Shared Environmental Information System (SEIS)

Alexandria Coastal Zone Management Project (ACZMP) 2010 - 2017
The project is financed by a Grant from the Global Environment Facility (GEF)) in the amount of US$ 7.15 million. Managed by the WB, and implemented by the EEAA during the period of 2010-2017.

The main objective of the project is to reduce water pollution reaches the Mediterranean from Lake Mariout.
Project Objectives

Supply a strategic framework and immediate small-scale investments to reduce the load of land-based sources of pollution entering the Mediterranean Sea in the hot spots of El Mex Bay and Lake Mariout.

Protect/restore globally significant coastal heritage and ecosystem processes by supporting the Government of Egypt's efforts to develop and implement a National Coastal Zone Management Plan.
Project Components:

Component (1):
Planning, Institutional Capacity and Monitoring.

Component (2):
Pollution Reduction Measures.

Component (3):
Project Management and Monitoring & Evaluation.
Current Environmental Problems

• Most of the lake area is covered by reeds which leads to a decrease in the rates of dissolved oxygen and in available fishing area.
• Decrease in the annual fish production which leads to socio-economic problems
• Deterioration of water quality
• Lake drying up.
• Management conflicts between stakeholders.
Project Framework

Alexandria Coastal Zone Management Project (ACZMP)

**COMPONENTS**

**Planning, Institutional Capacity and Monitoring Strengthening**

Increase capacities to manage the coastal zone

**Pollution reduction**

Reduction in the land based source through pilot measures

**Project Management and Monitoring and Evaluation**

Completion of a M&E system and dissemination

**OUTCOMES**

i) Preparation of an ICZM plan for Alexandria including Lake Mariut

ii) Development of an integrated water quality monitoring network for Lake Mariout and Med. Sea including a water quality and hydraulic model

iii) Supporting stakeholders with required equipments, capacity building programs, and technical support.

US$ 7.15 million
Lake Mariout Water Balance

- El-Qala drain (92358)
- Eastern Station (607000)
- Somoha drain (19152)
- Janet Zahra drain (131616)
- El-Amlak drain (65664)

- Western station
  3410325 m³/d
  5%

- El-Mex Pumping station
  7993945 m³/d

- Sea Locks
  82200 m³/d
  5%

- Direct industrial discharge
  46747 m³/day

- Groundwater
  24974 m³/d

- Nubareya canal
  2530000 m³/d
  31%

- El-Qala drain
  915790 m³/d
  11%

- Evaporation
  169344 m³/day

- El-Unioun drain
  4200000 m³/day
  52%
POLLUTION REDUCTION MEASURES FOR ALEXANDRIA COASTAL ZONE

Mediterranean Sea

Lake Mariout

Water Bodies

Sources of Pollution

Urban/Municipal Wastewater
Agricultural Wastewater
Rural Wastewater
Industrial Wastewater

Funding Sources

GOE
- East & West Treatment Plants
- Upgrade to secondary treatment
- Operational by 2012
- Cost $600 million

GEF
- Innovative & Low-cost Technologies
- ICZM Plan for Alexandria
- Water Monitoring System
- Replication Strategy
- Grant: $7.15 million

EPAP2
- Treatment Plant/Cleaner Production
- Company Self-financing
- Start Date: 2006
- World Bank loan - $20 million
**Component (1): Planning, Institutional Capacity and Monitoring.**

The expected outcome is an increased capacity for various relevant entities to manage the coastal zones in and around Alexandria.

The outputs for this component include:

(i) A master plan for the management of the coastal zones of Alexandria including Lake Mariout.

(ii) Development of a water quality monitoring network for Lake Mariout.
Strategy for developing ACZM Plan

**Activities**

**TASK 1: LEGAL AND REGULATORY STUDY**

- Legal and reg. study

**TASK 2: KNOWLEDGE OF ACZ CHARACTERISTICS**

- Stakeholders identification
- Data compilation

**TASK 3: ALTERNATIVES, STRATEGIES AND GUIDELINES FOR ICZM**

- Meetings with stakeholders
- Local Workshops
- Study Area

**TASK 5: STAKEHOLDERS PARTICIPATION AND CB**

- SoW

**PHASE I: ISSUES IDENTIFICATION AND ASSESSMENT**

- Data compilation
- Integrated diagnosis: environmental, social, legal & institutional / Key issues
- Final Coastal Diagnosis / Agreed key issues CM
- Draft ICZM Objectives & Governance Framework
- 1st DRAFT ICZMP
## Objectives and Actions

### Methodology for Its Definition

<table>
<thead>
<tr>
<th>Strategic Objective</th>
<th>Operational Objective</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S1</strong> Enhancing Water Quality Management In Mariut Lake and Valley</td>
<td>S1 O1 Increasing the Temporal and Spatial Scope of the Water Quality Monitoring System</td>
<td>1 Extending the water quality monitoring system to Mariut Valley.</td>
</tr>
<tr>
<td></td>
<td>S1 O2 Ensuring the Adoption of Water Quality Criteria under Future Development Plans</td>
<td>2 The development and implementation of a set of indicators to monitor climate change effects on water quality.</td>
</tr>
<tr>
<td></td>
<td>S2 O1 Updating Water and Environmental Regulations</td>
<td>3 Including water quality assessment procedures into development plans and projects.</td>
</tr>
<tr>
<td></td>
<td>S2 O2 Increasing Efficiency of Water and Environmental Regulations</td>
<td>4 Establishing the communication framework for managers of water quality and urban development.</td>
</tr>
<tr>
<td></td>
<td>S2 O3 Enforcing the Application of Water and Environmental Regulations</td>
<td>5 Updating discharge emission limits.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 Establishing receiving water standards for Lake Mariut, Mariut Valley and waterways.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 Establishing water quality standards for water uses.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 Detecting and solving overlaps in water and environmental regulations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 Adjusting procedures to consider the socio-economic context under the Law drafting process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 The development of agreements for collaboration between the Legal Unit and competent stakeholders.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 The establishment of a single Legal Unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 Strengthening mechanisms for the surveillance and punishment of water quality violations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13 Strengthening mechanisms for the incentive of environmentally friendly actions.</td>
</tr>
<tr>
<td><strong>S2</strong> Improving the Water Regulatory System and Its Enforcement</td>
<td></td>
<td>14 Establishing the ICZM Steering Committee and its Technical Secretariat.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 Enhancing capacity building of the ICZM Steering Committee, its Technical Secretariat and the Technical Units on collaborative management and water and environmental quality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 Establishing the Research Advisory Group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17 The development of a Research Agenda.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18 The launch of the ICZM Monitoring Unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19 Establishing the Financial Resources Unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 Guaranteeing the provision of national ICZM funds to local ICZM processes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21 Ensuring the equitable distribution of stakeholders funding.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 Obtaining funding from international donors.</td>
</tr>
<tr>
<td><strong>S3</strong> Ensuring Sustainable ICZM</td>
<td>S3 O1 Developing the Institutional Framework for Local ICZM</td>
<td>23 Activating the Communication Unit.</td>
</tr>
<tr>
<td></td>
<td>S3 O2 Integrating Science and Management</td>
<td>24 Designing awareness campaigns regarding water and environmental quality.</td>
</tr>
<tr>
<td></td>
<td>S3 O3 Ensuring a Sustainable Funding System for Local ICZM</td>
<td>25 The development of online dissemination tools for ICZM initiatives.</td>
</tr>
<tr>
<td><strong>S4</strong> Promoting Stakeholders Participation in Water and Environment Management</td>
<td>S4 O1 Promoting Stakeholders Awareness</td>
<td>26 Establishing the Coastal Forum to discuss priority issues for coastal management.</td>
</tr>
<tr>
<td></td>
<td>S4 O2 Promoting Stakeholders Participation</td>
<td>27 Capacity building of coastal managers on collaborative management.</td>
</tr>
<tr>
<td></td>
<td>S4 O3 Increasing Collaboration on Coastal Management</td>
<td>28 Capacity building of private sectors (industries, farmers, aquaculture) on water quality management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29 The inclusion of collaborative management procedures within the regulations of key stakeholders.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 The design of an innovative tool to promote and provide shared ICZM information.</td>
</tr>
</tbody>
</table>
4. Institutional Arrangements

Description of ICZM Structures: description of the management structures and agreements required to develop ICZM in the area:

- Policy-making structures
- Executive structures
- Advisory structures

Bottom-up and Top-down Approaches
Activities – WQ Equipment Purchased
Activities – WQ Equipment Purchased

Lab – Car for Alex. RBO.

Sampling Boats was purchased to support GAFRD, and RDI
Reed Removal

Floating dredger was purchased to reduce the density of reeds in the fishing lake basin to enhance water circulation and increase DO levels
## WQ Monitoring Program

<table>
<thead>
<tr>
<th>Parameter type</th>
<th>Location</th>
<th>Frequency</th>
<th>Responsible Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Quality</strong></td>
<td>1,2,3,4,5,6,7,8,9</td>
<td>Monthly + Continuous at Elmex station only</td>
<td>Alex RBO</td>
</tr>
<tr>
<td><strong>Sediment</strong></td>
<td>1,2,3,4,5,6,7,8,9</td>
<td>Every 3 months</td>
<td>Alex RBO</td>
</tr>
<tr>
<td><strong>Reed</strong></td>
<td>Temporary storage site</td>
<td>Once after the removed reeds dry out</td>
<td>Alex RBO</td>
</tr>
<tr>
<td><strong>Biota</strong></td>
<td>6</td>
<td>Half Annual</td>
<td>GAFRD</td>
</tr>
</tbody>
</table>
Delft 3D Water Quality Model for Lake Mariout
Component (2): Pollution Reduction Measures

The expected outcome is a reduction in the land based source of pollution entering the Lake Mariout and subsequently the Mediterranean Sea.

The output of this component is the completion of small scale innovative pollution reduction measures such as in-stream treatment (bio-films and aeration) among others.
Feasibility Analysis – Studied Options

- Biofilm
- In lake Wetland
- In Stream Wetland
- Aeration
Allocated Areas

- **No 1**: 2.9 HA, 6.9 Feddan (biofilm area)
- **No 2**: 2.5 HA, 6.0 Feddan (biofilm area)
- **No 3**: 7.3 HA, 17.4 Feddan (Wetland area)

Image © 2013 Digital Globe
Preferred Option:

50,000m³ Biofilm Outside PS and Wetland
Component (3): Project Management and Monitoring and Evaluation

The expected outcome is the completion of a comprehensive Monitoring and Evaluation scheme and the documentation of the project results for the purpose of up-scaling and replication.
Component (3):
Project Management and Monitoring and Evaluation (Status)

- WQ monitoring plan has been developed
- Intensive training on the monitoring program including QC/QA has been conducted for all stakeholders
- Website has been developed
- Electronic financial system has been set-up
- PMU actively participates in exhibitions
- Study tour for 10 stakeholders’ representatives has been conducted
Component (3): Project Management and Monitoring and Evaluation - Training programs (more than 135 trainees)
Alexandria Coastal Zone Management Project – Direction for the future
Water Scarcity and Pollution Issues in Egypt

Fresh water availability on the decline while pollution of the available water sources is exacerbated and the population increases further pausing the pressure

Source: Water Pollution in Egypt, ECESR, 2013c
## Cost of Environmental Degradation in Egypt

### Annual cost of environmental degradation (Mean estimate as % of GDP)

<table>
<thead>
<tr>
<th>Category</th>
<th>Million LE per year</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>6,400</td>
<td>2.1%</td>
</tr>
<tr>
<td>Soil</td>
<td>3,600</td>
<td>1.2%</td>
</tr>
<tr>
<td>Water</td>
<td>2,900</td>
<td>1.0%</td>
</tr>
<tr>
<td>Coastal Zone and Cultural Heritage</td>
<td>1,000</td>
<td>0.3%</td>
</tr>
<tr>
<td>Waste</td>
<td>600</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14,500</strong></td>
<td><strong>4.8%</strong></td>
</tr>
</tbody>
</table>

*Cost of Environmental Degradation, World Bank, 2002*
Importance of Lakes

- Lakes for Fishing
- Lakes as Tourist and Recreation as well as Urban Development
- Lakes as Social Habitats Supporting Livelihoods
- Lakes as Biodiversity Conservation Areas
- Lake as Natural Balance Preserving Reservoirs
- Lakes as Water Sources as well as Natural Resources

$$ \text{Economic Value} $$

$$ \text{Environmental Buffer} $$
However....

- Important water resources such as lakes and the Nile have become an open dump from various sources (agriculture, municipal, industrial, etc).
- As a result, negative impacts on health, land productivity, fishery, biodiversity, and tourism.
- Uncoordinated and unregulated urban development and land reclamation further encroaching the lakes.

Needs to avoid lock-in where sustainable management becomes so expensive that no one can afford.
Achievement of ACZMP

- ICZM plan developed based on, and presented to, stakeholder consultation
- Cross-sectoral platform to discuss interventions in Mariout Valley
- Increased knowledge on 2D and 3D Lake modeling which encourages informed decision based on scientific evidence and potential impacts
- Pilot investment in low-cost pollution reduction technology (biofilm, engineered wetland) at West Wastewater Treatment Plant which has potential for
Scaling up potential

- ACZMP on spatial planning and scale up this experience in other northern lakes and delta. Scale up can include:
  1. institutionalization and development of lake management systems;
  2. spatial planning for development of the northern lakes and their catchments;
  3. co-management of natural resources to improve livelihood and ensure sustainable development;
  4. implementation of investments in low cost pollution mitigation measures; and
  5. pilot, plan-compliant, public (private project): partnership projects in the Lake Basin.
Thank You