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<b>Implementing Agency</b>	United Nations Development Programme
<b>Country</b>	Egypt
<b>Focal Area</b>	International Waters
<b>Project Title</b>	Lake Manzala Engineered Wetlands
<b>GEF Allocation</b>	US\$4.5 million
<b>Cofinancing</b>	US\$6.63 million
<b>Total Financing</b>	US\$11.13 million
<b>Dates</b>	December 1992–June 2001
<b>Environmental Problem</b>	<ul style="list-style-type: none"> <li>• Poor water quality of Lake Manzala threatens wildlife, ecosystems, and the health and livelihood of millions of people, while polluting Mediterranean Sea</li> </ul>
<b>Project Goals</b>	<ul style="list-style-type: none"> <li>• Demonstrate innovative engineered wetland technology to clean polluted water</li> <li>• Enhance environmental and economic opportunities at the local and national levels</li> </ul>

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Lake Manzala is located on the northeastern edge of the Nile Delta, separated from the Mediterranean Sea by a sandy beach ridge. The two water bodies are connected at three points, allowing for some water exchange. The lake is large, shallow, and brackish and exposed to high levels of pollutants from industrial, domestic, and agricultural sources. The Bahr El Baqar drain transports water from eastern Cairo for 170 kilometers to the lake, carrying large amounts of particulate matter, nutrients, bacteria, heavy metals, and toxic organics. Methane and hydrogen sulfide bubble up to the surface, releasing greenhouse gases. Only the hardiest of organisms can tolerate Lake Manzala at the entrance to the Bahr El Baqar drain but still suffer from deformities, discoloration, and stunted growth.

The lake exhibits a number of other environmental problems. Fish production overall is high and once supplied 30 percent of Egypt's total catch. In recent years, however, Lake Manzala's fish have had a reputation for being chemically and microbially contaminated. Tainted drinking water from the lake leads to enteric diseases. Fish and bird species have substantially declined in the area. Land reclamation has also reduced the lake surface by half, and, despite declining quality of life and standards of living near the lake, human populations are increasing, exacerbating the lake's problems. The condition of the lake is clearly deteriorating and concern is widespread, yet scientists and environmentalists lack adequate tools and data to determine and support effective management plans. Worsening water quality is greatly impeding development in Egypt.

**The Project** This project, being implemented by the Egyptian Environmental Affairs Agency, is demonstrating an approach to achieving sustainable development while addressing deteriorating water quality in Lake Manzala. The project will empower local residents and build the capacity of nongovernmental organizations and government institutions to achieve Egyptian self-sufficiency in an innovative technology. Specific objectives include (a) promote sustainable development by enhancing environmental and economic opportunities at the local and national levels and (b) construct and operate a demonstration wetland that will treat 25,000 to 50,000 cubic meters of wastewater per day before it enters Lake Manzala.

**Activities**

- *Capacity building.* This component will increase capability for sustainable development in managing Lake Manzala, including local and national participation. This involves activities to (a) strengthen and promote

community involvement in environmental management activities, (b) build capacity and develop human resources to ensure that the engineered wetland can be operated and replicated on a regional scale, and (c) disseminate lessons and experiences of the project at global, national, and community levels.

- *Engineered wetland technology.* This component will demonstrate a low-cost, efficient method of treating large bodies of water in Egypt and promoting a cleaner Mediterranean Sea. This will involve (a) completing preconstruction planning and activities, (b) constructing the demonstration wetland treatment system, sediment pond, engineered wetlands, and aquaculture facility, (c) implementing innovative wetland technology, and (d) establishing a monitoring and evaluation system to enable the Egyptian Environmental Affairs Agency to maintain the wetlands' expected performance levels.

In addition, biomass will be harvested and processed into marketable products. The clean effluent water will be used for an aquaculture facility to produce juvenile fish stock for the lake and other aquaculture ventures.

- Benefits**
- Reduce pollution flowing into Lake Manzala and the Mediterranean Sea
  - Protect diversity and enhance habitats of fish, bird, and other aquatic species
  - Reduce emissions of greenhouse gases from anoxic drain water
  - Improve economic well-being and health of local residents
  - Strengthen local and national institutions in project delivery and implementation
  - Demonstrate sustainable, low-cost alternative to traditional waste treatment
  - Increase environmental awareness of local citizens.

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The Global Environment Facility (GEF) is a financial mechanism that provides grants and concessional funds to developing countries for projects and activities designed to protect the global environment. GEF resources address climate change, biological diversity, international waters, and depletion of the ozone layer. Activities concerning land degradation, primarily desertification and deforestation as they relate to the four focal areas, are also eligible for funding.

GEF is a joint venture of the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and the World Bank. These three agencies implement GEF projects.

**For more information on this project, contact:**

**Egyptian Environmental Affairs Agency (EEAA)**

**United Nations Development Programme**

Mahenau Agha  
Information Officer  
One United Nations Plaza  
New York NY 10017 USA  
Tel: (212) 906-6112 Fax: (212) 906-6998  
E-mail: mahenau.agma@undp.org  
Internet Home Page: www.undp.org/gef

**For more information on GEF:**

**GEF Headquarters**

1818 H Street NW  
Washington DC 20433 USA  
Tel: (202) 473-0508 Fax: (202) 522-3240/522-3245  
Internet Home Page: www.gefweb.org

**Chief Executive Officer:** Mohamed T. El-Ashry

**Senior External Relations Coordinator:** Hutton G. Archer  
E-mail: harcher@worldbank.org