing waste processing, revising infrastructure construction codes to make new and reconstructed infrastructure flood and climate change proofed, as well as exploring retention of flood water by strengthening the water retention function of wetlands and other local practices in the area.

Kamaran-Luhaiyah represents a different type of coastal zone, in terms of both development and climate change adaptation. While the mangroves on Kamaran Island are intact and part of a protected area, the mangroves at Luhaiyah, on the mainland, are subject to ongoing development pressures. With rising sea temperatures and levels, Yemen will face potential losses of significant coastal ecosystems such as sea grasses, reefs, mangroves, and estuaries. Kamaran-Luhaiyah thus provides an opportunity for Yemen to explore a coastal management approach focusing more on biological and ecological development aspects, as well as nature-based adaptation measures.

Collectively, these two pilots showcase the value of climate-resilient-based ICZM along these vulnerable coastlines and serve as models for good practices and lessons learned to other parts of Yemen.

### **Synergies and Coordination**

The LCDF project is coordinated with an International Development Association (IDA)-funded World Bank project on fisheries resource management and conservation. It also works cooperatively with the proposed Regional Red Sea project targeting coordination at the regional level. Additionally, the project links with European Union activities on fisheries information management.

This project also benefits from critical climate modeling work done through ongoing analytical work led by the World Bank, with support from the Netherlands, Norway, and Japan. A recent initiative of the multidonor South-South Experience Exchange Trust Fund called Yemen and China Knowledge Sharing on Systematic Management of Coastal and Marine Areas in Yemen is also expected to bring practical inputs to the project preparation.

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### **For More Information**

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