Environmental Aspects of Water Management in the Egyptian Law of Environment

Prepared by:
Dr. Peter Hany Sobhy Riad
ph4318@yahoo.com
Prof. Dr. Ahmed Ali Hassan
ahmad9657@yahoo.uk

EXCEED REGIONAL WORKSHOP - ANTALYA-TURKEY
16th-20th May 2014
# Water Management Problems in Egypt

<table>
<thead>
<tr>
<th>Problem</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population growth</strong></td>
<td>Ever-increasing Population Led to Increasing Pressure on Water&amp;Land Resources</td>
</tr>
<tr>
<td><strong>Water Scarcity</strong></td>
<td>Limited Conventional Resources and Non-conventional Ones, while increasing Demand</td>
</tr>
<tr>
<td><strong>Demanding Sectors</strong></td>
<td>Increasing Sectors Demand (Irrigation, Drinking, Industry, …etc.)</td>
</tr>
<tr>
<td><strong>Pollution &amp; emission</strong></td>
<td>Ever-increasing water and environment pollutants destroy the main elements in the food-chain</td>
</tr>
<tr>
<td><strong>Food security</strong></td>
<td>Urban encroachment and rural poor need to withstand the limited food availability</td>
</tr>
<tr>
<td><strong>Cost of new resources</strong></td>
<td>Lack of available financial resources required for new resources investments.</td>
</tr>
</tbody>
</table>
Water resources in Egypt in 2010 (in Billion m³/year)

- Nile: 55.5
- Crop pattern & Irrigation Improvement: 7
- Sewage Water: 2.5
- Drainage Water Reuse in Lower Egypt: 4.9
- Ground Water in Delta and Nile Vally: 4.8
- Rainfall: 1.00
- Ground Water in Deserts and Sinal: 0.57
Renewable water supply in Egypt in 2000 (FAO, Aquastat 2004)

<table>
<thead>
<tr>
<th>Source</th>
<th>Quantity (km$^3$/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface water</td>
<td>55.5</td>
</tr>
<tr>
<td>Renewable ground water</td>
<td>3.0</td>
</tr>
<tr>
<td>Agricultural drainage water</td>
<td>4.0</td>
</tr>
<tr>
<td>Reused treated wastewater</td>
<td>0.2</td>
</tr>
<tr>
<td>Desalination of sea water</td>
<td>0.025</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62.53</strong></td>
</tr>
</tbody>
</table>
### Water demand in Egypt in 2000 (FAO, Aquastat 2004)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Water consumption (km³/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>53.85</td>
</tr>
<tr>
<td>Industry</td>
<td>9.57</td>
</tr>
<tr>
<td>Domestic</td>
<td>5.23</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>68.65</strong></td>
</tr>
</tbody>
</table>

Available renewable resources 62.53 km³ -> Consumption already exceeding long-term available renewable resources
All Egyptians have access to tapped water.
Sources of water pollution in Egypt

- AGRICULTURE
- INDUSTRIES
- ELECTRIC PLANTS
- MUNICIPAL USES
- NAVIGATION
- FISH FARMING
- MINING
- ANIMAL FARMS
Factors affect water quality in Egypt

- High Aswan Dam caused reduction of the sediment downstream.
- Agricultural activities using chemicals, toxic materials.
- Agricultural use and reuse of water in the Nile Valley and Delta, salt concentrations increase downstream.
- Discharge of untreated domestic and industrial wastewater to surface water and in the northern lakes.
- Increase population in the Nile Delta and Valley, pollution load increase.
- Water quality health problems.
Water pollution in Egypt

- **Sewage water** from slums and many other areas in Cairo is discharged into the river untreated due to lack of water treatment plants.

- **Agricultural runoffs** frequently contain pollutants from pesticides and herbicides, which have negative effects on the river and the people using it.

- **Industrial effluents** are often highly toxic, containing heavy metals that can combine with the suspended solids in domestic wastewater to form muck.
Sanitation coverage percentage in Egypt

Cities (217)

- 100% By the end of the ongoing projects
- 56% in 2012

Villages (4617)

- 11% By the end of the ongoing projects
- 40% in 2012
- 100% in 2022
Water Quality Monitoring

• The water quality of the Nile is affected by agricultural drainage water, and industrial and municipal wastewater from all towns and villages of Upper Egypt and Delta that return to the Nile.

• Most water quality parameters are available to evaluate the water quality in all monitoring points in the Nile system, GW wells, canals and drains.
Food Security in Egypt

Urban Encroachment of agriculture soil
Water legislation in Egypt

• As water becomes scarcer relative to demand; as externalities increase, and as knowledge improves, the need to control the deterioration of water quality has been converted to more detailed and demanding legislation.

• Permissions, preventions, and fines are used to control the deterioration of water and related natural resources and environment.
Egyptian Environmental Affairs Agency (EEAA)

• The Egyptian Environmental Affairs Agency (EEAA) was established in 1982, the environmental policies in Egypt have been formulated and implemented in various ministries, including Ministry of Health and Population (MoHP), Ministry of Agriculture and Land Reclamation (MALR), and Ministry of Water Resources and Irrigation (MWRI), in their perspective areas.

• Law 4 of 1994 (the Protection of the Environment) reorganized EEAA and gave the agency the responsibility of such tasks as coordination among relevant legislative bodies and draft and implement comprehensive environmental policy, was established.
The key features of law 4/1994

• It re-established EEAA under the Cabinet of Ministers as the highest national authority in charge of environment.
• It requires all new projects and activities to submit an Environmental Impact Assessment (EIA), and gave EEAA the final responsibility of approving them.
• It gave EEAA the power to inspect and enforce the law.
• It established an environmental fund and mandated EEAA for the protection of the Environment.
• It addressed gaps in the previous laws concerning air pollution, noise, industrial and municipal discharges to the marine environment, hazardous wastes and sanitary landfilling.
• It increased significantly the fines and penalties for violations.
Other laws and regulations complementing with law 4/1994

<table>
<thead>
<tr>
<th>Water pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Law 93/1962: details responsibilities and authorities of General Organizations for Sanitary Drainage in licensing and limitations of discharges to public sewers (Ministry of Housing and Public Utilities, local authorities)</td>
</tr>
<tr>
<td>• Law 38/1967: General cleanliness and sanitation (Local Authorities)</td>
</tr>
<tr>
<td>• Law 27/1978: Regulates public water resources for drinking and domestic use (Ministry of Health and Population)</td>
</tr>
<tr>
<td>• Law 57/1978: Sets measures for treating ponds and marshes (Ministry of Housing and Public Utilities, Ministry of Local Development)</td>
</tr>
<tr>
<td>• Law 48/1982: Regulates the discharge of wastewater into the River Nile and other waterways (Ministry of Health and Population, Ministry of Water Resources and Irrigation). The standards of the law specifies water quality of fresh water bodies receiving industrial effluents, limitations of treated industrial effluents discharged to fresh water, quality of drainage water mixed with fresh water bodies, and quality of sewage and industrial effluent discharge to drains and brackish water bodies</td>
</tr>
<tr>
<td>• Law 12/1984: Regulates irrigation, water distribution, groundwater management in the Nile Valley and Delta, and the establishment and maintenance of drainage canals (Ministry of Water Resources and Irrigation)</td>
</tr>
<tr>
<td>• Law 231/1984: Amends articles in Law 213/1984 (Ministry of Water Resources and Irrigation)</td>
</tr>
<tr>
<td>• Law 874/1996: Prohibits the use, import, handling and preparation of potential carcinogenic pesticides (Ministry of Agriculture and Land Reclamation)</td>
</tr>
<tr>
<td>• MD 44/2000: Regulates the discharge of wastewater into public sewers (Ministry of Housing and Public Utilities, The Local Authorities)</td>
</tr>
</tbody>
</table>
Sea Water protection
- Law 280/1960: Regulates activities within the ports and the regional waters (Ministry of Defense)
- Law 79/1961: Determines measures to be taken in case of marine disasters (The Port and Lighthouse Administration, Ministry of Defense)
- PD 1948/1965: Establishes a permanent committee for protecting the sea from oil pollution (Located on the Ministry of Defense)
- PD 45/1983: Signs the Protocol for the protection the Mediterranean from land based pollution sources (EEAA, Port Authorities)
- Ministry of Transport Decree 5/1991: Prohibits disposal of waste in the regional water, the Egyptian ports and waterways (All Port Authorities)

Solid Waste Management
- Law 38/1967 and its amendment 31/1976 regulates collection and disposal of solid wastes. No specific rules were delineated for handling hospital and other hazardous wastes (Ministry of Local Development and its departments, Department of Civil Defence)
- MD 134/1968: Implements Law 38/1967, and provides the specifications for dumping sites (Ministry of Local Development)
- PD 284/1983: Establishes the Cairo and Giza Beautification and Cleaning Authorities. Their mandates include the collection and disposal of garbage and solid waste (Ministry of Housing and Public Utilities)

Hazardous Waste Management
- Law 48/1967: Requires employers to inform their employees that they are dealing with hazardous waste (Ministry of Manpower)
- Law 137/1981 Requirements for labour safety and health in workplaces (Ministry of Manpower)
• Application of Environmental Water Quality Standards and Effluent Standards in Egypt
Institutional Problems in Egypt

• At least 25 agencies, in thirteen ministries, have legal responsibilities in water quality, mostly limited to monitoring.
• Sampling and analysis are different from ministry to ministry, resulting in conflict in information.
• Lack of coordination and integration
• Not enough technical, institutional and legal capacity
• Lack of data and information sharing
• Limited budget and financial resources
• Weak legal settings for IWRM implementation
• Conflict of interest and work plans
• Lack of law enforcement and instruments
Institutional Framework for Environmental Management

Management of Water Quality in Northern Lake with reference to Environmental laws

- The northern delta lakes have been converted into drainage basins for all types of wastes.
- The Egyptian Environmental laws could not protect the lakes!!
Example: Lake Maryout

• Lake Maryout is a shallow water body lies at Latitude 31° 07' N and Longitude 29° 57' E along the Mediterranean coast of Egypt.

• Lake Maryout is the only lake of northern lakes without a natural connection to the Mediterranean Sea.

• The average depth of the lake is ranges between 1 to 3m and length is about 25 km with maximum width of 10 km
The Current Configuration of Lake Maryout

6000 feddan
poorest environmental condition of the four basins

3000 feddan
triangular lagoon
located west of Ummum drain
It provides cooling water to Amereya Petroleum Refinery Company and receives their treated industrial wastewater effluent.

5000 feddan - triangular basin
south of the desert highway
bounded on two sides by Nubaria Canal and Ummum drain.

(Fisheries) 1000 feddan
smaller in size and receives no discharges.

17,000 feddan
artificially divided into 4 basins
### WQ parameters of Main Basin compared with Law 48 Specifications

<table>
<thead>
<tr>
<th>WQ parameters</th>
<th>Main Basin (mg/l)</th>
<th>Law (48/1982) specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH4</td>
<td>17.1</td>
<td>NH4 ≤ 0.5 mg/l</td>
</tr>
<tr>
<td>DO</td>
<td>1.3</td>
<td>DO ≥ 5 (mg/l)</td>
</tr>
<tr>
<td>P</td>
<td>5.88</td>
<td>P ≤ 1 (mg/l)</td>
</tr>
<tr>
<td>BOD</td>
<td>22</td>
<td>BOD ≤ 6 (mg/l)</td>
</tr>
<tr>
<td>NO3</td>
<td>55.6</td>
<td>NO3 ≤ 45 mg/l</td>
</tr>
</tbody>
</table>

*Distribution of DO (mg/l)*
Conclusions

• Water issue in Egypt is rapidly assuming alarming proportion. By the year 2020, Egypt will be consuming 20 percent more water than it has.
• With its dependence on the Nile, water scarcity could endanger the country’s stability and regional dominance.
Recommendations

• Environmental laws enforcement.
• Integrated ministries and environment agencies.
• Implementing water conservation techniques and control water pollution, develop plans that would install more efficient irrigation techniques, and control water pollution in order to avoid a disaster.
• Raising the public awareness.
• Discussing the environmental laws and how to empower them to equip with water scarcity and water management problems by EXCEED partners in a separate workshop.
Thank you for the Attention

شكرًا لحسن إستماعكم